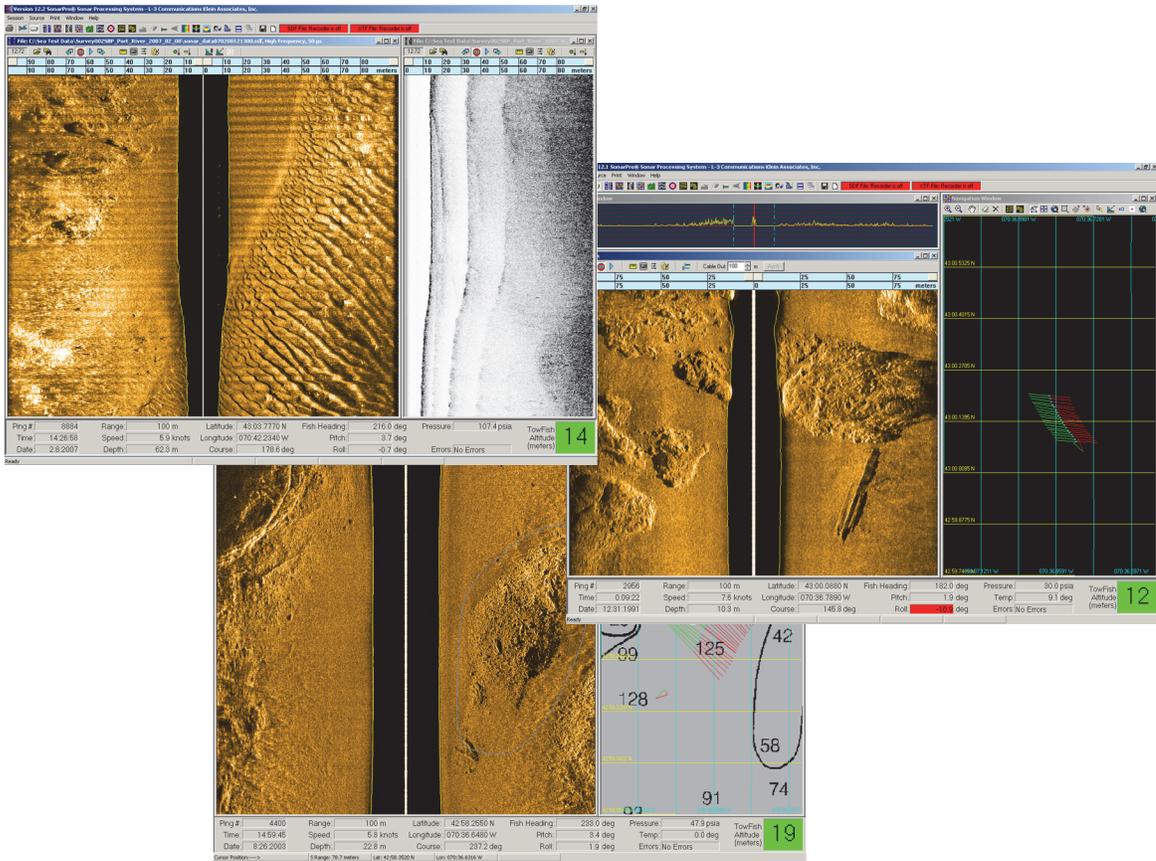# SONARPRO 14.0

User Manual

P/N 11210093 , Rev. 01

KLEIN
MARINE SYSTEMS, INC.

11 Klein Drive
Salem, NH 03079-1249
U.S.A.
Tel: (603) 893-6131
Fax: (603) 893-8807

www.KleinMarineSystems.com

This document contains proprietary information, and such information may not be disclosed to others for any purpose or used for any manufacturing purpose without expressed written permission from Klein Marine Systems, Inc. (KMS). The information provided is for informational purposes only and is subject to change without notice. KMS assumes no responsibility or liability for any errors, inaccuracies or omissions that may be present in this document.

The SonarPro software program may be used or copied only in accordance with the terms of the Software License Agreement.

SonarPro® is a registered trademark of Klein Marine Systems, Inc.

Windows® is a registered trademark of Microsoft Corporation.

vxWorks® is a registered trademark of Wind River Systems, Inc.

Table of Contents

KLEIN
MARINE SYSTEMS, INC.

KLEIN
MARINE SYSTEMS, INC.

List of Figures

KLEIN
MARINE SYSTEMS, INC.

KLEIN
MARINE SYSTEMS, INC.

KLEIN
MARINE SYSTEMS, INC.

KLEIN
MARINE SYSTEMS, INC.

Software License Agreement

This Software License Agreement is provided by Klein Marine Systems, Inc. (KMS) for end users of SonarPro© software for the KMS Series 3000, UUV-3500, 3900, 4900, 5000, 5000 V2, 5900, HydroChart 3500, HydroChart 5000, and D3500TF Sonar Systems.

YOU SHOULD CAREFULLY READ THE FOLLOWING TERMS AND CONDITIONS BEFORE USING THIS PRODUCT. IT CONTAINS SOFTWARE, THE USE OF WHICH IS LICENSED BY KMS, TO ITS CUSTOMERS FOR THEIR USE ONLY, AS SET FORTH BELOW. IF YOU DO NOT AGREE TO THE TERMS AND CONDITIONS OF THIS AGREEMENT, DO NOT USE THE SOFTWARE. USING ANY PART OF THE SOFTWARE INDICATES THAT YOU ACCEPT THESE TERMS.

LICENSE: KMS grants you a nonexclusive license to use the accompanying software programs(s) (the "Software") subject to the terms and restrictions set forth in this License Agreement. You are not permitted to lease, rent, distribute or sublicense the Software or to use the Software in a time-sharing arrangement or in any other unauthorized manner. Further, no license is granted to you in the human readable code of the Software (source code). Except as provided below, this License Agreement does not grant you any rights to patents, copyrights, trade secrets, trademarks, or any other rights in respect to the Software.

The Software is licensed to be used on any workstation or any network server owned by or leased to you, provided that the Software is used only in connection with one KMS Series 3000, UUV-3500, 3900, 4900, 5000, 5000 V2, 5900, HydroChart 3500, HydroChart 5000, or D3500TF Sonar System. You may reproduce and provide authorized copies only of the Software and supporting documentation for each such workstation or network server for this equipment on which the Software is used as permitted hereunder. Otherwise, the Software and supporting documentation may be copied only as essential for backup or archive purposes in support of your use of the Software as permitted hereunder. You must reproduce and include all copyright notices and any other proprietary rights notices appearing on the Software and the supporting documentation on any copies that you make.

NO ASSIGNMENT; NO REVERSE ENGINEERING: You may not transfer or assign the Software and/or this License Agreement to another party without the prior written consent of KMS. If such consent is given and you transfer or assign the Software and/or this License Agreement, then you must at the same time either transfer all copies of the Software as well as the supporting documentation to the same party or destroy any such materials not transferred. Except as set forth above, you may not transfer or assign the Software or your rights under this License Agreement.

Modification, reverse engineering, reverse compiling, or disassembly of the Software is expressly prohibited. You may not translate or create derivative works of the software or the supporting documentation.

BATHYMETRIC PROCESSING ATTRIBUTION: Bathymetric processing derived from DGA/GESMA publication in IEEE OCEAN'S 05 Europe Conference Proceedings: "Bathymetric Sidescan Sonar: a System Dedicated to Rapid Environment assessment, ref: 10.1109/OCEANSE.2005.1511695.

EXPORT RESTRICTIONS: You agree that you will not export or re-export the Software or accompanying documentation (or any copies thereof) or any products utilizing the Software or such documentation in violation of any applicable laws or regulations of the United States or the country in which you obtained them.

TRADE SECRETS; TITLE: You acknowledge and agree that the structure, sequence and organization of the Software are the valuable trade secrets of KMS. You agree to hold such trade secrets in confidence. You further acknowledge and agree that ownership of, and title to, the Software and all subsequent copies thereof regardless of the form or media are held by KMS.

UNITED STATES GOVERNMENT LEGEND: All technical data and Software are commercial in nature and developed solely at private expense. The Software is delivered as Commercial Computer Software as defined in DFARS 252.227-7014 (June 1995) or as a commercial item as defined in FAR 2.101(a) and as such is provided with only such rights as are provided in this License Agreement, which is KMS's standard commercial license for Software. Technical data is provided with limited rights only, as provided in DFAR 252.227-7015 (Nov. 1995) or FAR 52.227-14 (June 1987), whichever is applicable. You agree not to remove or deface any portion of any legend provided on any licensed program or documentation delivered to you under this License Agreement.

TERM AND TERMINATION: This license will terminate immediately if you fail to comply with any term or condition of this License Agreement. Upon such termination you agree to destroy the Software and documentation, together with all copies and merged portions in any form. You may terminate it at any time by destroying the Software and documentation together with all copies and merged portions in any form.

GOVERNING LAW: This License Agreement shall be governed by the laws of the State of New Hampshire, USA. You agree that the United Nations Convention on Contracts for the International Sales of Goods (1980) is hereby excluded in its entirety from application to this License Agreement.

LIMITED WARRANTY; LIMITATION OF LIABILITY: All warranties and limitations of liability applicable to the Software are as stated in the product manual accompanying the Software. Such warranties and limitations of liability are incorporated herein in their entirety by this reference.

SEVERABILITY: In the event any provision of this License Agreement is found to be invalid, illegal or unenforceable, the validity, legality and enforceability of any of the remaining provisions shall not in any way be affected or impaired and a valid, legal and enforceable provision of similar intent and economic impact shall be substituted therefore.

ENTIRE AGREEMENT: This License Agreement sets forth the entire understanding and agreement between you and KMS supersedes all prior agreements, whether written or oral, with respect to the Software, and may be amended only in a writing signed by both parties.

Customer Service

KMS technical support can be contacted using any of the following means:

Mail

Klein Marine Systems, Inc.
11 Klein Drive
Salem, NH 03079

Email

Klein.Mail@KleinMarineSystems.com

Telephone

(603) 893-6131

Facsimile

(603) 893-8807

For more information about KMS and our products, please go to our Web site at **www.KleinMarineSystems.com**.

1.0 About SonarPro 14.0

SonarPro 14.0 is a comprehensive Windows based software program that provides multiple displays of real-time or saved sonar and sensor data and towfish status. SonarPro also allows you to record all acquired sonar and sensor data.

> **NOTE** *The Series 3000, UUV-3500, 3900, 4900, 5000, 5000 V2, 5900, HydroChart 3500, and HydroChart 5000 Sonar Systems all use SonarPro 14.0.*

2.0 Installing SonarPro 14.0

To install SonarPro 14.0, insert the SonarPro Ver. 14.0 CD into your CD-ROM drive, and then double-click the setup.exe file in the SonarPro Disk1 folder. Follow the directions carefully during the installation process. Installation instructions are also provided in the SonarPro Installation.pdf file on the disk. Double-click this file to open it. After the installation is complete, and if your system is vxWorks based, verify that the Startup.ini and vxWorks files are located in the klein directory.

> **NOTE** *Multiple versions of SonarPro can reside on the same computer. Therefore, if you have an older version of SonarPro installed, you do not have to uninstall it.*

After installing SonarPro 14.0, you are asked if you want to install the Tera Term serial communications software. Tera Term enables configuration of the TPU and monitoring of sonar performance. For instructions on how to install this software, refer to "Installing the Tera Term Serial Communications Software" on page A-14.

For systems with the Swath Bathymetric Sonar (SBS), the CD will also contain bathymetric calibration files for each towfish. The files should be copied to the BathyParms directory which is in the SonarPro install directory. For example, if SonarPro 14.0 was installed at C:\program files\klein\SonarPro 14.0, then copy the files to the BathyParms directory in SonarPro 14.0.

For instructions on how to set up SonarPro on the Windows 7 operating system, refer to "SonarPro Setup for Windows 7" on page A-1; for the XP operating system, refer to "SonarPro Setup for Windows XP" on page A-19.

> **NOTE** *The SBS is optionally available on 5000 V2 and AUV 5000 V2 Sonar Systems and is standard on HydroChart 3500 and HydroChart 5000 Sonar Systems.*

KLEIN
MARINE SYSTEMS, INC.

3.0   SonarPro Quick Start

1. Open the SonarPro 14.0 folder and double-click the ▨ SonarPro.exe file. You can create a shortcut and place it on the desktop. This will start SonarPro.

2. Click ▭.

    This button will open the *TPU Connection* dialog box. Once connected to the TPU, SonarPro will open the Sonar Viewer window and be ready for real-time data acquisition.

3. Click ▷.

    This button will start the presentation of real time data. The data will start scrolling down in the Sonar Viewer window.

4. Click ▨.

    This button will open the Sub Bottom Viewer window. In this window click ▷ to start the presentation of real time chirp sub bottom profiler data if the optional chirp sub bottom profiling system is installed. The data will start scrolling down in the Sub Bottom Viewer window.

5. Click ☰.

    This button will allow you to adjust the time varied gain (TVG) on the data. For normal operation leave the **Auto TVG is On** check box selected and adjust the **Intensity** slider. For manual control clear this check box and tune the port and starboard sides manually.

6. Click ▨.

    This button allows you to change the color of the data being displayed. You have control over the hue and the saturation. There is also an **Inverse Video** check box.

7. Click ▨.

    This button will open the Navigation window where sonar coverage and target locations are plotted.

8. Click ▨.

    This button will open the Sensor window which displays the sensor data. Right-click in the Sensor window to select the sensor data to be displayed.

9. Right-click in any open window for more options.

10. Double-click on a target to open the Target window.

4.0   Main Window

The Main window, which is shown in Figure 1, opens after launching SonarPro. It includes the Title bar, the Main Tool bar and the Menu bar. The display area comprises the rest of the Main window in which all of the other SonarPro windows can be opened.
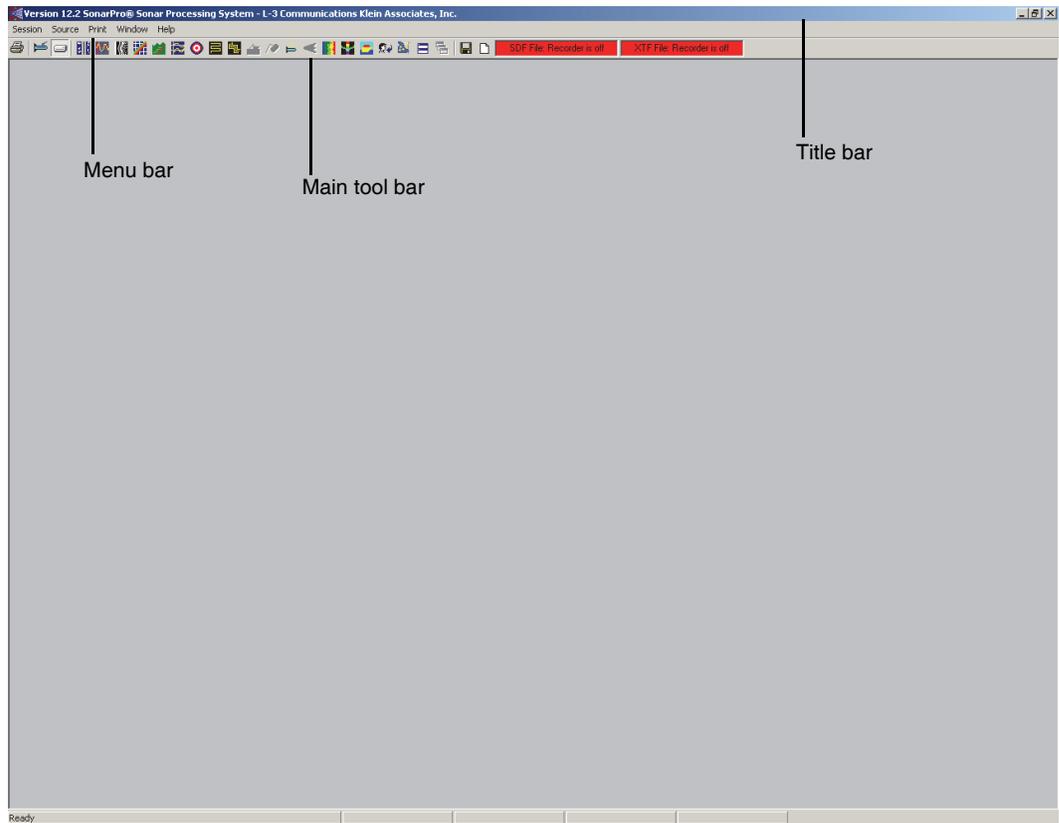
Figure 1: *The Main Window*

4.1   Title Bar

The Title bar displays the SonarPro name, logo and version number. The Title bar also provides access to some of the standard Windows features for the Main window, such as minimize, maximize, restore, and close.

4.2   Main Tool Bar

The Main Tool bar contains buttons that are used as a convenient means of opening windows and dialog boxes and choosing commands. If the pointer is held over a button for a few seconds, a cue card opens displaying the name of the button. The Main Tool bar also includes two displays. Similarly, holding the pointer over these displays a few seconds opens a cue card that displays its name.

KLEIN
MARINE SYSTEMS, INC.

