

<b>WinFrog Device Group:</b>	<b>Output</b>
<b>Device Name/Model:</b>	<b>Simrad SDP600</b>
<b>Device Manufacturer:</b>	<p><b>KONGSBERG SIMRAD AS</b>  DYRMYRGATA 35, P.O. BOX 483  3601 KONGSBERG NORWAY  Phone: 47 32 28 50 00; Fax: 47 32 73 59 87  E-mail: <a href="mailto:WebOffice@kongsberg.simrad.com">WebOffice@kongsberg.simrad.com</a>  <a href="http://www.kongsberg-simrad.com/">http://www.kongsberg-simrad.com/</a></p> <p><b>KONGSBERG SIMRAD INC.</b>  7250 LANGTRY STREET  HOUSTON TX 77040-6625, U.S.A.  Phone: 1 713 934 8885; Fax: 1 713 934 8886</p>
<b>Device Data String(s) Output to WinFrog:</b>	<p>\$PRRMP String read from SDP600.</p> <p>Driver disables the \$PRPMP message output from WinFrog, when a '9' is received from the DP.</p> <p>Reads Tension (tons) from COUNT and PLOWDATA data items (up to two devices). The PLOWDATA tension is converted to tons from kN. Raw Tension data is stored in originating device.</p>
<b>WinFrog Data String(s) Output to Device:</b>	NMEA strings: \$GPGGA, \$GPAPG, \$GPVTG, \$GPVBR, \$PRPMP
<b>WinFrog .raw Data Record Type(s):</b>	Type: 450

**DEVICE DESCRIPTION:**

Kongsberg Simrad Dynamic Positioning (SDP) control systems integrate control of the vessel's propulsion systems via inputs from positioning systems, gyrocompasses, wind speed and direction monitoring equipment, and any other sensors which can assist with the automatic positioning of the vessel.

The Simrad SDP600 driver differs from the other Simrad drivers (and other DP output drivers) as it 'takes control' of the Vessel. This driver was written for Pirelli Jacobson Incorporated, and more specifically, for the DP Cable Lay Barge PT46.

WinFrog and the SDP600 systems were interfaced to provide the Pirelli LayBarge with Dynamic Positioning for both static and dynamic operations. The WinFrog system sends reference and command Telegrams to the SDP600. The SDP600 sends status and verification to the WinFrog system.

Presently, the WinFrog interface on the PT46 provides the SDP600 with all required reference telegrams with exception of Heading (HDT) information. This is acquired through a separate serial port connected directly to the Barge's Gyrocompass.

**Modes of Operation:**

The SDP600 normally has four modes of operation: Manual Joystick and Autohead, which require no reference telegrams from WinFrog, and Autoposition and Autotrack which require reference telegrams from WinFrog (or another positioning system) to operate properly. WinFrog adds a fifth mode of operation. This mode incorporates the Reference Telegrams, and the Command Telegram (\$PRPMP) to add further functionality to the Autoposition mode.

Manual Joystick mode (0 in the DP System) will accept manual commands utilizing all four thrusters in a ganged fashion with no requirement of reference telegrams. Autohead mode (1) utilizes thrusters similarly, however will also maintain a heading. Autohead mode uses the Heading Telegram (\$GPHDT) received from the Gyro as its primary reference. Autoposition mode (4) will not accept manual commands and operates strictly from reference telegrams. The reference telegrams required are both Heading (\$GPHDT) and Position (\$GPGGA).

WinFrog adds further functionality to Autoposition with the use of the Position Move Pelagos (\$PRPMP) telegram for position moves based on destination Waypoints and Survey Lines. Fast and Slow Autotrack mode (8) will accept manual speed settings with the joystick but require Crosstrack Error (\$GPAPB) and Speed (\$GPVTG) reference telegrams. WinFrog can switch to, and control Autotrack mode's speed remotely with Wanted Speed (\$GPVBR) and Position Move Pelagos (\$PRPMP) telegrams.

The SDP600 sends Verification and Status (\$PRRMP) telegram to the WinFrog system for monitoring.

**DEVICE CONFIGURATION INSTRUCTIONS (WinFrog Suggested):**

Baud Rate: 9600

Data Bits: 8

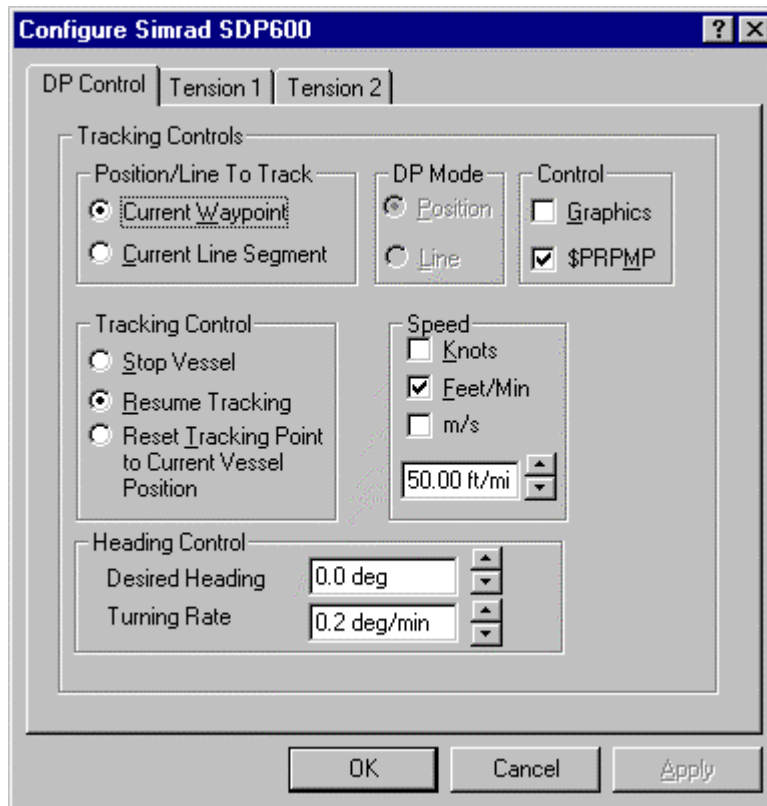
Stop Bits: 1

Parity: None

Full Duplex (talk and listen at the same time) configuration via a standard COMM port, in a serial RS232 format. Communication is standard NMEA ASCII telegrams.

## WINFROG I/O DEVICES > CONFIG OPTIONS:

The SIMRAD SDP600 device is added to WinFrog from the OUTPUT device types. The DP OUTPUT data item is added along with the SIMRAD SDP600 device. The following dialog box appears for configuring output data via the *Configure > I/O Devices > Configuration* command. This dialog box can also be accessed if you highlight the SIMRAD SDP600 device, right-click in the I/O Devices Window, and choose *Configure Device*. This is the method to use for issuing commands to the SDP600.



The Configure Simrad SDP600 dialog box has three tabs: DP Control, Tension 1, and Tension 2. Commands are initiated in this box when the Surveyor clicks the 'OK' button; no commands are launched when the Cancel button is clicked. The following items are configurable under the **DP Control** tab of the Configure Simrad SDP600 dialog box:

### DP Control/Tracking Controls:

This section consists of the Vessel movement commands.

### Position/Line to Track:

Here you can toggle between **Waypoint tracking** and **Survey Line Tracking**. The Waypoint Tracking function has proven to be the standard mode as the Barge direction movement can be controlled more accurately. When the **Current Line Segment** is tracked, the vessel will move towards the closest point on the Line, which is not always the best method.

### **DP Mode:**

This is only configurable for **Survey Line Tracking**. In **Waypoint Tracking** only the position (**Autoposition**) is available. In Survey Line tracking both Position (**Autoposition**) and Line (**Autotrack**) are available for use.

### **Control:**

The Surveyor can toggle on/off the control (**\$PRPMP**) telegram and/or the **Tracking Point Graphics**. The important issue with this control is that when the \$PRPMP is not checked, the SDP600 operates normally without WinFrog intervention. When the \$PRPMP is checked, the Control PMP telegram will override any local commands set at the SDP600 console (for Autoposition and Autotracking). In short, the Surveyor 'takes control' of the SDP600 by checking the \$PRPMP box and exiting the dialog box.

The Simrad SDP600 internal software provides a new mode reference number (9) that is issued when the functioning mode of the SDP600 is changed or reinitialized. This Reference mode number will be seen in the first field of the \$PRRMP status telegram from the SDP600. When this mode is sensed by WinFrog it will act as an override disabling the \$PRPMP telegram and WinFrog's remote control. That is to say, the DP Operator can override WinFrog's control by sending the '9' in the \$PRRMP data string.

By selecting the **Graphics** checkbox, a SIMRAD SDP600 graphics item will move toward the intended Waypoint (or Line). This Graphics item is also called the Tracking Point Reference or 'Rabbit' and is the location the vessel tries to reach. The 'Rabbit' allows you to visualize where the vessel is going, as well as when the intended Waypoint should be moved (ahead). This is very important, as the Surveyor must move the intended point before the Barge reaches its destination, and the 'Rabbit' should not get too far ahead of the vessels' tracking point. The Graphics item should always be checked when moving the Vessel.