4.3   Menu Bar

The Menu bar is located at the top of the Main window just below the Title bar as shown in Figure 1 on page 3. The Menu bar comprises the *Session*, *Source*, *Print*, *Window* and *Help* menus.

Session menu. The *Session* menu allows you to set up individual work spaces with individual operator preferences and to open and save cable out and depth output devices that have been set up in the *Cable Out* and *Depth Output* dialog boxes. (See "Choosing or Setting up an External Cable Out Source" on page 141 and "Towfish Depth" on page 143.) You can also exit from SonarPro from the *Session* menu. The following items are on the *Session* menu:

- Choose *New State* when you want to set SonarPro to its default settings.

- Choose *Open State File* to open a previously saved session. A search box will open. Look for yourfile.ini. This will read the session file and restore SonarPro to the state it was in when the session file was created. If you want to have SonarPro in a state with resized window sizes, you must click on and under the *General* tab to set the window sizes to manual.

- Choose *Save State, to Registry* to save the current session state to the Windows registry. The next time SonarPro is started, it will open in this state.

- Choose *Save State, to File* to save a separate work space session. For example, each operator may prefer to have the windows in SonarPro sized differently. This can be saved in a yourfile.ini file.

- Choose *Open Devices File* to open a previously saved cable out or depth output device file.

- Choose *Save Devices, to File* to save the current cable out or depth output device settings to a file.

- Choose *Exit* to exit from SonarPro. You can also exit from SonarPro by clicking the X button in the Main window. When SonarPro is closed down this way, the current session is saved. The next time you start SonarPro, it will be set up the way you exited.

Source menu. The *Source* menu allows you to select the source of the sonar data, either from the towfish in real time or from a file when playing back sonar data:

- Choose *TowFish* when the data source is the towfish. This menu item is the same as the Towfish Source button 🖅 on the Main tool bar.

- Choose *Hard Disk* when the data source is a file on the local computer or on an external drive or network. This menu item is the same as the Towfish Source button 🖴 on the Main tool bar.

Print menu. The *Print* menu allows you to capture a screen from the local computer's monitor and save it to a file, or capture a screen from the monitor and output it to an optional EPC 1086 Recorder if connected:

- Choose *SnagIt Capture* to capture a screen and save it to a file, preferably a .tif file. This menu item is the same as the **Print** button 🖨 on the Main tool bar.

- Choose *EPC 1086* to capture a screen and output it to an EPC 1086 Recorder.

Refer to "Printing with SonarPro" on page 145 for more information on printing with SonarPro.

Window menu. The *Window* menu provides access to all of the windows in SonarPro. And most of these windows have corresponding buttons on the Main Tool bar. In addition to providing access to all the windows, the Window menu provides the following items:

- Choose *SonarPro Tile* to arrange all of the open windows to the default layout.

- Choose *Cascade* to arrange all of the open windows in a cascading, overlapping manner.

- Choose *Windows Tile* to arrange all of the open windows using the default Windows layout.

- Choose *Arrange Icons* to arrange all of the minimized windows in a row at the bottom of the Main window.

Help Menu. The Help menu contains the single item *About SonarPro®* which displays the version number and build number of the SonarPro currently running. In addition, once connected to the TPU, the current version of the TPU operating system, vxWorks or Linux, will be displayed.

KLEIN
MARINE SYSTEMS, INC.

5.0   Selecting the Connection Type

 Towfish Source

Click this button to set up the connection type. The *TPU Connection* dialog box will open as shown in Figure 2.
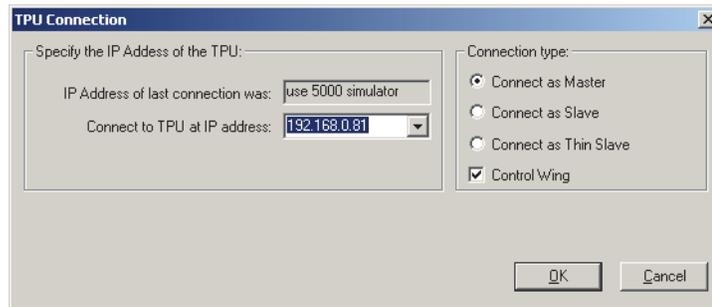
Figure 2: *The TPU Connection Dialog Box*

The **Specify the IP Address of the TPU** section of the *TPU Connection* dialog box displays the IP address of the last TPU connection. You can change the IP address here if you have a second TPU with a different address or if you are using the system on a network that has different IP addresses. The default address 192.168.0.81.

There are three connection types:

Connect as Master. Select this option when the computer you are using will be running the sonar system and controlling the towfish. This setting is used most of the time. There can only be one master.

Connect as Slave. Select this option when there is already a master computer on the network running the sonar system. You may want to put one or more additional computers on the network to work with the data in real time or for post processing. The slave computer cannot control the sonar.

Connect as Thin Slave. Select this option to transfer only navigation data to another computer running SonarPro. This option is useful in certain instances where you want to conserve bandwidth; for example, when you are running on a wireless network.

Control Wing. Select this check box to initialize and enable control of the wing actuator on a Series 5000 MK IIB System or Series 5900 System towfish—for the **Connect as Master** option only. With this check box selected, the **Show/Hide Wing Control** button on the Main tool bar and the *Wing Control* item on the *Window* menu are available.

When the settings in the *TPU Connection* dialog box have been made or verified, click **OK**. The *Run Survey Wizard* dialog box shown in Figure 3 will open where you are asked if you want to run the Survey Wizard. The Survey Wizard guides you through setting up parameters for maintaining an orderly survey data file structure. For instructions on how to use the Survey Wizard, refer to "Survey Wizard" on page 9. Click **Yes** to run the Survey Wizard, or **No** if you do not.
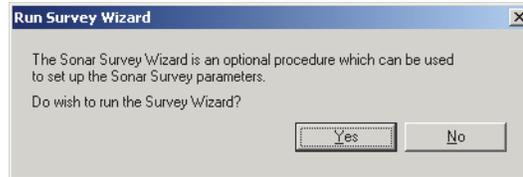
Figure 3: *The Run Survey Wizard Dialog Box*

The Sonar Viewer window will open, along with the Information window in the Main window as shown in Figure 6. When running in real time, the Sonar Viewer window includes the Real-Time tool bar as shown in Figure 4 for Series 5000, 5000 V2 and HydroChart 5000 Sonar Systems and in Figure 5 for Series 3000 and 3900 Sonar Systems.

Figure 4: *The Real-Time Tool Bar—Series 5000, 5000 V2, 5900, and HydroChart 5000 Sonar Systems*

Figure 5: *The Real-Time Tool Bar—Series 3000, UUV-3500, 3900, and 4900 Sonar Systems*

The Information window allows you to monitor the towfish and its position along the bottom and in the water column. If this window does not open, you can open it from the *Window* menu.
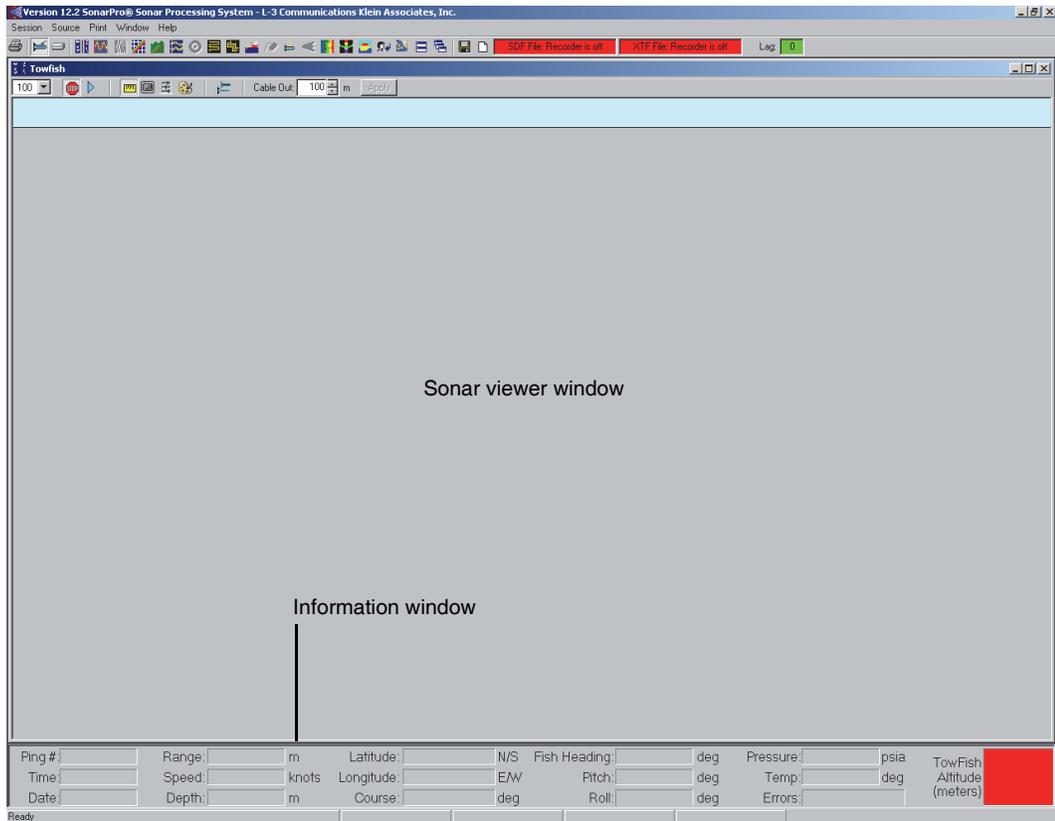
Figure 6: *Real Time Sonar Viewer and Information Windows*

6.0   Opening Additional Sonar Viewer Windows

New Viewer

Click this button on the Main tool bar to open additional Sonar Viewer windows. This button can be used to display sonar data differently in separate windows. For example, the data can be slant range corrected or displayed with a different color palette. In addition, for the Series 3000, 3900, 4900, and UUV-3500 Sonar Systems, which have dual frequency sonars, separate Sonar Viewer windows can be used to display the sonar data for both sonars simultaneously. To select the sonar, right-click in the Sonar Viewer window to open the *Sonar Viewer Properties* dialog box to the *Plan View Configuration* tab, and then select the sonar frequency option.

7.0 Survey Wizard

![Survey Wizard icon] **Survey Wizard**

Click this button to start the Survey Wizard. The *Survey Wizard* dialog box will open to the *Start* page as shown in Figure 7.
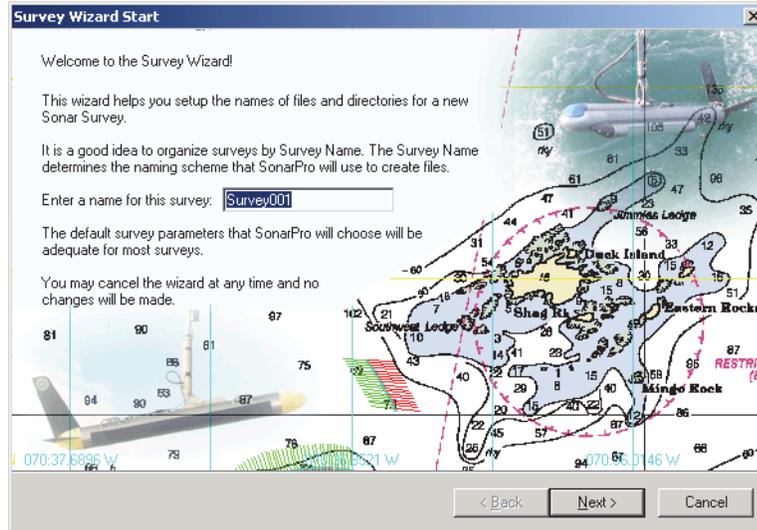
Figure 7: *The Survey Wizard Dialog Box—Start Page*

The Survey Wizard will guide you through the following parameters:

- First enter a name for the current survey.
- Select a towfish type.
- Select a data directory.
- Specify a target catalog.
- Specify target parameters.
- Specify a survey grid waypoint file.
- Specify a session state file.
- Specify the sensor scale of the towfish being used.

Once the above has been checked or set up, click **Finish**. You will then have an opportunity to print a summary of the setup information using the Snagit print utility (check print preview).

On the *Start* page of the Survey Wizard, you are asked to enter a name for the survey. This action gives the main folder a name in which to store the sonar data files and sub folders, in this case Survey001, the default, as shown in Figure 8.
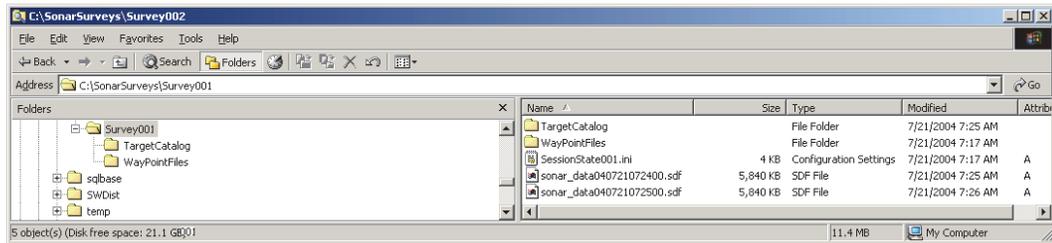
Figure 8: *The Survey001 File*

On the *Select Towfish Type* page shown in Figure 9, you are asked to select a
towfish type. Select the towfish from the **Towfish Type** drop-down list box. To
make this towfish the default selection, select the *Make this the default towfish
type selection* dialog box.
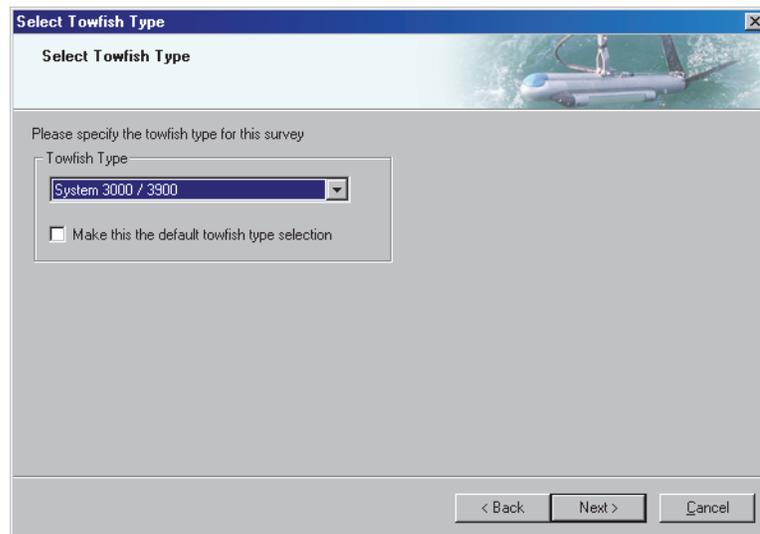
Figure 9: *The Survey Wizard—Select Towfish Type Page*

On the *Data Storage Location* page shown in Figure 10, you are asked for the directory name.

Figure 10: *The Survey Wizard—Data Storage Location Page*

You can enter the name in the **Directory** text box, or you can browse for one. In most cases you will want to use the default. You can also change the data file prefix in this box by entering it in the **Prefix** text box. In the following example the prefix is sonar_data.

sonar_data040721072400.sdf

The final text box is **Minutes of data per disk file**. This sets the length of time that the current data file will collect sonar data. The default is one minute. You should usually keep this file time short to protect the data should a problem occur. You will only lose one minute of data. There are times, however, when you may want to increase the time interval. For example, if you are running a survey and want to have one file for each survey line, you would enter a file time that is longer than the time it would take for you to survey the line, and then at the end of the line, you would click ▢. This will end the file and start the next file.

On the *Target Catalog Location* page shown in Figure 11, you are asked to specify information for the target catalog. In most cases the default should be used. You can also specify a reference catalog to be used to place historical targets on the page for comparison. You must browse for a previous catalog.
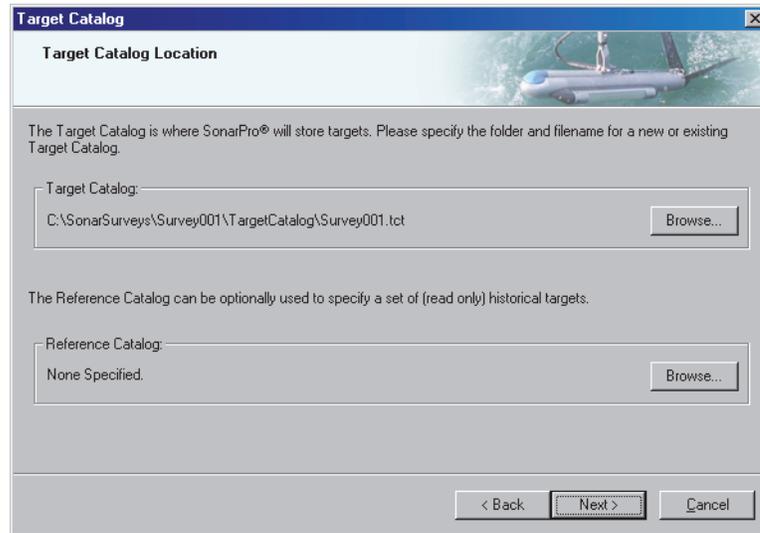
Figure 11: *The Survey Wizard—Target Catalog Page*

On the *Target Parameters* page shown in Figure 12, you are asked to set a target name prefix. This is the prefix that will appear for the target in the target window when a new target is generated. Again, in most cases you should use the default. You may want to change the prefix if you have a unique requirement. You also have the option of selecting a new layer. If you will be using the targets in conjunction with a reference target catalog you might want to set the new targets on a different layer. In this case they will have a different color and will be easily identified. In addition, you can choose to continue the current target number sequence or begin a new one beginning at a specified number.