### **Tracking Control:**

This applies to **Autoposition Mode** only, with the exception of the **Stop Vessel** radio button. The Stop Vessel radio button issues a zero speed in Line (Autotrack) Mode. The Stop Vessel resets the **Tracking Point** reference position to the vessels current position, zeros the Wanted Speed, and captures the current Heading. In this mode the Reference Position for the DP will not change until you intervene with a Resume Tracking or Reset Tracking Point. The Stop Vessel setting is intended to stop the vessel and remain there. This is the important difference between Stop Vessel as opposed to Resume Tracking when set to a zero speed.

The **Resume Tracking** is the normal mode for operating the SDP600, whether tracking down a line, or to a waypoint. This mode incorporates an algorithm that will not let the **Tracking Point** stray further than 20m. This is to prevent the DP from surging, and includes when and if the Vessel is falling off position.

The Tracking Point will follow the fall off at less than 20m preventing the SDP600 from moving into its higher power setting. If a problem should occur, the **Stop Vessel** will allow the SDP600 to utilize full thrusts. In normal operations, zeroing the speed in the **Resume Tracking** is more than acceptable.

The **Reset Tracking Point to Current Vessel Position** does exactly what is listed. This is particularly useful when first applying, or reapplying, DP control, as well as when the Surveyor wants to capture the current position to slow progress. This mode will reset only the Tracking Point reference to the current position when the dialog box is exited. The Tracking Control will then return to either the Stop Vessel or Resume Tracking Mode, depending on the setting prior to exiting the dialog box.

### **Speed:**

Speed commands can be issued in three units of measure, **Knots** (to the hundredth of a knot), **Feet/Min** (to the tenth of a foot), and **Meters/Second** (to the tenth of a meter). The actual command sent to the SDP600 is in Knots or nautical miles per hour. This means that any of the other measures will only be accurate to the converted value.

The Speed commands, when issued during line tracking in the Autotrack (slow or fast) Mode, are compared to the reference Speed and Course from the SDP600. The thrust output will increase or decrease accordingly to maintain speed. It's important to note that this is a 'coast down' speed control with no actual 'braking' thrust being applied. This means that in a pushing current of a greater speed than the issued Wanted Speed, the barge will not try to slow itself. The issued speed commands in Autoposition are not actual speed commands but measures of force. When a wanted speed of 0.5 knots is applied, the reference Tracking Point moves away at .5kts and a force in the direction of the Tracking Point reference position's offset is applied. The method the SDP600 uses for applying this speed is similar to its method of countering external forces of wind and current. This means that the speed command is not distinguishable from a 0.5-knot current, from the direction of the Tracking Point offset.

The Tracking Point moves away from the Barge at a desired speed. There is no speed control that verifies the SDP600 is moving the Barge at the desired speed. Therefore given that there might actually be a current or wind from that direction, or an opposing tow force from the opposite direction, the desired speed must be monitored and adjusted to perform as DP Operator and Surveyor desire.

### **Heading Control:**

Heading changes in the **Autoposition Mode** are issued here. The **Desired Heading** and **Turning Rate** can be input to the tenth of a degree.

When the Configuration dialog is opened the current heading is captured so changes will be minimal if the dialog is exited in error. It is important that commands in heading are scrutinized for accuracy. The heading commands can have the direst consequences if entered incorrectly.

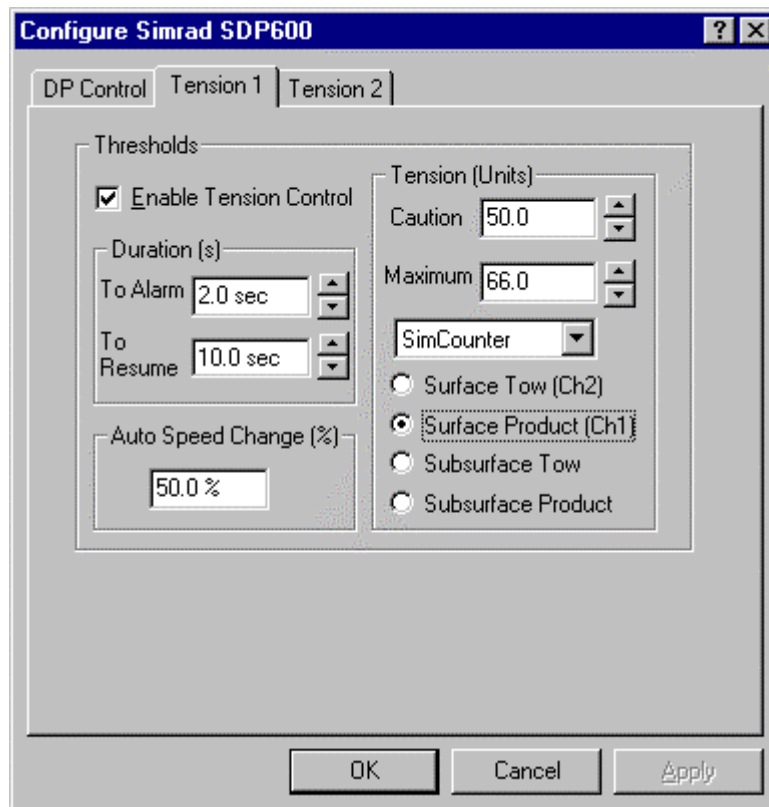
The Turning Rate is normally set to 0.0 deg./min. for all heading changes. Increases in this rate are generally used as to amplify the turning rate, when circumstances warrant the need.