On the *Survey File Location* page shown in Figure 13, you are asked to either create a new survey grid or route file or load a previously created survey route or grid. The **Create a new survey grid or route file** selection is the default. It will generate a default survey grid and put it in the default file location shown. You can edit this if needed, but it is suggested that you use the default. If you already have a survey route or grid for the survey area, the **Load an existing survey grid or route file** selection gives you the opportunity to browse to the file and have it loaded on startup.
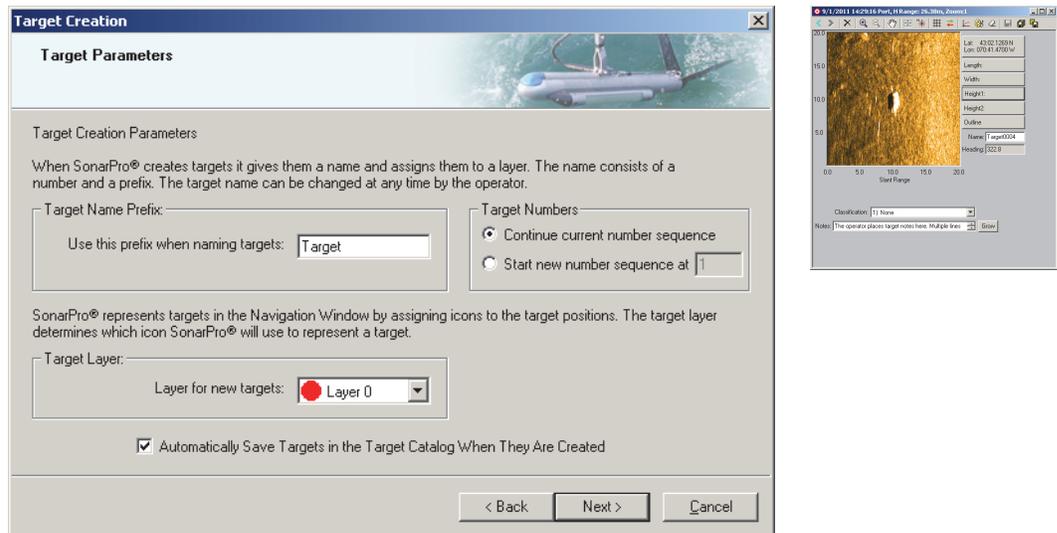
Figure 12: *The Survey Wizard—Target Creation Page*
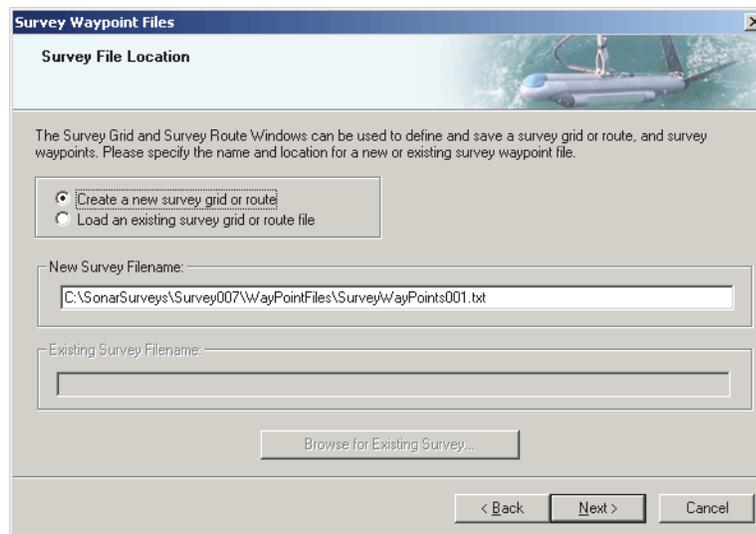
Figure 13: *The Survey Wizard—Survey File Location Page*

On the *Session State Files* page shown in Figure 14, you can change the name of the default Session State file. This is a file that stores all of SonarPro's parameters, such as the number of open windows and their locations, file prefixes, and so on. It is suggested that the default settings be used.

On the *Depth Sensor Scale* page shown in Figure 15, you can specify a pressure range for your pressure sensor. At the present time the Series 5000 towfish uses a 750 psi sensor, which is selected by default. This should not be changed unless there is a custom sensor installed in the towfish. It is important that this setting be correct, since it affects the depth reading. The Series 3000 towfish currently has a
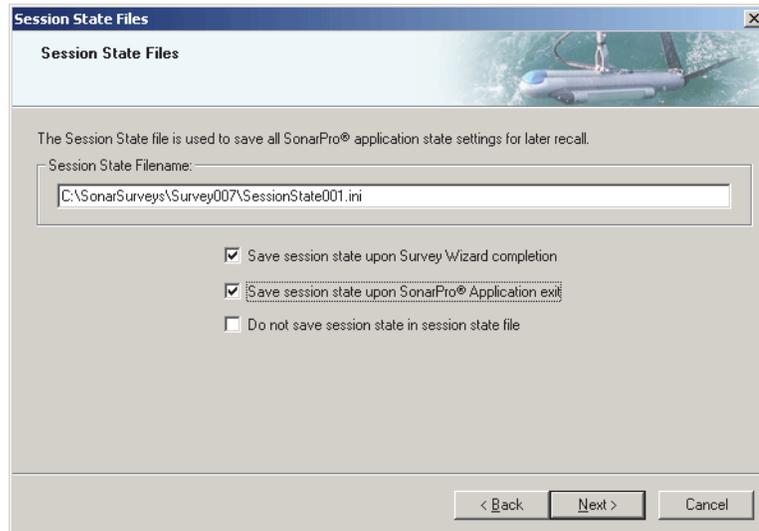
Figure 14: *The Survey Wizard—Session State Files Page*
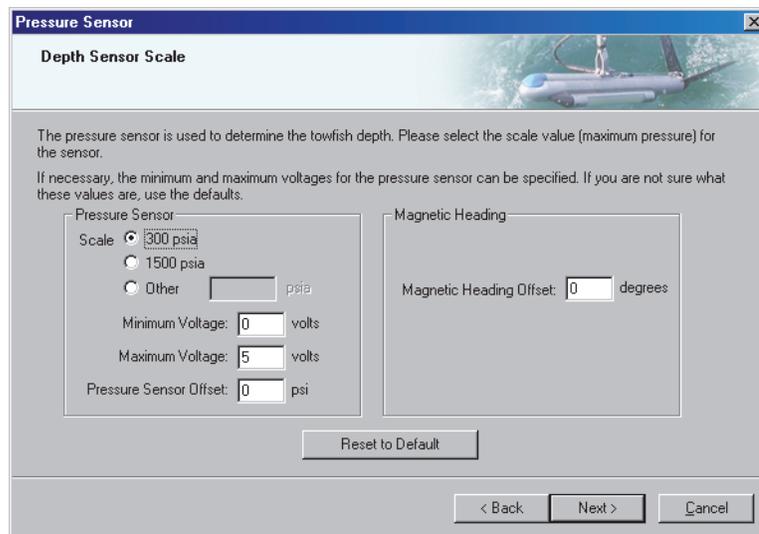
Figure 15: *The Survey Wizard—Depth Sensor Scale Page*

standard 1500 psi sensor and an optional 300 psi sensor. Select the appropriate one. By default SonarPro will obtain the pressure sensor settings from the startup.ini file. If the incorrect sensor is selected here, the operator can change the setting within SonarPro once the program is launched and running by opening the Sensor window, right-clicking, which will open the *Sensor* dialog box.

NOTE *The Depth Sensor Scale page also allows you to enter a magnetic heading offset in degrees if there is an offset between the compass reading and the true ship heading.*

8.0   Information Window

The Information window displays time and date, sonar, sensor, and navigation information in digital displays. The Information window is shown in Figure 16.

To open the Information window, choose *Information* from the *Window* menu.

Ping #:	1468	Range:	117 m	Latitude:	42:55.7425 N	Fish Heading:	225.7 deg	Pressure:	68.0 psia	TowFish
Time:	16:42:07	Speed:	4.8 knots	Longitude:	070:36.3825 W	Pitch:	-1.1 deg	Temp: 10.1W 30.0A deg		Altitude 30
Date:	8:27:2015	Depth:	35.9 m	Course:	220.8 deg	Roll:	1.0 deg	Errors: No Errors		(meters)

Figure 16: *The Information Window*

8.1   Digital Displays in the Information Window

The digital displays in the Information window are as follows:

Ping #. The ping number of the side scan sonar that corresponds to the displayed data. The displayed data updates with each ping number.

Time. The time of day in hours, minutes and seconds as provided by the TPU or the GPS.

Date. The date in months, days and year as provided by the TPU or the GPS.

Range. The range selection of the side scan sonar.

Speed. The ship speed in knots.

Depth. The towfish depth.

Latitude. The ship or towfish north (N) or south (S) latitude location.

Longitude. The ship or towfish east (E) or west (W) longitude location.

Course. The course-made-good ship heading in degrees from true north.

Heading. The ship or towfish heading in degrees from true north.

Pitch. The towfish pitch in degrees where a positive pitch is bow up and a negative pitch is bow down.

Roll. The towfish roll in degrees where a positive roll is starboard down and a negative roll is starboard up.

Pressure. The water pressure in PSIA.

Temp. The water temperature (W) in degrees Celsius and the air (A) temperature in degrees Celsius inside the electronics bottle.

Errors. Turns red if an error from the TPU is detected. An occasional error is acceptable. Excessive errors may indicate a problem.

Towfish Altitude. The towfish height off the bottom.

Elevation. Height of the GPS antenna above mean sea level.

GPS Quality. GPS quality indicator from NMEA specification.

9.0   Information Window Options

A number of options are available for the Information window. These options are selected in the *Information Window Options* dialog box which is shown in Figure 17. To open this dialog box, right-click anywhere in the Information window.
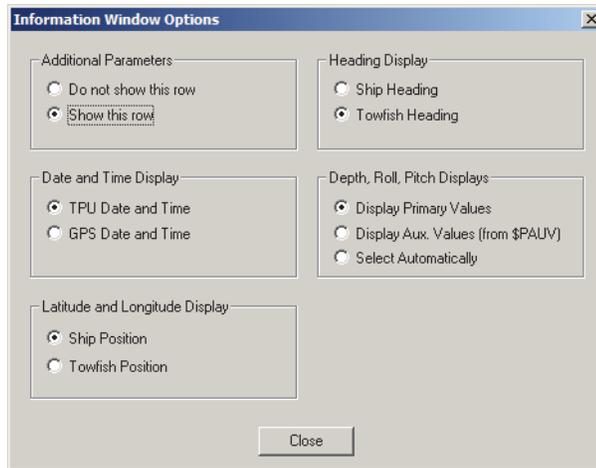
Figure 17: *The Information Window Options Dialog Box*

The Information *Window Options* dialog box provides the following choices:

Additional Parameters. Allows you to view the **Cable Out**, the **Sound Speed** and, for a Series 5000 MK IIB towfish only, the **Wing Angle** and **Emergency Switch** displays in the Information window as shown in Figure 18. For HydroChart 3500 and 5900 Sonar Systems, the **GPS Quality** and **Elevation** displays are also included. The **Sound Speed** display can be viewed only if an external sound speed sensor is installed. This sensor is offered as an option on the HydroChart 3500 and HydroChart 5000 Sonar Systems only.
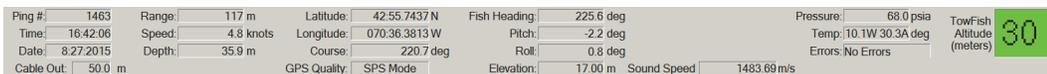
Figure 18: *The Information Window with Cable Out, Wing Angle and Emergency Switch Displays*

Date and Time Display. Selects either the TPU date and time or the GPS date and time for the **Date** and **Time** displays.

Latitude and Longitude Display. Selects either the ship or towfish position for the **Latitude** and **Longitude** displays.

Heading Display. Selects either the ship or towfish heading for the **Heading** display.

Depth, Roll, Pitch Displays. Selects whether to display altitude, depth, roll, and pitch data from sensors included with the towfish sonar, from external auxiliary sensors if installed or automatically select from which group of sensors.

9.1   Towfish Altitude Alarm

To set a towfish altitude alarm, left click the **Towfish Altitude** display in the Information window. The *Towfish Altitude Display* dialog box shown in Figure 19 will open. Set the towfish altitude threshold by entering a value in the **Altitude Threshold** text box and enable the audio alarm. When the altitude is below this threshold, the alarm will sound, and the **Towfish Altitude** display background will change from green to red.
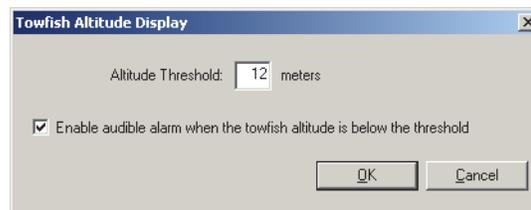
Figure 19: *The Towfish Altitude Display Dialog Box*

9.2   Roll Alarm

To set a roll alarm threshold, click the **Roll** display in the Information window. The *Towfish Roll* dialog box shown in Figure 20 will open. Set the roll threshold by entering a value in the **Roll Threshold** text box and enable the audio alarm. When the roll threshold is exceeded, the alarm will sound, and the **Roll** display background will turn red. If you are viewing the roll data in the Sensor window, the roll graph will change from yellow to red.
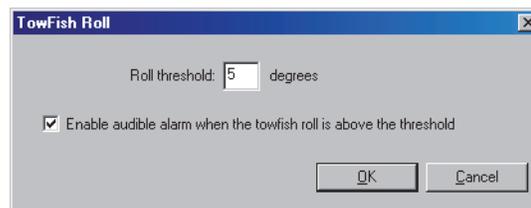
Figure 20: *Towfish Roll Dialog Box*

10.0 Running SonarPro in Real Time

▷ **Play**

Click this button on the Real-Time tool bar in the Sonar Viewer window to start the sonar and run SonarPro in real time. The sonar data will start scrolling down the Sonar Viewer window, and the TVG will start to automatically adjust the gain on the data.

Click ⌷100▾. The drop-down list box displays the sonar range scale setting.

Click 🛑. This will stop sonar data collection.

Many of the features in SonarPro are available when running in either real time or in playback. Refer to "Running SonarPro in Playback" on page 22 for information on the operating features of SonarPro.

11.0 Monitoring SonarPro Performance

On the right side of the Main tool bar is the **Lag** display as shown in Figure 21. Here you monitor the performance of SonarPro, and it provides a level of confidence that no sonar data are being lost. If at any time SonarPro is overloaded, such as having too many tasks to perform, the status box will begin to increment. When the incrementing number reaches the set threshold, the background will turn red. In general, the count can increment to a number above 200 before you begin to near the data loss point. If the count begins to increase and does not decrement back to zero, by closing a window or two the count should go back to zero.

Figure 21: *The Main Tool Bar*

Click in the **Lag** display to open the *Ping Lag* dialog box shown in Figure 22. Here you can set a ping lag threshold and a time interval for SonarPro to check the ping status. An audible beep may also be enabled.

Figure 22: *The Ping Lag Dialog Box*

For troubleshooting purposes a Check Lag of 5 seconds is recommended; for slower computers you may have to use 15 to 20 seconds.

12.0 Recording Sonar Data

💾 **Data Recorder**

Click this button to set up for recording data. The *Sonar Data Recorder* dialog box will open and appear as one of the three shown in Figure 23 *after* clicking the **Play** button ▷ on the Real-Time tool bar, depending on whether the system is a Series 5000 V2, 5900 or HydroChart 5000 Sonar System; a Series 3000 Sonar System with the sub bottom profiler option installed; or other available sonar system.

The *Sonar Data Recorder* dialog box allows you to specify the recorder parameters for saving the survey data. You can record in either the SDF or XTF formats, or both simultaneously, and play back in either format. However, SonarPro will only play back XTF data that were recorded in SonarPro. The SDF format is SonarPro's own format, and the data it contains largely reflects the sonar data received from the TPU. The XTF format is an industry standard format for side scan data. In addition, for Series 5000 V2, 5900 and HydroChart 5000 Sonar Systems, the dialog box will allow a choice of whether to record raw data, processed data, or both. For the Series 3000 system only, if the sub bottom profiler option is installed, a choice of 16-bit or 24-bit recording format can be made.