As stated above, when the 'OK' button is clicked, commands present will be issued to the SDP600. The box can also be cancelled out of with no commands issued to the SDP600.

Refer to the Configuration Details section for further and more complete operational procedures when using this driver to track Waypoints and Survey Lines.

### Tension 1/Tension 2:

The Simrad SDP600 driver is capable of monitoring tension inputs from two sources, **Tension 1** and **Tension 2**. These values are compared with the Thresholds entered under the **Tension Tabs** as shown in the dialog box below. The idea behind this is that the SDP600 will reduce the thruster power if tensions go beyond the **Caution** and **Maximum Tension** units. The actual power reduction and the values that the power is reduced should be tested prior to operations.

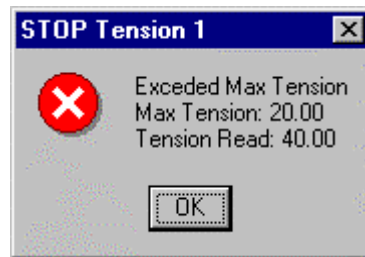


### Enable Tension Control:

By selecting this checkbox the Surveyor is allowing control of the thrusters to be governed by the **Tension (Units)** input.

### Duration(s):

The **Duration To Alarm** is the amount of time before the alarm will sound and either of the windows below will appear. The alarms are based on the Tension (Units).



### Auto Speed Change:

When the **Caution Tension** is reached the speed input under DP Control will drop by 50%. When the **Maximum Tension** is reached the speed will go to zero and the **Tracking Control** (under DP Control) will automatically go to **Stop Vessel**.

### Tension Units:

The **Caution** and **Maximum Tension** tolerances are input here and displayed under Decoded Data in the I/O Devices Window.

The device supplying the tension is input from the dropdown list, and the type of tension is chosen from the radio buttons. Note that Channel 1 is designated as the product being laid, and Channel 2 is the tow wire. Subsurface Tow and Product are supplied by the PLOWDATA data type.

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

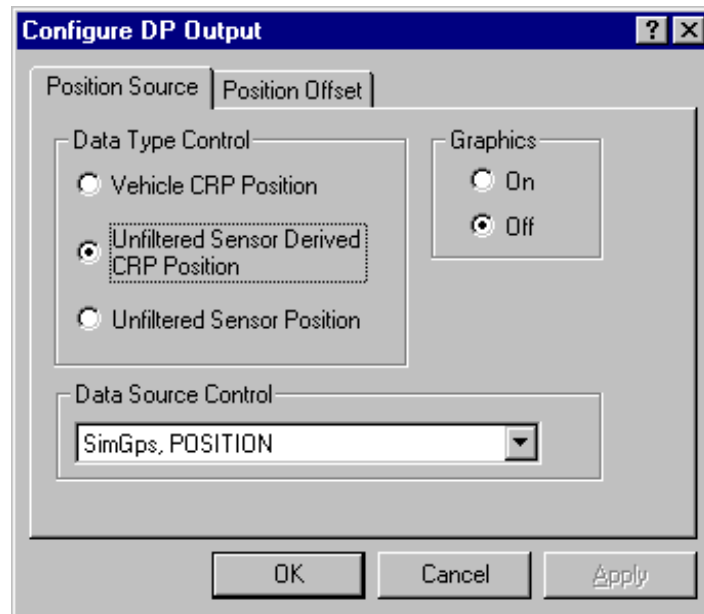
The **OUTPUT, SIMRAD SDP600, DP OUTPUT** is added to the vehicle in which WinFrog is sending commands to the DP System.

If the SDP600 Configuration is set to track the **Current Waypoint** (in the Configure Simrad SDP600 dialog box, under Tracking Controls > Position/Line to Track), then the vehicle must be tracking a Waypoint. If it is not, the Vehicle can't be moved by the WinFrog commands as it has nowhere to move towards. The same goes for tracking the **Current Line**. No warning dialog appears if a Line or Waypoint is not enabled, the vessel just won't move.

Almost all of the operation of this device is within the I/O Devices Window.

When the SIMRAD SDP600, DP OUTPUT data item is edited from the Configure Vehicle Devices dialog box, the **Configure DP Output** dialog box appears. The

**Position Source** and the **Position Offset** tabs must be configured. These items configure the vehicle position output. Refer to the type 450 record under Configuration Details for the output position.



**Position Source:**

Three items need to be configured on this tab: **Data Type Control**, **Graphics**, and **Data Source Control**.

**Data Type Control:**

In **Data Type Control**, there are three options to choose from: **Vehicle CRP Position**, **Unfiltered Sensor Derived CRP Position**, and **Unfiltered Sensor Position**.

Choose the **Vehicle CRP Position** for filtered position updates referenced to the vehicles' Central Reference Point (CRP). The offset input under the **Position Offset tab** is added to the CRP position.

The **Unfiltered Sensor Derived CRP Position** is the same as the above only unfiltered data is output. With this option, filtering can be performed within the DP unit.

The **Unfiltered Sensor Position** outputs unfiltered positions from the positioning sensors' location. The offset input under the **Position Offset tab** is added to the sensors raw position.

**Data Source Control:**

The data source depends on the **Data Type Control** that was selected. If the **Vehicle CRP Position** is chosen, the **Data Source Control** will automatically be set to **VEHICLE, CRP POSITION**, and the primary positioning sensor data will be



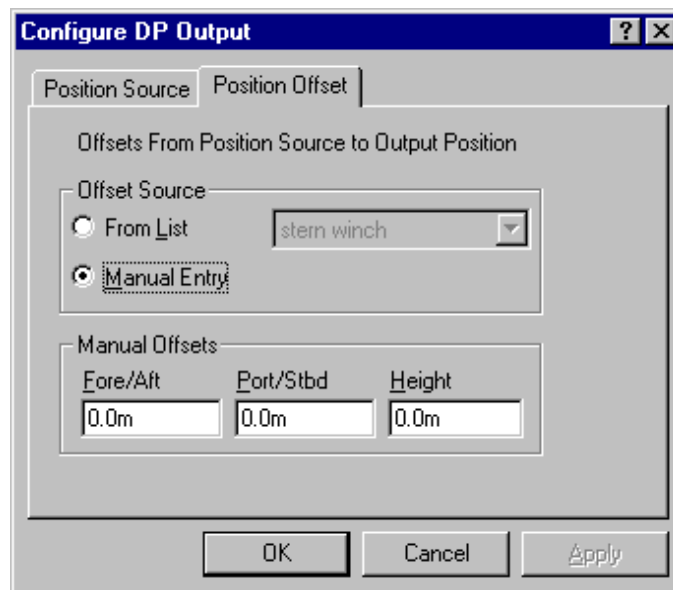
used. If either the **Unfiltered Sensor Derived CRP Position** or the **Unfiltered Sensor Position** is chosen in the **Data Type Control**, then the positioning sensor can be chosen from the dropdown list under **Data Source Control**. Here a secondary positioning sensor can be chosen. It is important to note that the **Unfiltered Sensor Derived CRP Position** is based on the chosen sensor, however the data is related to the **CRP**. Note that the SimGps, POSITION is used in this dialog as an example only.

### Graphics:

If the **Graphics** item is turned on in the **Configure Simrad SDP600** dialog box, under **DP Control**, then the Graphics should not be turned on here. It is advisable to configure the Graphics in this manner, as this will display the device name and a square at the location of the **SIMRAD SDP600 position output**. If the Graphics 'square' is not configured in this manner, then the SIMRAD SDP600 position output 'square' may blink between two locations on the screen. The true location of the 'Rabbit', therefore, will not be known.

### Position Offset:

The **Offsets From Position Source to Output Position** can be configured on the Position Offset tab. This means that any offset input here will be applied to the position output from the **Position Source** tab options listed above.



### Offset Source:

The Offset Source can be chosen from the list of offsets for the vehicle, or the Manual Entry can be used.

### Manual Offsets:

If Manual Entry is chosen under the Offset Source, the offsets must be input here. Offsets are input similar to all offsets in WinFrog.