Use the **Record to SDF disk file** and **Record to XTF disk file** areas to specify where the data are to be saved for the corresponding format. Click **Specify Destination Directory** to open the *Save* dialog box and choose the directory. If possible, use a drive that is different from the one used for the operating system. Enter the default prefix for the data file name in the **Use this prefix when naming files** text box. This information is also set up when you use the Survey Wizard. If desired, in the **Minutes of data per disk file** text box, change the recording time for the data file.

When operating SonarPro with a Series 5000 V2, 5900 or HydroChart 5000 Sonar System, you can record raw side scan data only, processed side scan data only or both raw and processed side scan data. To record raw data only, select **Store Raw Data Only (no Processed Data)**. With this option selected, however, SonarPro must be used to play back the data. To record processed data only, select **Store Processed Data Only (no Raw Data)**. With this option selected, the least amount of storage space is required, and in addition to SonarPro, other programs that read SDF files can be used to play back the data. To record both raw and processed data, select **Store Raw and Processed Data**. This option requires the most storage.

For the Series 3000 Sonar System only, and if it includes the sub bottom profiler option, select the **Store 16-Bit Sub Bottom Data** check box to save the data in 16-bit resolution or the **24-Bit Sub Bottom Data** check box to save the data in 24-bit resolution. Select both check boxes to save the data in both formats. Some applications that read XTF data may require data stored in 16-bit format, while others may require 24-bit format.

KLEIN
MARINE SYSTEMS, INC.
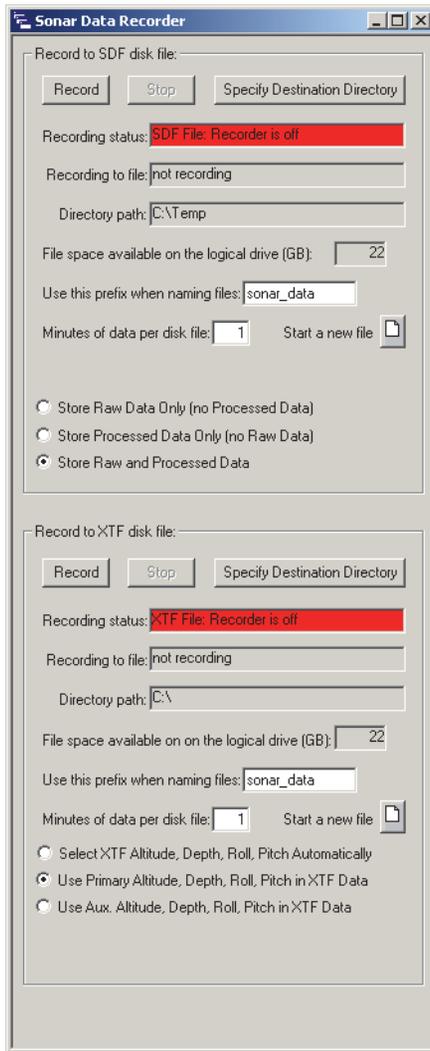
For Series 5000 V2, 5900, and
HydroChart 5000 Sonar Systems
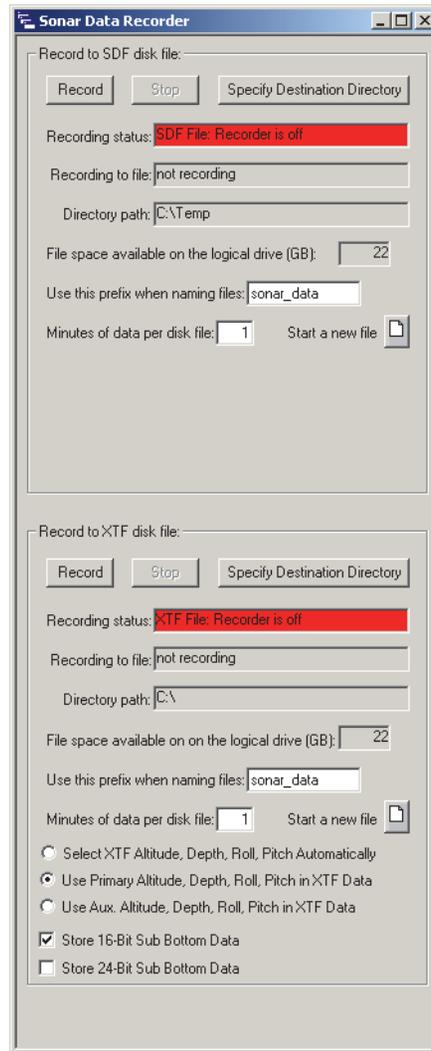
For Series 3000 Sonar Systems
with sub bottom profiler option
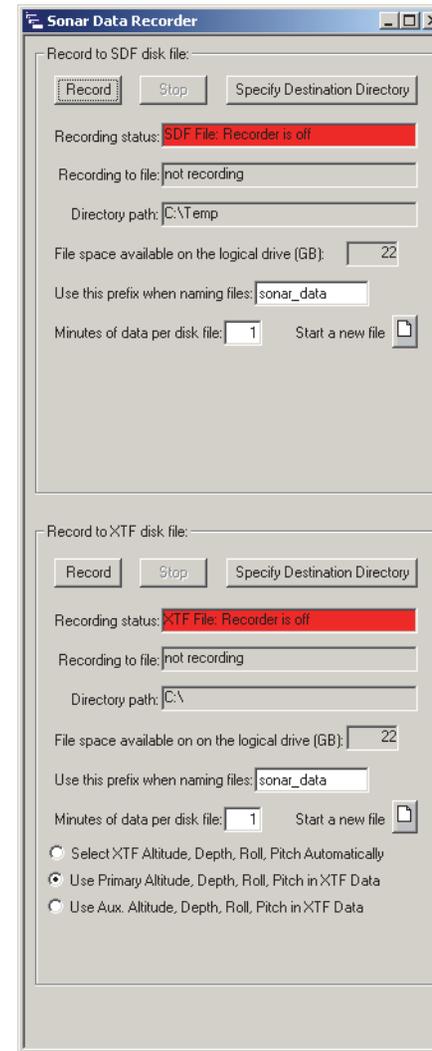
For all other sonar systems

Figure 23: *The Sonar Data Recorder Dialog Box—Series 5000 and HydroChart 5000 Systems, Series 3000 Systems and Series 3900 Sonar Systems*

The *Sonar Data Recorder* dialog box for all systems also includes the **Use Primary Altitude, Depth, Roll, Pitch in XTF Data** option which records altitude, depth, roll, and pitch data from sensors included with the towfish sonar; the **Use Aux. Altitude, Depth, Roll, Pitch in XTF Data** option to record data from external auxiliary sensors if installed; and the **Select XTF Altitude, Depth, Roll, Pitch Automatically** option to automatically select which group of sensors to record data from, where SonarPro selects the first option if the auxiliary source is zero and the second option if the auxiliary source is nonzero. These options apply only to XTF files, where the data from the auxiliary sensors are stored in the *aux* fields of the page header. To start recording sonar data, click **Record**. After the recording parameters are set up, close the *Sonar Data Recorder* dialog box. You can start or stop the recording by clicking the **SDF File Recording Status** or **XTF File Recording Status** displays on the Main tool bar as shown in Figure 24.

Figure 24: *The SDF File and XTF File Recording Status Displays on the Main Tool Bar*

When recording is on, the background is green:
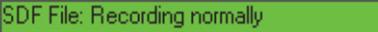
When recording is off, the background is red:

12.1 Extracting and Re-Recording Pre-Recorded Data

Selected data or all the sonar data from a pre-recorded data file can be re-recorded to a new file. Refer to "Running SonarPro in Playback" on page 22 and play back the selected data file. Click the **Data Recorder** button on the Main tool bar to open the *Sonar Data Recorder* dialog box, click **Specify Destination Directory** for the file type, and then select the folder in which to save the data. During the playback, click **Record** and **Stop** as required to select the parts of the data file to re-record. The **Store Raw Data Only (no Processed Data)**, **Store Processed Data Only (no Raw Data),** and **Store Raw and Processed Data** options can be used to exclude data only, as some selections may not apply to the pre-recorded data file.

12.2 Selecting a New Data File

Located on the Main tool bar, as well as in the *Sonar Data Recorder* dialog box, is the **Start a new file** button.

 Start a new file

Click this button to force the start of a new data file. For example, if you want to have a survey line all in one file, when setting up a survey you would set the file length to be longer than the time it will take to gather the data (but not more than 6000 minutes) on the survey line. When you reach the end of the line and are ready to start a new line, click the **New Data File** button to force a new file to begin.

13.0 Running SonarPro in Playback

Hard Disk

Click this button to open the Sonar Viewer window and run SonarPro in playback. The data could be on a hard drive or CD on the local computer or on a mass storage device that is on a network. Many of the features in SonarPro are available when running in either real time or in playback. When running in playback, the Sonar Viewer window includes the Playback tool bar as shown in Figure 25.

Figure 25: *The Playback Tool Bar*

To display sonar data you must select the data file you want to view.

Open File

Click this button to open the *Open* dialog box where you can browse for the files of your choice.

Search

Click this button to open the *Go To Time or Ping* dialog box shown in Figure 26. You can use this dialog box to locate data by entering the time and date of the data or the ping number of the data.

Figure 26: *The Go To Time or Ping Dialog Box*

File Counter

This display is located on the left side of the Playback tool bar. It displays two sets of numbers. The first number indicates the file number you are viewing in the data set. The second number indicates the total number of files in the data set. The data set is usually the total number of files in a folder.

After selecting the data file, use the following set of buttons to control the data being presented.

Back

Click this button to move back one file in the file sequence.

Stop

Click this button to stop playback.

Play

Click this button to start playback.

Forward

Click this button to move forward one file in the file sequence.

Speed Up

Click this button to speed up the playback rate.

Slow Down

Click this button to slow down the playback rate.

Ruler

Click this button to show or hide the ruler in the Sonar Viewer window. The ruler is displayed in cyan below the tool bar and has two scales. The top scale is a fixed reference based on the range selection and is either in meters or in time, depending on whether the **Distance** or **Time** option is selected on the *Plan View Configuration* tab of the *Sub Bottom Profiler Viewer Properties* and *Sonar Viewer Properties* dialog boxes as described below. The lower scale is variable. By adjusting the sliders on the top scale, you can zoom in or out of any swath segment of the displayed sonar data, both port and starboard simultaneously. Effectively, the right slider for the port channel selects the distance or time from the start of each scan to where or when the display of data starts. The left slider for the port channel selects the distance or time in each scan at which the display of data ends. The reverse is true for the starboard channel. When adjusting the sliders, the scaling of the lower scale adjusts automatically, and double clicking any slider returns the lower scale to the range selection.

KLEIN
MARINE SYSTEMS, INC.

Display

Click this button to open the *Sonar Viewer Properties* dialog box to the *Plan View Configuration* tab as shown in Figure 27 through Figure 30, depending on the sonar system. You can set the properties of the Sonar Viewer window here.
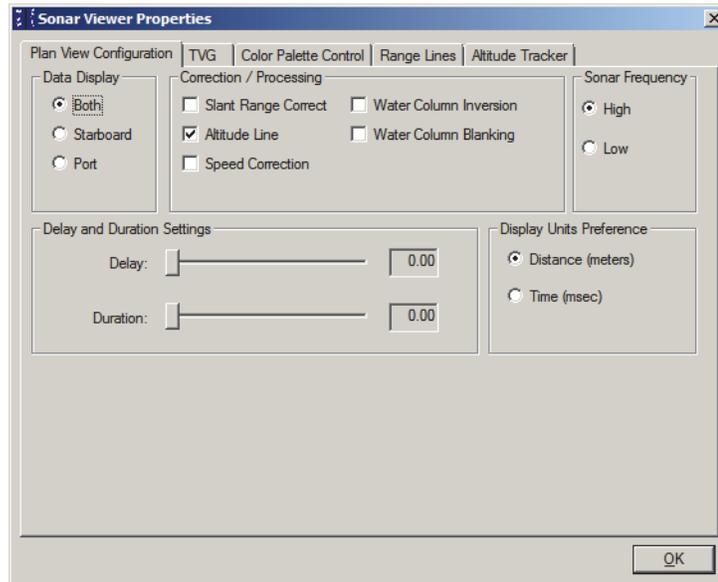
Figure 27: *The Sonar Viewer Properties Dialog Box, Series 3000, UUV-3500, 3900, 4900, and HydroChart 3500 Sonar Systems—Plan View Configuration Tab*
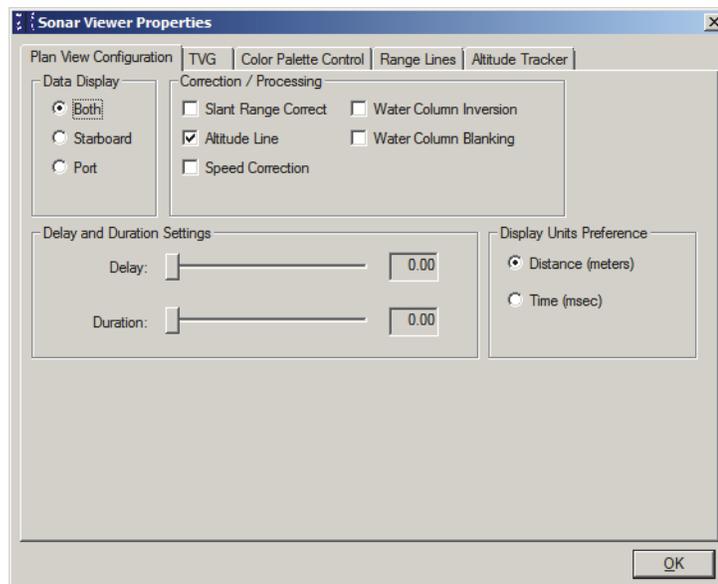
Figure 28: *The Sonar Viewer Properties Dialog Box, Series 5000 Sonar System—Plan View Configuration Tab*
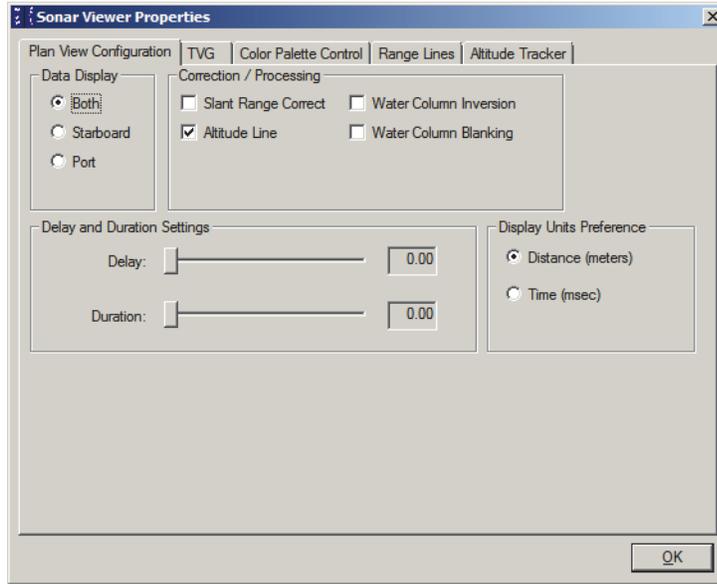
Figure 29: *The Sonar Viewer Properties Dialog Box, Series 5000 V2 and HydroChart 5000 Sonar Systems—Plan View Configuration Tab*
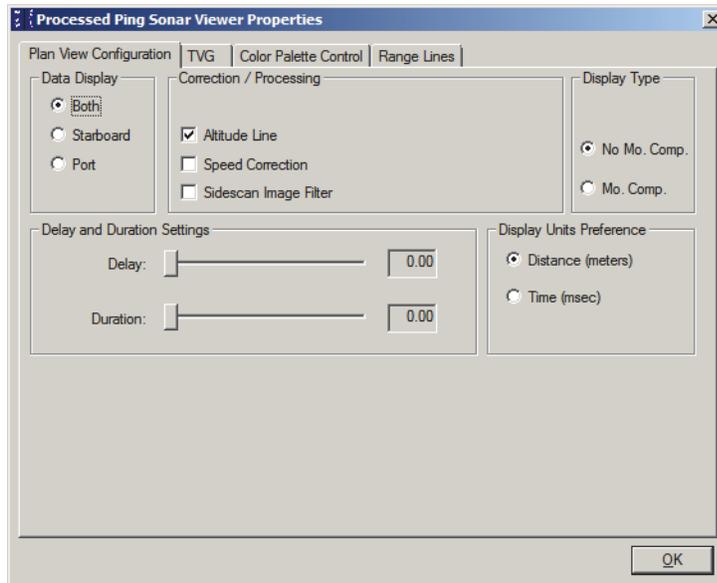
Figure 30: *The Sonar Viewer Properties Dialog Box, Series 5900 Sonar System—Plan View Configuration Tab*

On the *Plan View Configuration* tab you can make the following selections:

- Select the **Starboard** option to display only starboard sonar data, the **Port** option to display only port sonar data, or the **Both** option to display both starboard and port sonar data.

- Select the **Slant Range Correct** check box to display slant range corrected data.

- Select the **Water Column Inversion** check box to change the water column from black to white.

- Select the **Water Column Blanking** check box to blank the surface noise in the water column.

- Select the **Altitude Line** check box to display the yellow altitude line.

- Select the **Speed Correction** check box to turn on speed correction. When selected speed correction adjusts the scaling of the displayed sonar image such that the across-track distances and the along-track distances have the same scale. This feature ensures that the linear dimensions of targets are properly scaled in both length and width. For the Series 3000 Sonar System only, there is an 8-ping delay when selecting this check box.

- Select the **Distance** option to scale the ruler in meters; select the **Time** option to scale the ruler in milliseconds.

- Adjust the **Delay** and **Duration** settings to zoom in or out of any swath segment of the displayed sonar data. The **Delay** adjustment postpones the display of data in distance or time from the start of each scan, depending on whether the **Distance** or **Time** option is selected. Effectively it selects where or when in each scan the display of data starts. The **Duration** adjustment selects the distance or time in each scan over which data are displayed. Effectively it selects where or when in each scan the display of data ends. The ruler scale and its units are automatically adjusted accordingly.

- Select the **High** option to display the high frequency sonar; select the **Low** option to display the low frequency sonar.

When playing back processed ping data in the Processed Ping Viewer window for a Series 5900 Sonar System, clicking the **Display** button in the Playback tool bar opens the *Processed Ping Sonar Viewer Properties* dialog box to the *Plan View Configuration* tab as shown in Figure 27. You can set the properties of the Sonar Viewer window here. This tab also includes a **No Mo. Comp.** option which if selected disables motion compensation in the displayed data and **Mo. Comp.** option which includes motion compensation in the displayed data.

When playing back processed ping data in the QC Sonar Viewer window for a Series 5900 Sonar System, clicking the **Display** button in the Playback tool bar opens the *Processed Ping Sonar Viewer Properties* dialog box to the *Plan View Configuration* tab as shown in Figure 32. You can set the properties of the QC Sonar Viewer window here.
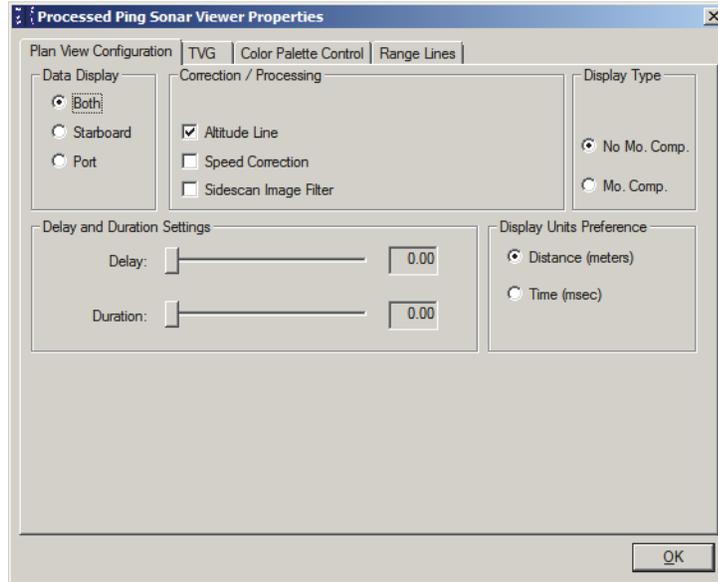
Figure 31: *The Sonar Viewer Properties Dialog Box, Series 5900 Sonar System— Plan View Configuration Tab*
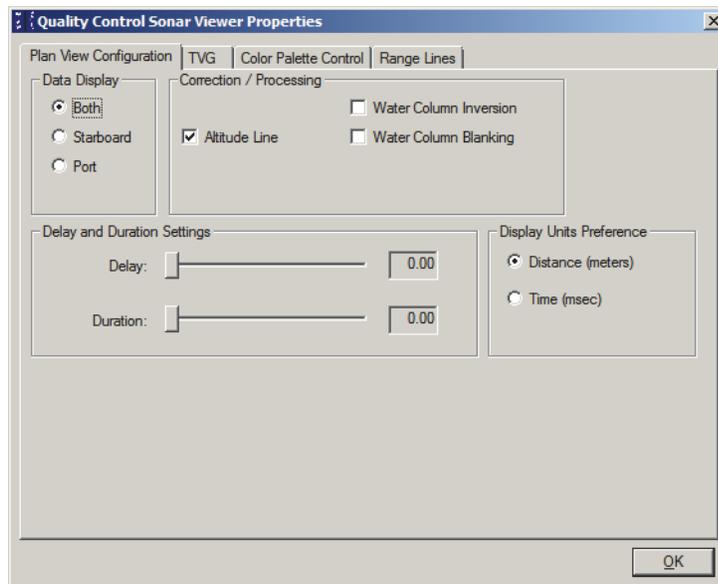
Figure 32: *The Quality Control Sonar Viewer Properties Dialog Box, Series 5900 Sonar System—Plan View Configuration Tab*

⊞ TVG

Click this button to open the *Sonar Viewer Properties* Dialog box to the *TVG* tab as shown in Figure 33. With the **Auto TVG is On** check box selected, you can adjust the overall TVG intensity of the displayed sonar data by using the **Automatic TVG** slider. The TVG is automatically adjusted, based on an average level of signal intensity, increasing with decreasing intensity, and decreasing with increasing intensity. To hold the auto TVG adjustment to its current value, select **Freeze Auto TVG**. Clear the **Auto TVG is On** check box to manually adjust the TVG for each channel separately by adjusting the **Port Gain** and the **Starboard Gain A**, **B** and **C** sliders to control the initial, end and overall intensity of the displayed sonar data. Changing any of the settings on the *TVG* tab will affect *only* the displayed data. It will not affect the recorded data.
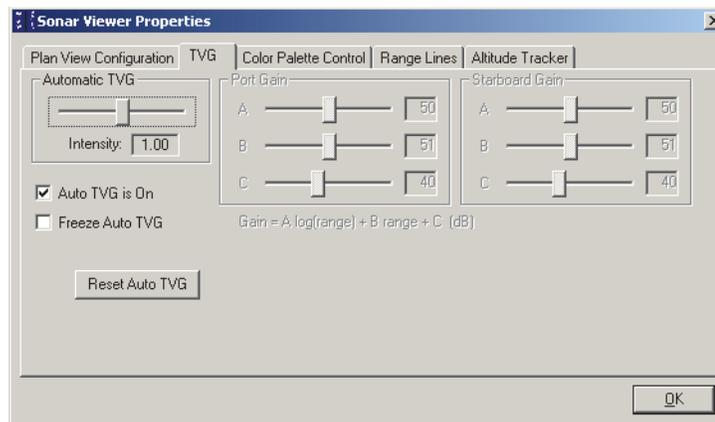
Figure 33: *The Sonar Viewer Properties Dialog Box—TVG Tab*

In addition, with **Auto TVG is On**, you can also click **Reset Auto TVG** to quickly converge to a visible sonar image where otherwise it may be necessary to wait a period for the gain on the data to be automatically adjusted. If the gain has already been automatically adjusted, clicking this button will show little or no effect.

🎨 Palette

Click this button to open the *Sonar Viewer Properties* dialog box to the *Color Palette Control* tab as shown in Figure 34. You can adjust the color of the data being displayed. Select **Inverse Video** to display shadows as light and the contacts as dark. To return to the default color palette after making any adjustments, click **Use Default Palette**.

The *Range Lines* tab is shown in Figure 35. To open this tab right-click anywhere in the Sonar Viewer window to open the *Sonar Viewer Properties* dialog box, and then click the tab. On this tab you can turn the range lines on or off in the Sonar
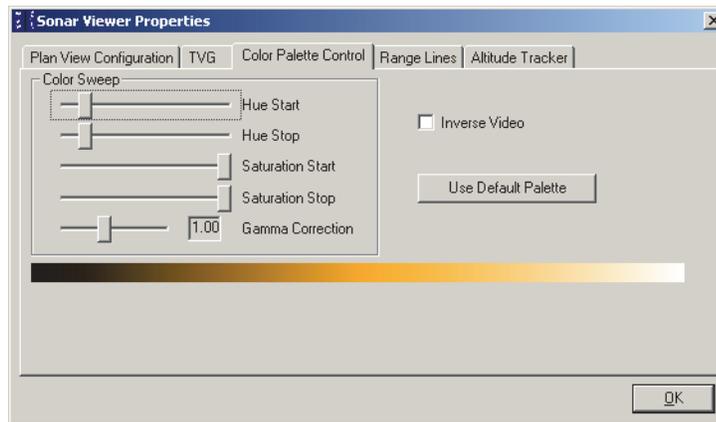
Figure 34: *The Sonar Viewer Properties Dialog Box—Color Palette Control Tab*

Viewer window. The distance between the range lines and the color of the lines can also be set here. Click **Specify Range Line Color** to open a color selection box. Range lines are disabled when slant range is selected.
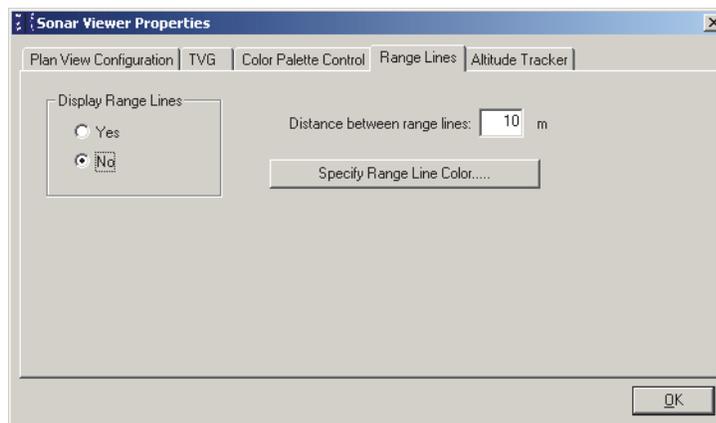
Figure 35: *The Sonar Viewer Properties Dialog Box—Range Lines Tab*

The *Altitude Tracker* tab is shown in Figure 36. To open this tab right-click anywhere in the Sonar Viewer window to open the *Sonar Viewer Properties* dialog box, and then click the tab. On this tab you can override the altitude tracker in an attempt to manually track the bottom in adverse operating conditions. The altitude determines the start of TVG when auto TVG is on which affects the display of the sonar data and allows for dynamic tuning. The altitude has no effect on the TVG or the display when the TVG is set manually.

NOTE *The Altitude Tracker tab is not available for a Series 5900 Sonar System.*

KLEIN
MARINE SYSTEMS, INC.

Figure 36: *Sonar Viewer Properties Dialog Box—Altitude Tracker Tab*

Select **Use Altitude from Towfish** to run with the altitude tracker on. This is the default setting when starting SonarPro and should be used almost all of the time. With this setting selected during real-time operation, you can set lower and upper altitude tracker limits between which altitude tracking will track the bottom. Altitude tracking will not be performed outside these limits. The limit settings are especially useful when operating in shallow water where surface returns may interfere with altitude tracking. Scroll boxes in the Sonar Viewer window tool bar, as shown in Figure 37, allow you to enter the lower and upper altitude tracker limits. In addition, the upper and lower rulers in the Sonar Viewer window indicate the span between the upper and lower limits with yellow bars. To return the altitude tracker limit settings to their original settings, click **Reset** in the Sonar Viewer window tool bar. The original settings are 1 meter for the lower limit and 75% of range for the upper limit. This feature is also available during playback by selecting the **Recalculate Altitude from Sonar data** option.

NOTE *The Recalculate Altitude from Sonar data option on the Altitude Tracker tab is available for Series 3000, UUV-3500 and 3900 Sonar Systems only, and only when playing back data that have been recorded using these systems. This option is not available for Series 5000, 5000 V2 or HydroChart 5000 Sonar Systems. For the Series 5900 Sonar System it is available on the Altitude Selection tab of the Sonar Interface dialog box for the system as described in "Series 5900 Sonar System Towfish Setup" on page 63.*

If conditions warrant, select **Use Manual Setting** to enable manual altitude tracking, or select **Use Altitude from Towfish plus Manual Offset** to enable the sum of the altitude tracker and manual tracking. Selecting a manual setting may be necessary when trying to track a very soft bottom, or when operating in shallow water where surface reflections may interfere.
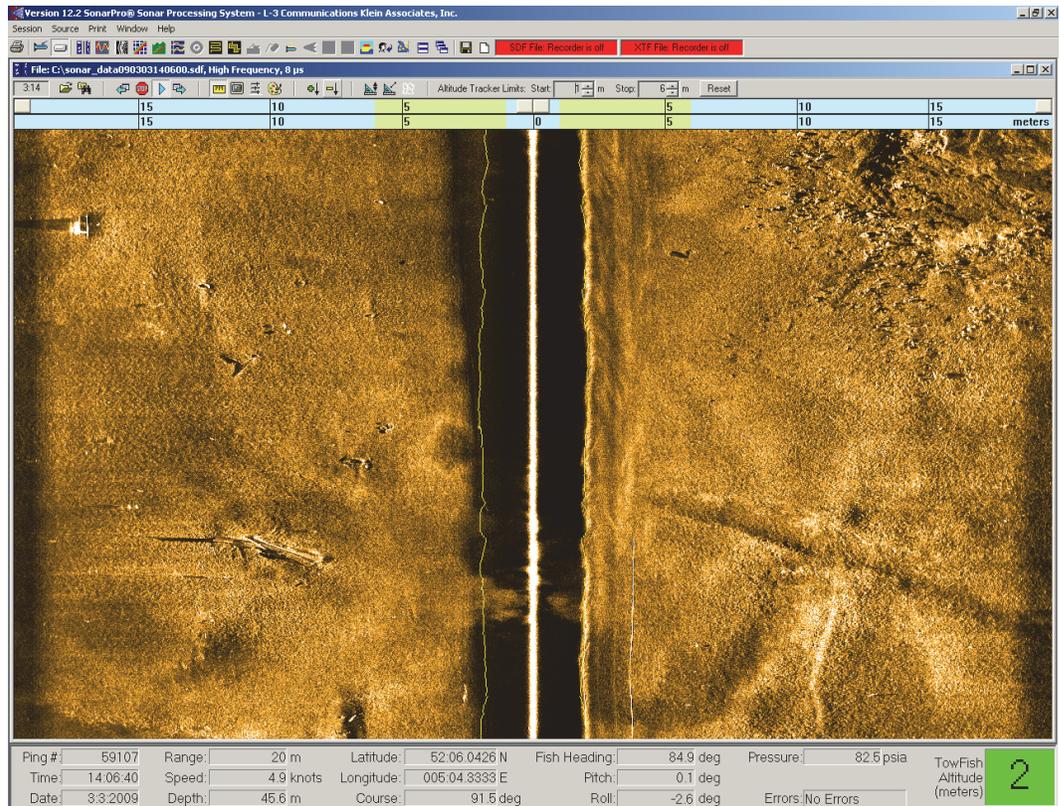
Figure 37: *Sonar Viewer Window with Altitude Tracking*

When selecting the **Use Manual Setting** option, the **Manual Towfish Altitude** scroll box appears on the *Altitude Tracker* tab as shown in Figure 38. In this scroll box enter an estimated altitude for the towfish. This altitude will remain fixed. When selecting the **Use Altitude from Towfish plus Manual Offset** option, the **Manual Towfish Altitude Offset** scroll box appears as shown in Figure 39. Enter an estimated altitude offset within which the altitude tracker will ignore any bottom detections. Once the offset is exceeded, the altitude tracker will look for the bottom. In both cases the altitude tracking lines in the Sonar Viewer window will change to the color cyan; the **Towfish Altitude** display in the Information Window will also change to cyan; and a display with a cyan background will appear in the Sonar Viewer window tool bar indicating either "Manual Altitude" followed by the altitude as shown in Figure 38 for the **Use Manual Setting** option, or "Offset Altitude" followed by the altitude as shown in Figure 39 for the **Use Altitude from Towfish plus Manual Offset** option.
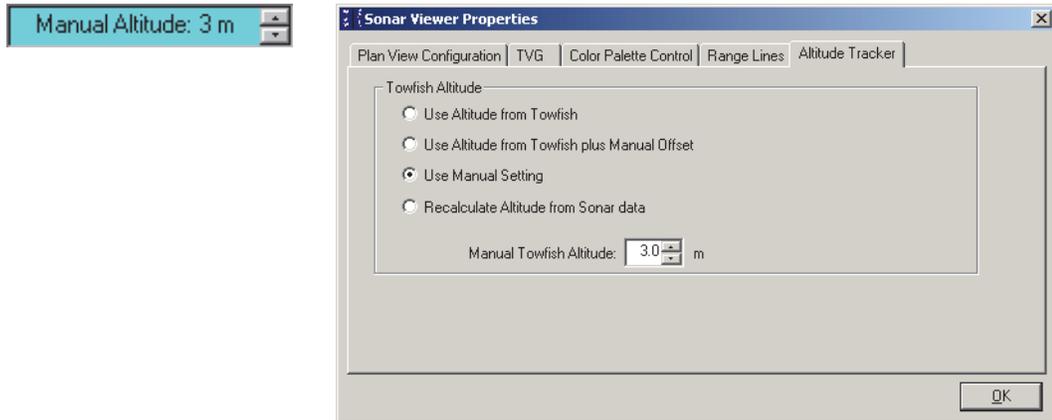
Figure 38: *Sonar Viewer Properties Dialog Box—Altitude Tracker Tab with Manual Towfish Altitude Scroll Box*
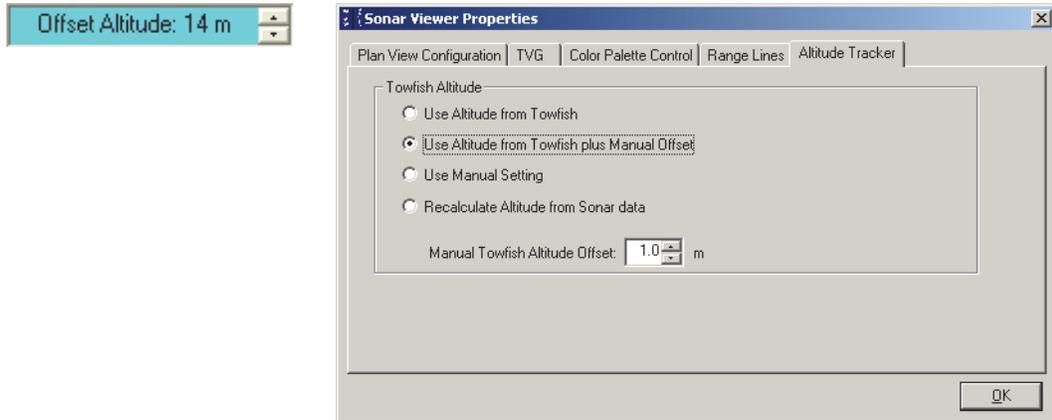
Figure 39: *Sonar Viewer Properties Dialog Box—Altitude Tracker Tab with Manual Towfish Altitude Offset Scroll Box*