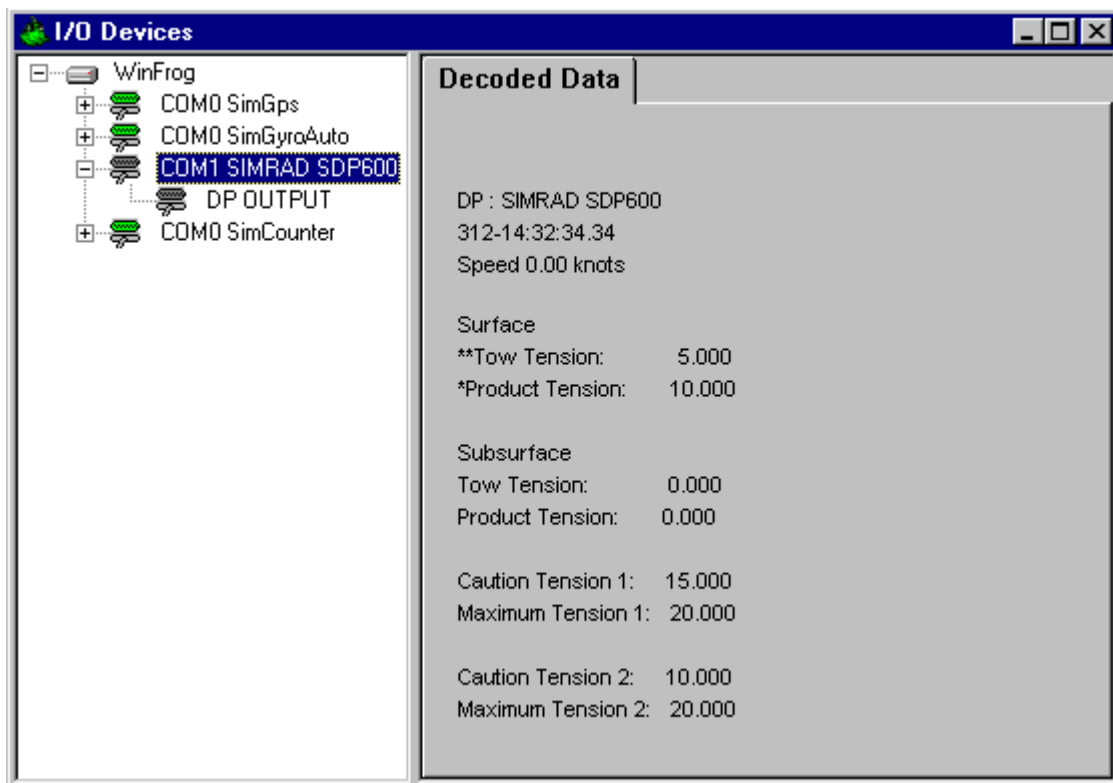
### CONFIGURATION DETAILS:

WinFrog is currently interfaced to the SDP600 DP system installed on Pirelli Jacobson's PT46 Barge. Should the requirement arise to interface WinFrog to another SDP600 system, whereby WinFrog controls the Vessels' movements, then this should only be performed under the supervision of qualified personnel. After interfacing, extensive tests should be performed to check on the reactions of the vessel, when commands are initiated in WinFrog.

If this document is being used for information on the system installed on the PT46, then the Surveyor should test and confirm all functions listed in this document. It would also be advisable to have a person experienced with the operations onboard the PT46 as a trainer, prior to operation of this driver.

### I/O Device Window:

In Versions of WinFrog previous to V.3.1, the I/O Device Window displays the data strings input to, and output from, WinFrog. After V.3.1, the I/O Device Window displays the Tension Information as shown below.



Note that the SimGps, SimGyro, and SimCounter devices are added only to demonstrate the operation of this driver.

## Data Output Strings:

### \$GPGGA - Global Positioning System Fix Data:

\$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,Mx.x,xxxx\*hh<CR><LF>

\$--GGA,123519,4807.038,N,01131.324,E,1,08,0.9,545.4,M,46.9,M, , \*42

Where:

123519	Fix taken at 12:35:19 UTC
4807.038,N	Latitude 48Deg. 07.038 min N
01131.324,E	Longitude 11Deg 31.324 min E
1	Fix quality: 0 = invalid 3=GPS PPS Mode,fix valid 1 = GPS fix 99= Simulator Mode 2 = DGPS fix 10= Simulator Mode Edit
08	Number of satellites being tracked
0.9	Horizontal dilution of position
545.4,M	Altitude, Metres, above mean sea level
46.9,M	Height of geoid (mean sea level) above WGS84 ellipsoid
(Empty field)	time in seconds since last DGPS update
(Empty field)	DGPS station ID number

### \$GPVTG - Track made good and ground speed

\$GPVTG,054.7,T,034.4,M,005.5,N,010.2,K\*hh<CR><LF>

Where:

054.7,T	True track made good
034.4,M	Magnetic track made good
005.5,N	Ground speed, knots
010.2,K	Ground speed, Kilometers per hour

### \$GPAPB – Autopilot Sentence “B”

\$GPAPB,A,A,x.x,a,N,A,A,y.y,b,c—c,z.z,d,v.v,e\*hh<CR><LF>

Where:

A	A=Data Valid, V=General warning flag when a reliable fix is not available,
A	A=Data Valid or not used, V=Loran-C Cycle Lock warning flag (shouldn't see a V here),
x.x	Magnatude of cross track error (XTE),
a	Direction to steer, L/R,
N	XTE units (N=nautical miles, M=metres),

A	Status: A=arrival circle entered,
A	Status: A=perpendicular passed at waypoint,
y.y,b	Bearing origin to destination, M/T
c—c	Destination waypoint ID,
z.z,d	Bearing, Present position to destination, M/T,
v.v,e	Heading-to-steer to destination waypoint, M/T,

### **\$GPVBR – Intended Speed (input)**

\$GPVBR,00.35\*hh<CR><LF>

Where:

00.35 Is the intended speed in Knots (nm/h)

### **\$PRPMP – Position Move Pelagos command string being sent to SDP600**

\$PRPMP,P,068.2,00.6,01.20,178.7,4614.4580,N,06311.9656,W\*25

Where:

P	P=Tracking Waypoint or Tracking Line (Position), L=Tracking Line with DP Mode also set on Line,
068.2	Desired Heading,
00.6	Turning Rate
01.20	Speed Input in Knots
178.7	Heading to Waypoint/Line (from vessel position)
4614.4580,N	Latitude of position of 'Rabbit',
06311.9656,W	Longitude of position of 'Rabbit'.

### **\$PRRMP – Status and Verification Telegram received from the SDP600**

\$PRRMP,4,039.0,61.5,-52.6,-05.6,-00.0,000,000,000\*47

Where:

4	4=Autoposition Mode, 9=Override Mode. This mode disables the \$PRPMP telegram, 0=Manual Joystick, 1=Autohead Mode, 8=Autotrack Mode,
068.2	Heading from SDP600. Sets the Desired Heading when the Configure Simrad SDP600 box is opened.
61.5	Not used by WinFrog,
-52.6	Not used by WinFrog,

-05.6	Not used by WinFrog,
-00.0	Not used by WinFrog,
000	Not used by WinFrog,
000	Not used by WinFrog,
000	Not used by WinFrog.

**Raw Data (Type 450 record):**

When the DP OUTPUT data item is attached to a vehicle the type 450 raw record is logged to file. This record is described in the WinFrog User's Guide (Appendix B) and is as follows:

**In WinFrog:**

```
sprintf(rawStr, "450,%s,%.2f,%.8f,%.8f,%.8f,%.8f,%.3f,%.3f,%.3f,%.8f,%.8f\n",name,
fixTime,centreLat,centreLon,
waypointX,waypointY,desiredBrg,desiredSpeed,desiredRange,
currentX,currentY);
```

For this record the currentX,currentY position refers to the position of the 'Rabbit'

**Raw 450 Record:**

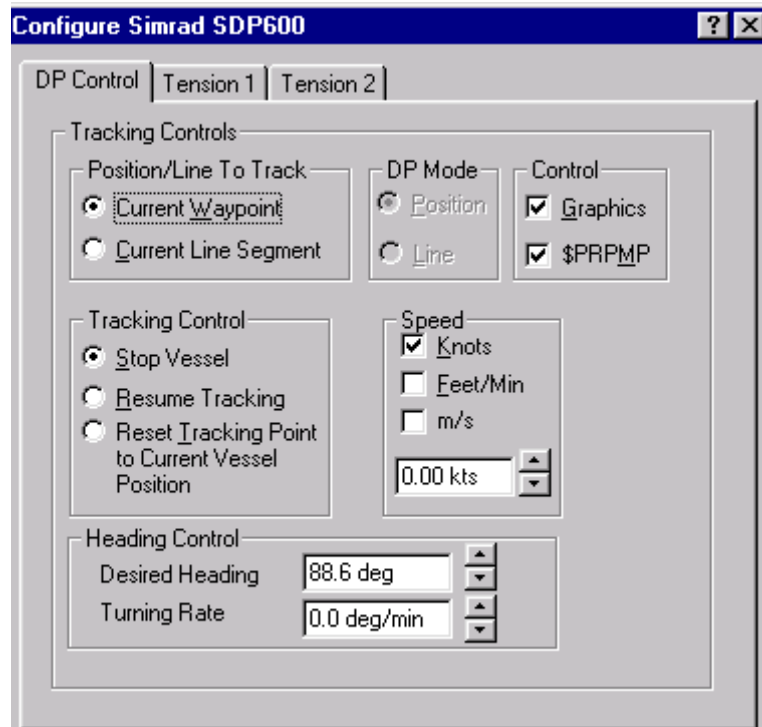
```
450 , SIMRAD SDP600 ,980437502.29 ,46.22148557 , -63.19405810 ,
484583.43330372 ,5121844.24644184 ,0.000 ,0.000 ,0.000 ,
484741.26494069 ,5120790.13542081
```

Where:

```
980437502.29 , is the time of the last position,
46.22148557 , -63.19405810 , is the latitude and longitude of the vessel position,
484583.43330372 ,5121844.24644184 , is the position (Grid) of the current or last
Waypoint Tracked under Waypoint Tracking.
484741.26494069 ,5120790.13542081 , is the position of the Rabbit.
```

## Set Up Procedures for Using Waypoints:

When setting up for waypoint tracking it is best first to have the SDP600 in a “Stand Alone” Autoposition mode. This will require the Configuration menu to first have the **\$PRPMP** checkbox unchecked. As time permits and conditions warrant, a stable DP should be achieved within 5 minutes. It is possible to go into a Waypoints Tracking “on the fly”. The WinFrog should be set up as follows (see below).