> **NOTE** *The displayed offset altitude in Figure 39 is the sum of the towfish altitude and the manually entered altitude in the **Manual Towfish Altitude Offset** scroll box.*

You can also adjust the manual altitude or altitude offset from the display by using the up/down arrows in the display. An example of the Sonar Viewer window with manual altitude tracking is shown in Figure 40.
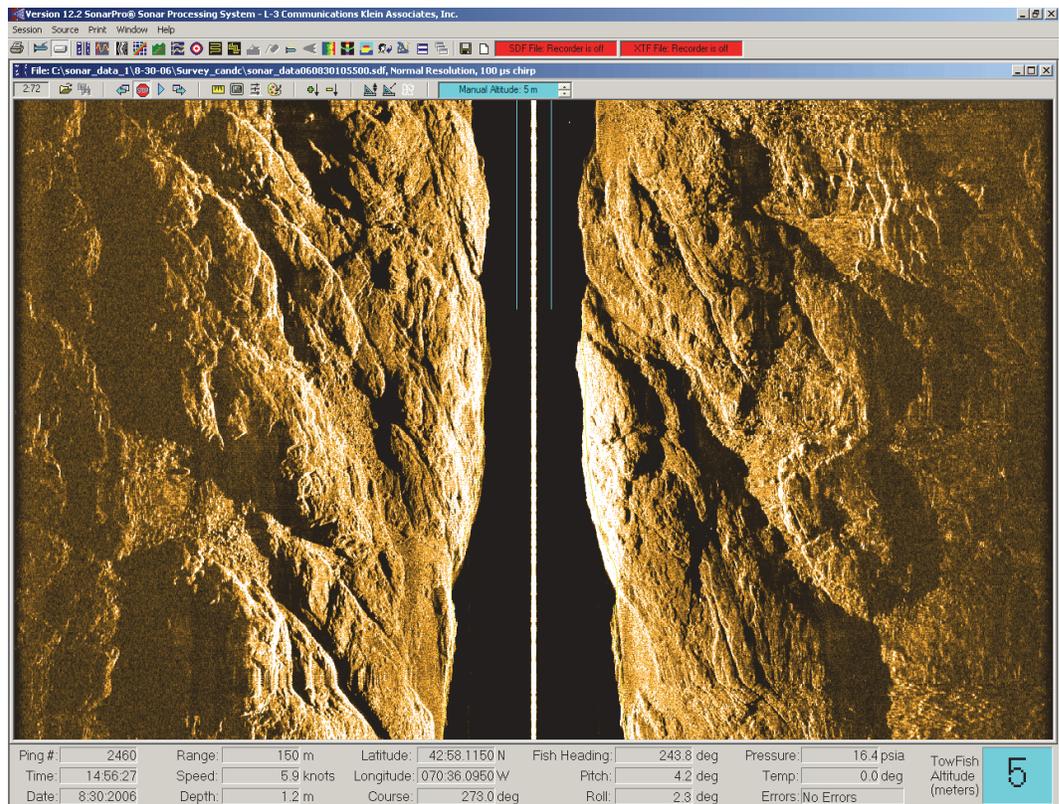
Figure 40: *Sonar Viewer Window with Manual Altitude Tracking*

Outline

Click this button to stop the display and use your mouse to outline a target of interest when playing back sonar data. The outline also appears in the Navigation window. Refer to "Navigation Window" on page 107 for information about the Navigation window. Cursor information will be displayed on the bottom of the Main window in the Status bar as shown in Figure 41. By placing the cursor in the sonar display and holding the left mouse button down, the sonar range, latitude, and longitude will also be displayed in the Status Bar.
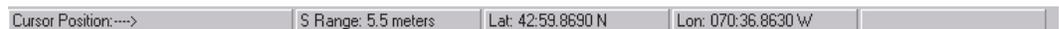
Figure 41: *The Status Bar*

Height

Click this button to measure height. The result is displayed in the Status bar.

Length

Click this button to measure length. The result is displayed in the Status bar.

Sonar Scan

Click this button to open the Scan window which is shown in Figure 42. You can also open this window by choosing *Sonar Scan* from the *Window* menu. The Scan Window is above the Sonar Viewer window. This window displays the signal intensities of the data similar to how they would be seen on an oscilloscope. In addition, for the UUV-3500 Sonar System only, the Scan Window also provides receiver saturation alerts for input signals that might be too large due to a high gain setting or a low towfish altitude.

Figure 42: *The Scan Window*

Right-clicking in the Scan window opens the *A-Scan Display Configuration* dialog box shown in Figure 43.
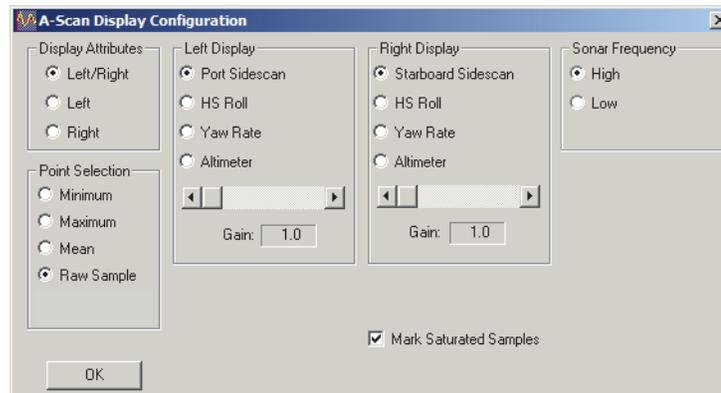
Figure 43: *The A-Scan Display Configuration Dialog Box*

In the **Display Attributes** area you can select the data you want to display across the display area. Select **Left/Right** to display both left and right channel data; select **Left** to display only left channel data; or select **Right** to display only right channel data. In the **Left Display** area, and when **Left/Right** or **Left** is selected, you can select the port side scan sonar data, the optional HS roll sensor data, the optional yaw rate sensor data, or the altimeter data to display. The gain of the signal being displayed can also be adjusted using the **Gain** slider. Similarly, in the **Right Display** area, and when **Left/Right** or **Right** is selected, you can make the same selections and adjustments.

In the **Point Selection** area you can select how the data, which can contain a large number of samples, exceeding the number of pixels on which to display them, are displayed in the Scan Window. The following selections are available:

- **Min**, which displays the lowest magnitude value of the group of data samples corresponding to each pixel on the horizontal axis.

- **Max** which displays the highest magnitude value of the group of data samples corresponding to each pixel on the horizontal axis.

- **Mean** which displays the average of the magnitude values of the group of data samples corresponding to each pixel on the horizontal axis.

For the UUV-3500, 5900 and HydroChart 3500 Sonar Systems only, to display alerts of receiver saturation, which will occur for input signals whose amplitude approaches or exceeds that of the input range of the system's analog-to-digital (A/D) converter, select the **Mark Saturated Samples** check box. Any input signal that is greater than 88% of the input range of the A/D will cause an orange indicator to be displayed as shown in Figure 44 where much of the data scan displays receiver saturation alert indications. A relatively small number of alerts is acceptable. However, for a UUV-3500 Sonar System, should a large number of alerts be displayed, decrease the Rx Gain setting or increase the altitude of the towfish. (See "Series UUV-3500 Sonar System Setup" on page 45 for instructions on how to select the Rx Gain setting.).
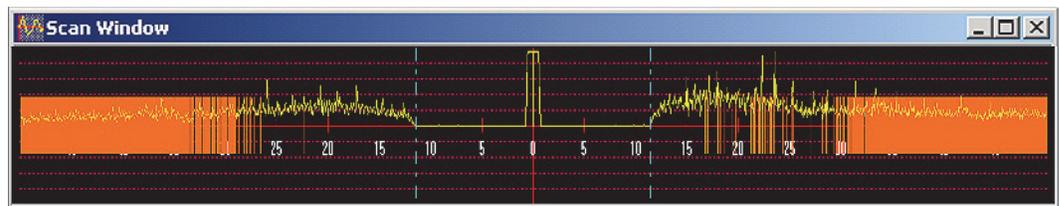
Figure 44: *The Scan Window with a Large Number of Receiver Saturation Alerts—UUV-3500 Sonar System Only*

KLEIN *MARINE SYSTEMS, INC.*

14.0 Towfish Setup

The towfish setup encompasses the configuration of the towfish setup parameters for a sonar system.

14.1 Series 5000, 5000 V2 and HydroChart 5000 Sonar Systems Towfish Setup

🔧 **Towfish Setup**

Click this button on the Real-Time tool bar to configure the towfish setup parameters. The *Sonar Interface* dialog box will open to the *System 5000 Control* tab as shown in Figure 45 for a Series 5000 Sonar System, or as shown in Figure 46 for Series 5000 V2 and HydroChart 5000 Sonar Systems.
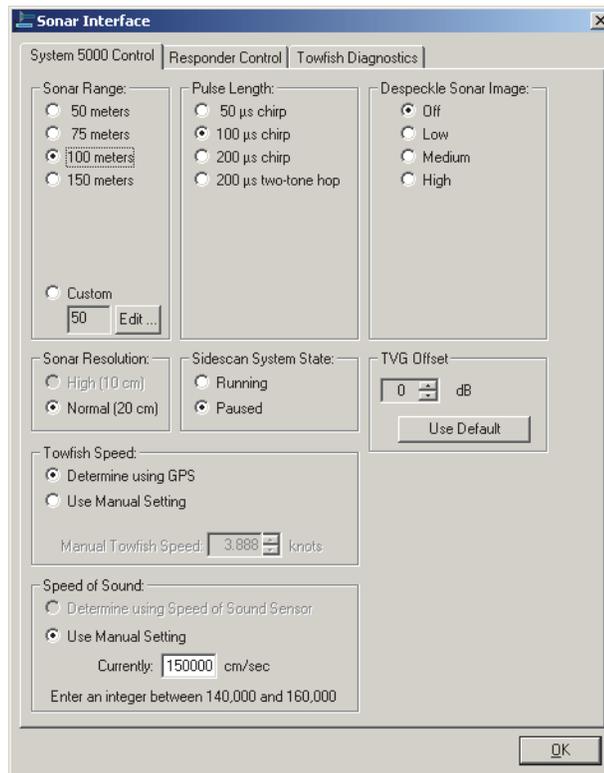
Figure 45: *The Sonar Interface Dialog Box, Series 5000 Sonar System—System 5000 Control Tab*

The *System 5000 Control* tab is the main control interface for the Series 5000, 5000 V2 and HydroChart 5000 Sonar Systems. It is used to configure the following towfish setup parameters:
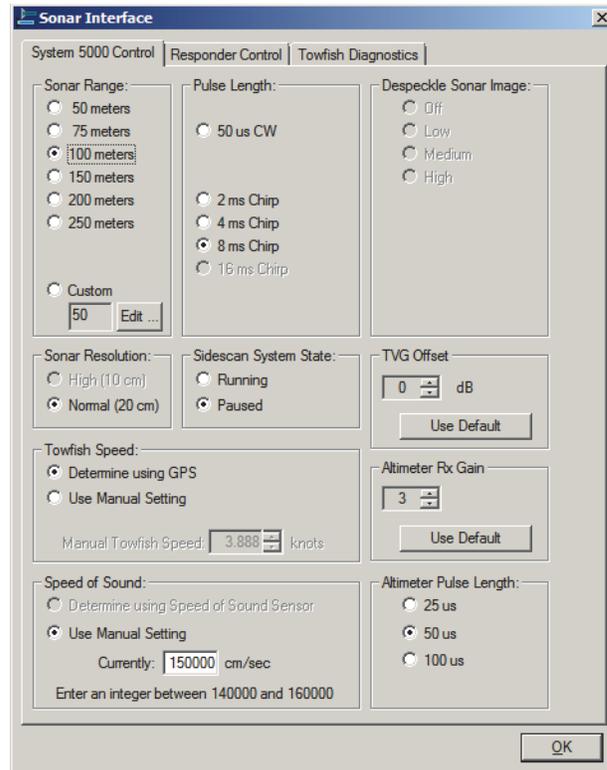
Figure 46: *The Sonar Interface Dialog Box, Series 5000 V2 and HydroChart 5000 Sonar Systems—System 5000 Control Tab*

Sonar Range. There are 6 range scale settings from 50 meters to 150 meters for the Series 5000 Sonar System and 50 meters to 250 meters for the Series 5000 V2 and HydroChart 5000 Sonar Systems plus a custom setting.

To select the **Custom** range scale setting, click **Edit** to open the *Set Custom Range* dialog box as shown in Figure 47, and then enter the range in the **Range** scroll box directly or by using the up/down arrows. Click **OK** and the **Custom** scale setting option will be selected automatically, unless the entered range is equal to one of the standard range options, where in that case that one is selected.
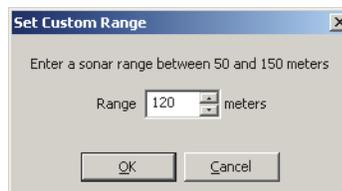
Figure 47: *The Set Custom Range Dialog Box, Series 5000, Series 5000 V2 and HydroChart 5000 Sonar Systems*

Pulse Length. Provides several pulse length settings for the output sound waveforms. The optimum pulse length is selected automatically for the selected sonar range. However, you can select a different pulse length if desired. Some pulse length options are not available for some range selections.

Despeckle Sonar Image. Filter settings to smooth sonar images. For the highest resolution, select **Off**, as this function is applied to the raw data. This setting is not available for Series 5000 V2 and HydroChart 5000 Sonar Systems.

Sonar Resolution. Select **Normal (20 cm)** or **High (10 cm)** for the 50 and 75-meter ranges.

Sidescan System State. Select **Running** or **Paused**. These options function the same as the **Play** and **Stop** buttons on the Real-Time tool bar in the Sonar Viewer window.

TVG Offset. This setting should only be changed if you are having unsatisfactory results with the tuning or if you are working in unusual conditions, such as extremely soft mud. The range is -21 dB to +24 dB for a Series 5000 Sonar System and -12 dB to +12 dB for Series 5000 V2 and HydroChart 5000 Systems, with 0 dB as the default. Changing this setting will affect *both* the displayed and recorded data as it is applied in the towfish.

Towfish Speed. Accurate speed input is necessary for the sonar system to work properly. The Series 5000, 5000 V2 and HydroChart 5000 Sonar Systems should always be used with a speed input device such as a GPS receiver. However, a manual setting is available should a failure occur. To enter a manual setting, select **Use Manual Setting** and enter the speed in knots in the **Manual Towfish Speed** scroll box directly or by using the up/down arrows.

Speed of Sound. The speed of sound in water. Select the **Determine using Speed of Sound Sensor** option if a sound velocity sensor is used. Select the **Use Manual Setting** option to enter the speed of sound directly in cm/sec in the **Currently** text box. The sound velocity will be displayed based on the selection. This setting may be adjusted for special conditions.

Altimeter Rx Gain. For the Series 5000 V2 and HydroChart 5000 Sonar Systems only, adjusts the gain of the sonar altimeter. A range of 1 to 7 is provided with 3 being the default setting. Use the default setting unless you are operating in a low backscatter environment, such as when over a soft bottom, whereby a higher gain setting may be required. Conversely, use a lower gain setting for a relatively hard bottom. The altimeter receiver gain should be chosen along with the altimeter pulse length for best altitude tracking performance. To enter the default setting, click **Use Default**.