1. **Position/Line to Track:** Set to **Current Waypoint**. The Vehicle associated with the SDP600 must be tracking a Waypoint at this time for reference information. The potential exists to track the wrong waypoint and make undesired ship movements. Before initializing, time should be taken to insure that the waypoint being tracked would provide the proper reference for the desired barge movement.
2. **Control:** Does not require the **Graphics** to be on but this does act well as a visual reference, and should be on. The **\$PRPMP** needs to be checked on for any remote use. Initially with the \$PRPMP not checked and the SDP600 holding a static DP in the Autoposition mode, the Tracking Point should be **Reset to the Current Vessel Position**. This will ensure that barge movement will not occur during the transition to remote control. If the \$PRPMP is checked when the SDP600 is changed to Autoposition mode, WinFrog will see the mode change and reset the Tracking Point automatically. However, the \$PRPMP will be overridden and will need to be rechecked (to on) for remote control.
3. **Tracking Control:** This can initially be set to **Stop Vessel** and the Tracking Point and heading will automatically reset to current position and heading.

The tracking control can also be set to **Resume Tracking** at 0.0 speed if the Tracking Point is current or close enough for only minor movement. This is preferable in the case where heading commands would also like to be issued. The Stop Vessel will only set the heading to current heading and then require additional 'trips' through the Configuration menu.

4. **Speed Control:** The **Stop Vessel** mode of Tracking Control will automatically set speed to zero. The speed can only be set in the **Resume Tracking** mode.
5. **Heading Control:** This will issue commands while the barge is static or dynamic. The only exception is when initially executing the Stop Vessel command. At this point the heading will be set to current barge heading. After the initial Stop Vessel command, heading adjustments can be issued.

### **Waypoint Tracking:**

- Tracking Control is set to **Resume Tracking** for any required movement.
- Speed Control is set to the 'Wanted Speed' in the units of choice i.e. 0.5 kts.

While in **Resume Tracking Mode**, the waypoint can be changed at any time. The speed setting will remain constant and the Tracking Point reference (Rabbit) will shift directions to the new waypoint location.

This is true in all cases with the exception of actually reaching a waypoint. When the Tracking Point Reference reaches a waypoint, the 'Wanted Speed' is set to zero. In this case switching waypoints will not initiate movement until a new 'Wanted Speed' is reset. Generally waypoint tracking is very useful for making course changes and setting up to get on line for Survey Line tracking. When care is taken, the Waypoint Tracking is the preferred operational method. The limitation to waypoint tracking is that waypoint tracking requires more planning if greater distances are to be covered. The other disadvantage is that waypoint tracking is just on a true bearing with a range to target and no distinct side to side references.

### **Survey Line Tracking:**

When setting up for Survey Line tracking it is best to have the vessel already online or very close to line. This can be done initially with waypoint tracking and then transition to survey line tracking.

Some of the important things to remember about Line Tracking are that there are three total modes and the modes acquire line and react on line differently. In Autotrack 'Slow' speed and Autoposition line tracking the vessel will acquire line at the closest perpendicular intersection. What this means is that before tracking downline, the vessel will first move sideways to acquire line. Autotrack 'Fast' acts like an Autopilot and drives downline, slowly changing heading until the line is acquired. In Autoposition mode (Line with the 'Position' mode checked) you will have heading control, where as in both Autotrack modes (Line with the 'Line' mode checked) the SDP600 makes a decision on what heading or 'Crab' angle is best for staying on line. It is also important to remember that in the Autotrack mode 'Slow' and 'Fast' modes can only be set and verified at the SDP itself and cannot be

toggled remotely. Although the Autotrack mode has better speed control than the Autoposition, the Autoposition has better dynamics for Survey work just by virtue of the heading control and the ability to stop on line.

### **Line Tracking Set-up**

The set-up and controls are the same for Line Tracking as for Waypoint Tracking. The major difference is that the **Current Line Segment** rather than the **Waypoint** is selected, and either Line (Autotrack 'Slow or 'Fast') or Position (Autoposition) is chosen for a DP Mode. The remaining parts of the Configuration menu act the same. It is important to note that in the 'Line' or Autotrack mode, the only functional command is that of **Speed**.