Altimeter Pulse Length. For the Series 5000 V2 and HydroChart 5000 Sonar Systems only, provides three pulse length settings for the sonar altimeter. For

most applications using 50 μs for the pulse length is adequate. However, for high altitudes better tracking may be achieved when using 100 μs, as more energy is transmitted into the water column. For low altitudes 25 μs is the best choice, as the relatively small amount of energy may avoid saturating the altimeter's receiver. In all cases, the pulse length should be chosen along with the altimeter receiver gain for best altitude tracking performance.

The *Responder Control* tab shown in Figure 49 is used when the towfish is equipped with an optional responder. Set the responder ping rate and the responder frequency here. One of two tabs will be available, depending on whether it is a Series 5000 or HydroChart 5000 Sonar System or whether it is a Series 5000 V2 Sonar System.

The *Towfish Diagnostics* tab shown in Figure 50 is used for testing the system. One of two tabs is available, depending on whether the system is a Series 5000, 5000 V2 or HydroChart 5000 Sonar System. The **Operator Command** area of the dialog box allows you to send specialized commands to the towfish. In addition, the *Towfish Diagnostic* tab provides access to the *Compass Calibration Wizard* dialog box. Click **Run Compass Calibration Wizard** to open the dialog box which is shown in Figure 48. The *Compass Calibration Wizard* dialog box provides a fairly quick and accurate method for calibrating the towfish compass.
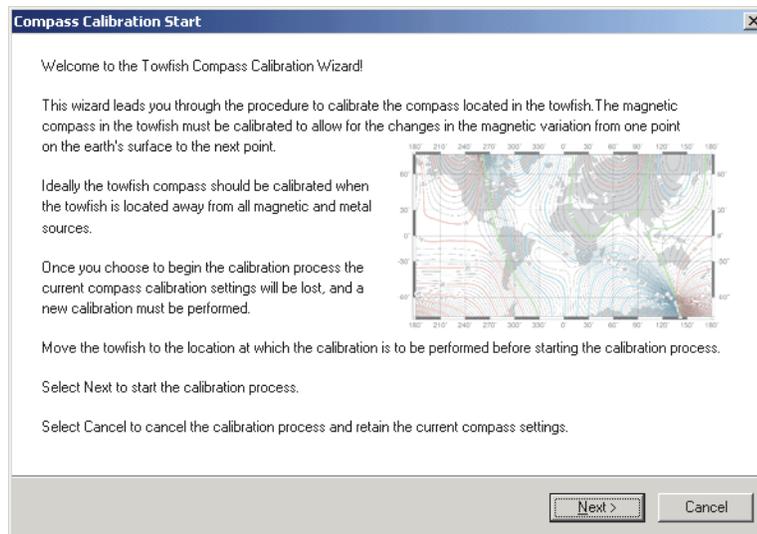
Figure 48: *The Compass Calibration Wizard*

To run the compass calibration wizard, follow the directions in the wizard and play the animation to gain an understanding for the procedure. The animation is shown in Figure 51 on page 41. Once started, the Compass Calibration Wizard must be completed. There will be a slight time delay between pages within the wizard, as commands are sent to the towfish.
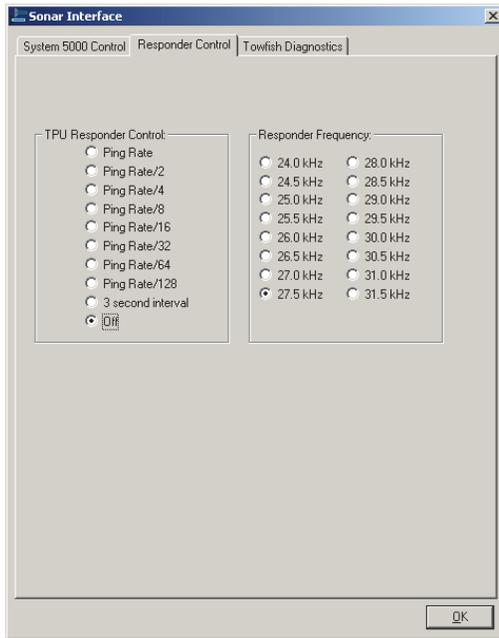
For Series 5000 and HydroChart
5000 Sonar Systems
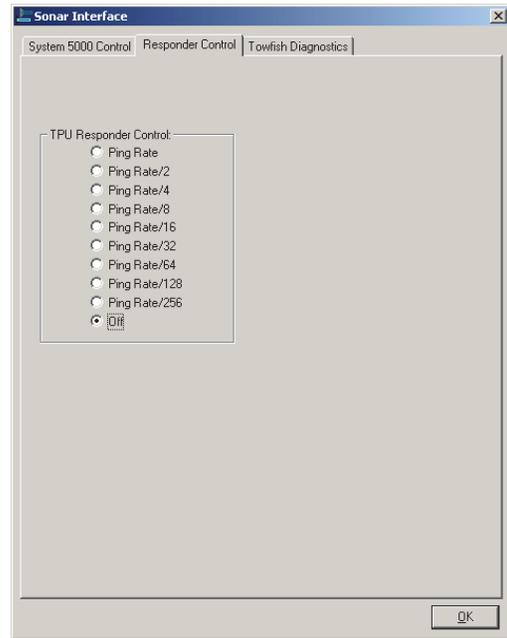
For Series 5000 V2 Systems

Figure 49: *The Sonar Interface Dialog Box, Series 5000, HydroChart 5000 and 5000 V2 Sonar Systems—Responder Control Tab*
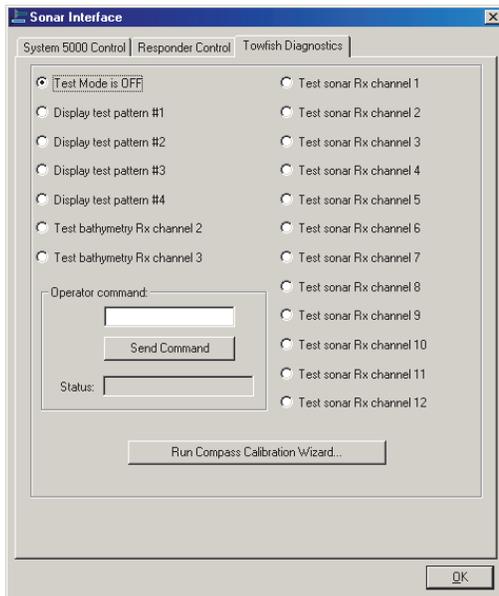
For Series 5000 Sonar Systems
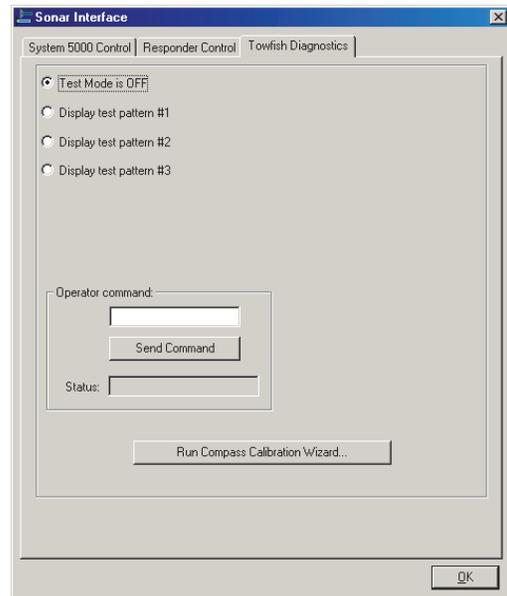
For Series 5000 V2 and
HydroChart 5000 Sonar Systems

Figure 50: *The Sonar Interface Dialog Box, Series 5000, 5000 V2 and HydroChart 5000 Sonar Systems—Towfish Diagnostics Tab*
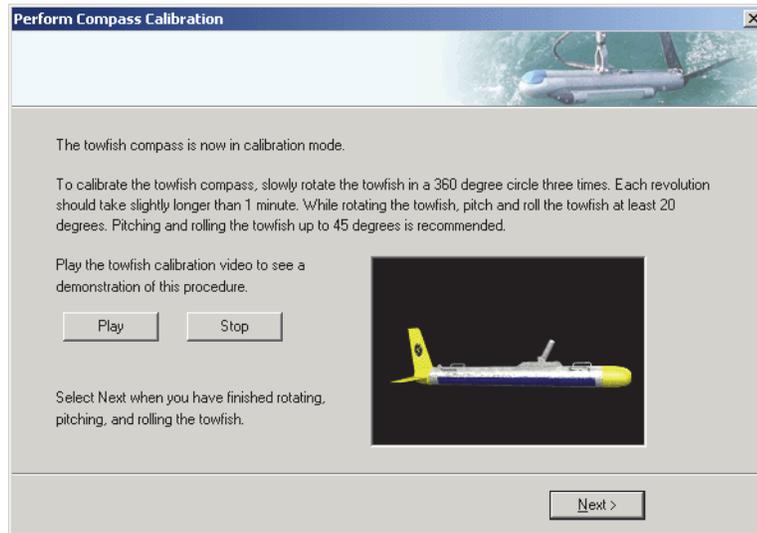
Figure 51: *The Compass Calibration Wizard Animation*

14.2 Series 3000 Sonar System Towfish Setup

Towfish Setup

Click this button on the Real-Time tool bar to configure the towfish setup parameters for the Series 3000 Sonar System. The *Sonar Interface* dialog box will open to the *System 3000/3900 Control* tab as shown in Figure 53.

The *System 3000/3900 Control* tab is the main control interface for the Series 3000 Sonar System. It is used to configure the following towfish setup parameters:

Sonar Range. There are 15 range scale settings from 25 meters to 1000 meters plus a custom setting. However, when operating at ranges longer than 150 meters, the high frequency sonar will fall off at longer ranges.

To select the **Custom** range scale setting, click **Edit** to open the *Set Custom Range* dialog box as shown in Figure 52, and then enter the range in the **Range** scroll box directly or by using the up/down arrows. Click **OK** and the **Custom** scale setting option will be selected automatically, unless the entered range is equal to one of the standard range options, where in that case that one is selected.
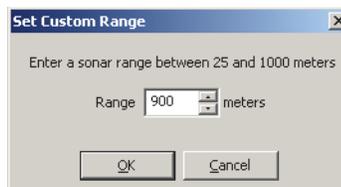
Figure 52: *The Set Custom Range Dialog Box, Series 3000 Sonar System*
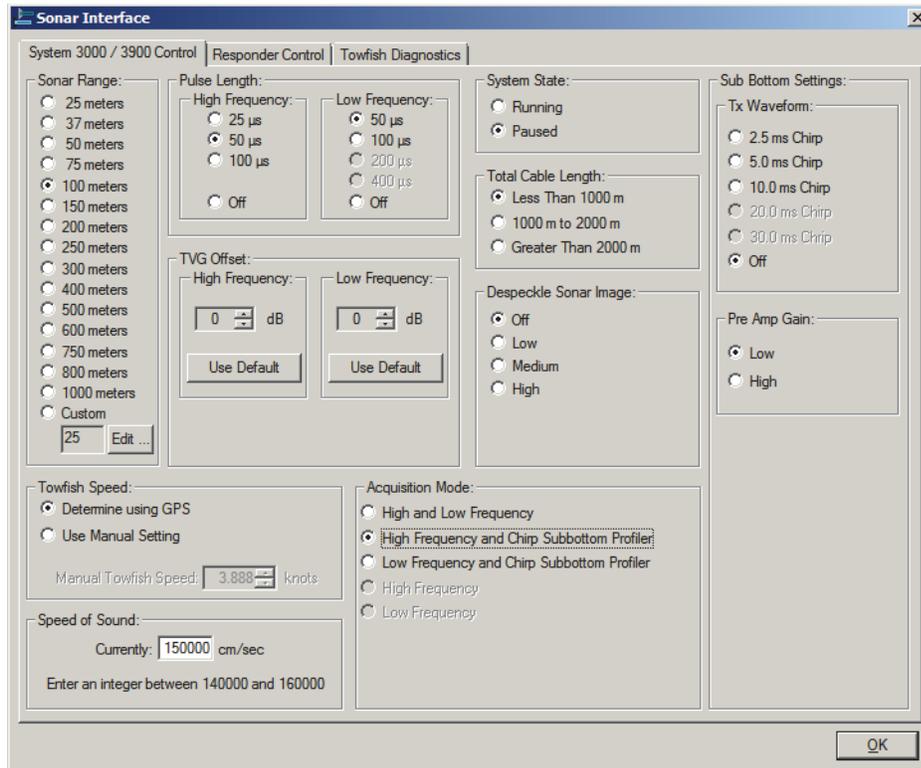
Figure 53: *The Sonar Interface Dialog Box, Series 3000 Sonar System—System 3000/3900 Control Tab*

Pulse Length. When applicable, you can have different pulse length selections for the high and low frequencies. When you select a range scale, the optimum pulse length will be selected. Keep in mind that longer pulse lengths put more power into the water but lower the resolution. You can select **Off** to turn the unused transmitter off if you are only using one frequency.

System State. Select **Running** or **Paused**. These options function the same as the **Play** and **Stop** buttons on the Real-Time tool bar in the Sonar Viewer window.

TVG Offset. This setting should only be changed if you are having unsatisfactory results with the tuning or if you are working in unusual conditions, such as extremely soft mud. There is a setting for each the low and the high frequency with 0 dB as the default. Changing this setting will affect *both* the displayed and recorded data.

Total Cable Length. Determines the gain setting of the telemetry system in the towfish. This setting should only be changed with instructions from the factory.

Despeckle Sonar Image. Filter settings to smooth sonar images. For the highest resolution, select **Off**, as this function is applied to the raw data.

Towfish Speed. Accurate speed input is necessary for the sonar system to work properly. The system should always be used with a speed input device such as a GPS receiver. A manual setting is available should a failure occur.

Speed of Sound. The speed of sound in water. This setting may be adjusted for special conditions.

Acquisition Mode. Selects whether to acquire sonar or sub bottom data or both.

Sub Bottom Settings. Selects the chirp pulse length for the sub bottom sonar if installed. The available settings are dependent on the range selection. To turn off the chirp transmitter, select **Off**.

NOTE *The sub bottom sonar acquires data to a maximum range of 250 meters. In addition, the available chirp pulse length selections are dependent on the range selection.*

Pre Amp Gain. Selects either low or high gain for the sub bottom preamplifier.

The *Responder Control* tab shown in Figure 54 is used when the towfish is equipped with an optional responder. Set the responder ping rate and the responder frequency here.

The *Towfish Diagnostics* tab shown in Figure 55 is used for testing the system. The **Operator Command** area of the dialog box allows you to send specialized commands to the towfish. In addition, the *Towfish Diagnostic* tab provides access to the *Compass Calibration Wizard* dialog box. Click **Run Compass Calibration Wizard** to open the dialog box which is shown in Figure 48 on page 39. The *Compass Calibration Wizard* dialog box provides a fairly quick and accurate method for calibrating the towfish compass. (See page 39 for instructions on how to use the Compass Calibration Wizard.)

The Series 3000 towfish uses a different pressure sensor than the Series 5000 towfish. If your towfish is equipped with a pressure sensor for towfish depth readings, choose *Sensor* from the *Window* menu to open the Sensor window, and then right-click in the window to open the *Sensor Configuration* dialog box shown in Figure 141 on page 127. Select the correct pressure sensor scale option. For the Series 3000, **1500 psia** is the default selection, and **300 psia** is the optional selection. These settings can be made permanent with a modification to the startup.ini file.

KLEIN
MARINE SYSTEMS, INC.

Figure 54: *The Sonar Interface Dialog Box, Series 3000 Sonar System—Responder Control Tab*

Figure 55: *The Sonar Interface Dialog Box, Series 3000 Sonar System—Towfish Diagnostics Tab*

14.3 Series UUV-3500 Sonar System Setup

Towfish Setup

Click this button on the Real-Time tool bar to configure the setup parameters for the Series UUV-3500 Sonar System. The *Sonar Interface* dialog box will open to the *System Control* tab as shown in Figure 56.

Figure 56: *The Sonar Interface Dialog Box, Series UUV-3500 Sonar System—System Control Tab*

> **NOTE** *The Sonar Interface dialog box for a Series UUV-3500 Sonar System is applicable only when the sonar system is under operator control, such as when connected to an ROV.*

The *System Control* tab is the main control interface for the Series UUV-3500 Sonar System. It is used to configure the following setup parameters:

Sonar Range. There are 12 range scale settings from 15 meters to 200 meters plus a custom setting when operating the high or the low frequency sonar, or both, *without* swath bathymetry, and 10 settings from 30 to 200 meters plus a custom setting when operating the high or the low frequency sonar, or both, *with* swath bathymetry. However, for the high frequency sonar only, both the

displayed range, as indicated by the ruler in the Sonar Viewer window, and the recorded range are typically limited to 100 meters regardless of the range selection.

To select the **Custom** range scale setting, click **Edit** to open the *Set Custom Range* dialog box as shown in Figure 57 for when swath bathymetry *is not* operating or as shown in Figure 58 for when swath bathymetry *is* operating, and then enter the range in the **Range** scroll box directly or by using the up/down arrows. Click **OK** and the **Custom** scale setting option will be selected automatically, unless the entered range is equal to one of the standard range options, where in that case that one is selected.
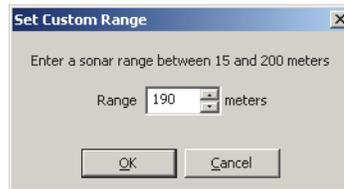
Figure 57: *The Set Custom Range Dialog Box, Series UUV-3500 Sonar System—Operating without Swath Bathymetry*
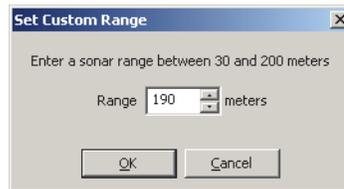
Figure 58: *The Set Custom Range Dialog Box, Series UUV-3500 Sonar System—Operating with Swath Bathymetry*

System State. Select **Running** or **Paused**. These options function the same as the **Play** and **Stop** buttons on the Real-Time tool bar in the Sonar Viewer window.

Towfish Speed. Accurate speed input is necessary for the sonar system to work properly. The system should always be used with a speed input device such as a GPS receiver. A manual setting is available should a failure occur.

Speed of Sound. The speed of sound in water. This setting may be adjusted for special conditions.

High Freq. Transmit and Low Freq. Transmit. Provides several pulse length settings for the output sound waveforms for both the high frequency and low frequency transmitters. The optimum pulse length is selected automatically for the selected sonar range. However, you can select a different pulse length if desired. Some pulse length options are not available for some range selections. Selecting the **Enable** check box turns on the transmitter for that frequency; clearing it turns it off.

Acquisition Mode. Selects single or dual frequency side scan operation with or without swath bathymetry.

- Select **Low Frequency Side Scan** to acquire low frequency side scan data only.

- Select **High Frequency Side Scan** to acquire high frequency side scan data only.

- Select **Low/High Frequency Side Scan** to acquire both low and high frequency side scan data. Data are acquired even if one of the transmitters, the high frequency transmitter or the low frequency transmitter, is disabled.

- Select **Low Frequency Side Scan with Bathy** to acquire low frequency side scan and swath bathymetry data. Available for Series UUV-3500 Sonar Systems with the swath bathymetry sonar option installed.

- Select **High Frequency Side Scan with Bathy** to acquire high frequency side scan and swath bathymetry data. Available for Series UUV-3500 Sonar Systems with the swath bathymetry sonar option installed.

- Select the **Low/High Frequency Side Scan with Bathy** to acquire both low and high frequency side scan data and swath bathymetry data. Available for Series UUV-3500 Sonar Systems with the swath bathymetry sonar option installed. Data are acquired even if one of the transmitters, the high frequency transmitter or the low frequency transmitter, is disabled.

Rx Gain. Select **High (+12 dB)** for a receiver gain setting that is 12 dB above that of the setting for the **Low (0 dB)** option; select **Low (0 dB)** for a receiver gain setting that is 12 dB below that of the setting for the **High (+12 dB)** option. The **High (+12 dB)** option is recommended.

The *Responder Control* tab shown in Figure 59 is used when the UUV is equipped with an optional responder. Set the responder ping rate and the responder frequency here.

The *Towfish Diagnostics* tab shown in Figure 60 is used for testing the system. The **Operator Command** area of the dialog box allows you to send specialized commands to the UUV.

Figure 59: *The Sonar Interface Dialog Box, Series UUV-3500 Sonar System—Responder Control Tab*

Figure 60: *The Sonar Interface Dialog Box, Series UUV-3500 Sonar System—Towfish Diagnostics Tab*

14.4 Series HydroChart 3500 Sonar System Towfish Setup

Towfish Setup

Click this button on the Real-Time tool bar to configure the towfish setup parameters for the Series HydroChart 3500 Sonar System. The *Sonar Interface* dialog box will open to the *System Control* tab as shown in Figure 61.
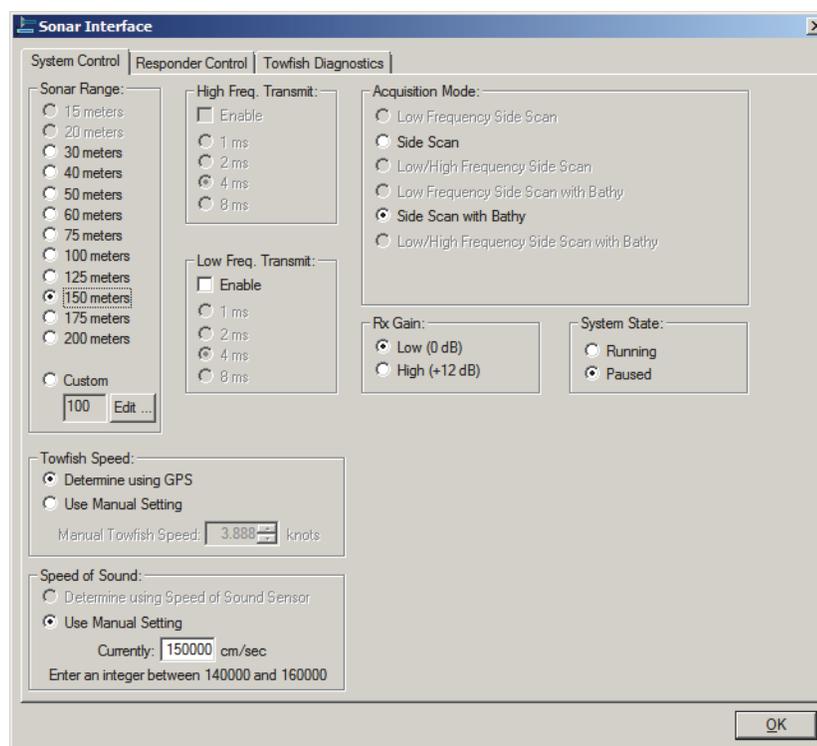
Figure 61: *The Sonar Interface Dialog Box, Series HydroChart 3500 Sonar System—System Control Tab*

The *System Control* tab is the main control interface for the Series HydroChart 3500 Sonar System. It is used to configure the following towfish setup parameters:

Sonar Range. There are 10 range scale settings from 30 meters to 200 meters for both the low and high frequency sonars plus a custom setting.

To select the **Custom** range scale setting, click **Edit** to open the *Set Custom Range* dialog box as shown in Figure 62 for when swath bathymetry *is not* operating or as shown in Figure 63 for when swath bathymetry *is* operating, and then enter the range in the **Range** scroll box directly or by using the up/down arrows. Click **OK** and the **Custom** scale setting option will be selected automatically, unless the entered range is equal to one of the standard range options, where in that case that one is selected.
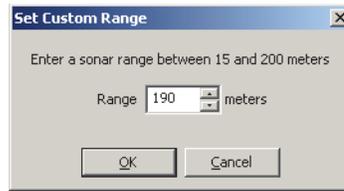
Figure 62: *The Set Custom Range Dialog Box, Series HydroChart 3500 Sonar System—Operating without Swath Bathymetry*
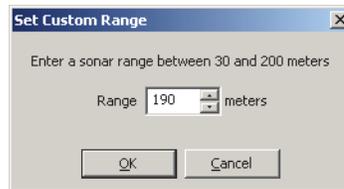
Figure 63: *The Set Custom Range Dialog Box, Series HydroChart 3500 Sonar System—Operating with Swath Bathymetry*

System State. Select **Running** or **Paused**. These options function the same as the **Play** and **Stop** buttons on the Real-Time tool bar in the Sonar Viewer window.

Towfish Speed. Accurate speed input is necessary for the sonar system to work properly. The system should always be used with a speed input device such as a GPS receiver. A manual setting is available should a failure occur.

Speed of Sound. The speed of sound in water. This setting may be adjusted for special conditions.

Low Freq. Transmit. Provides several pulse length settings for the output sound waveforms for the transmitter. However, you can select a different pulse length if desired. Some pulse length options are not available for some range selections. Selecting the **Enable** check box turns on the transmitter; clearing it turns it off.

Acquisition Mode. Selects side scan operation with or without swath bathymetry.

- Select **Side Scan** to acquire side scan data only.

- Select **Side Scan with Bathy** to acquire side scan and swath bathymetry data.

Rx Gain. Select **High (+12 dB)** for a receiver gain setting that is 12 dB above that of the setting for the **Low (0 dB)** option; select **Low (0 dB)** for a receiver gain setting that is 12 dB below that of the setting for the **High (+12 dB)** option. The **High (+12 dB)** option is recommended.

The *Responder Control* tab shown in Figure 64 is used when the towfish is equipped with an optional responder. Set the responder ping rate and the responder frequency here.

The *Towfish Diagnostics* tab shown in Figure 65 is used for testing the system. The **Operator Command** area of the dialog box allows you to send specialized commands to the towfish.
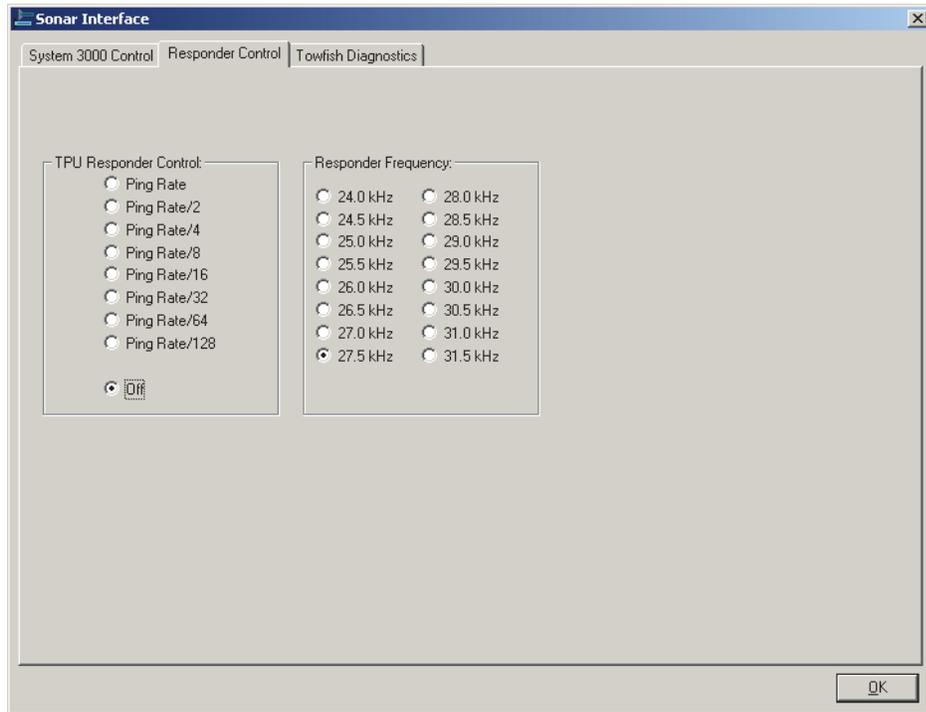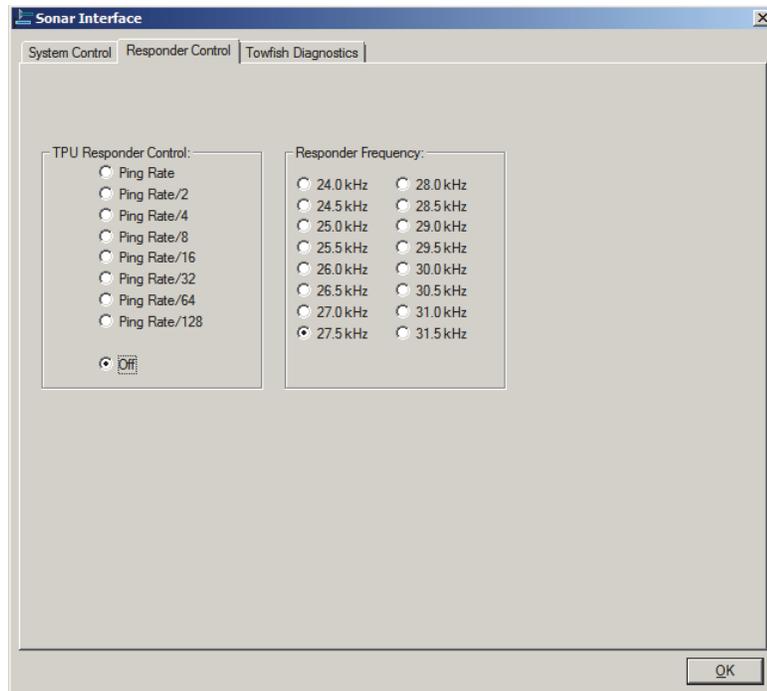

Figure 64: *The Sonar Interface Dialog Box, Series HydroChart 3500 Sonar System—Responder Control Tab*
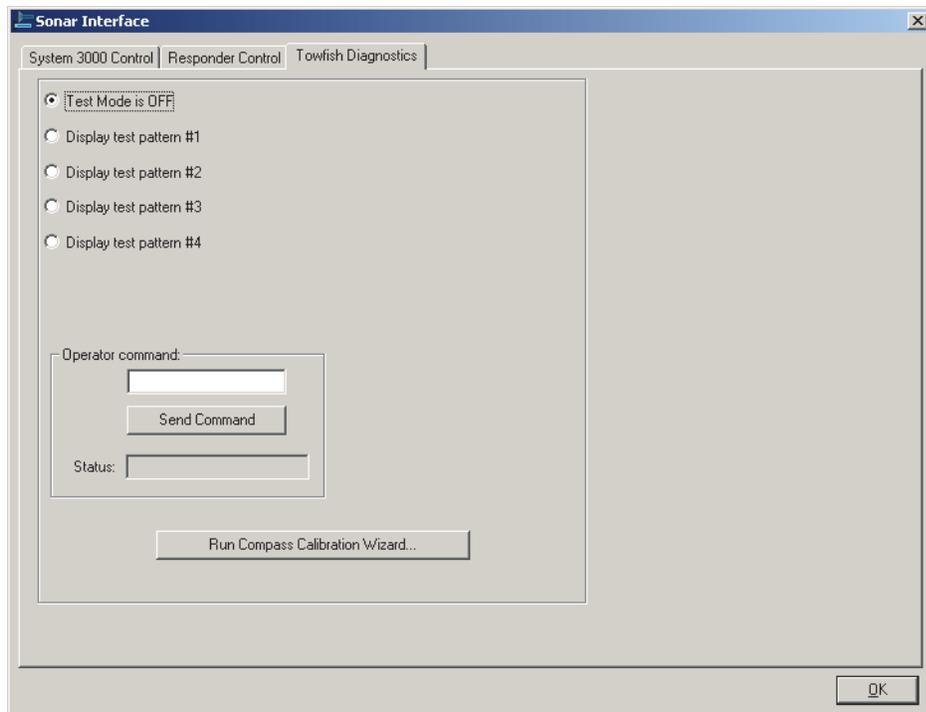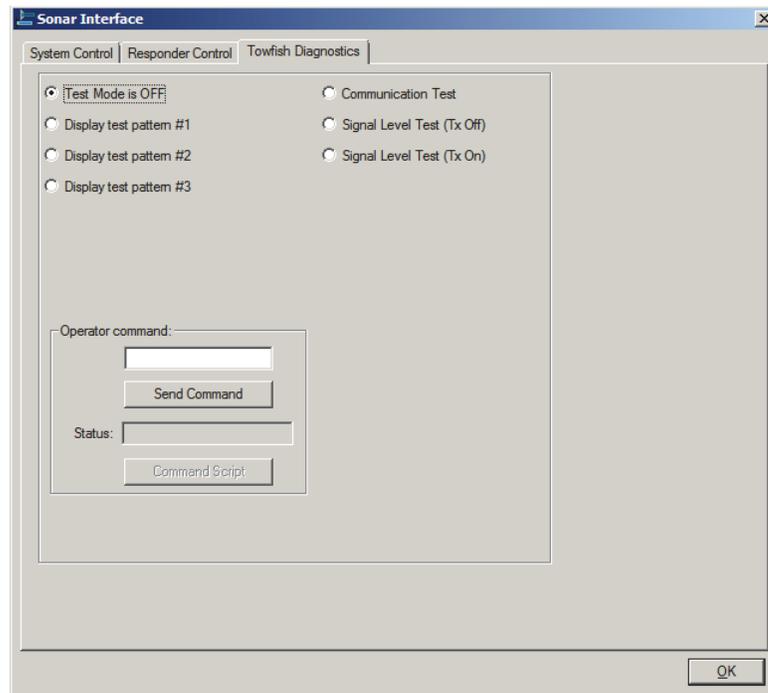
Figure 65: *The Sonar Interface Dialog Box, Series HydroChart 3500 Sonar System—Towfish Diagnostics Tab*

14.5 D3500TF Sonar System Towfish Setup

🖾 **Towfish Setup**

Click this button on the Real-Time tool bar to configure the towfish setup parameters for the D3500TF Sonar System. The *Sonar Interface* dialog box will open to the *System D3500TF* tab as shown in Figure 66.

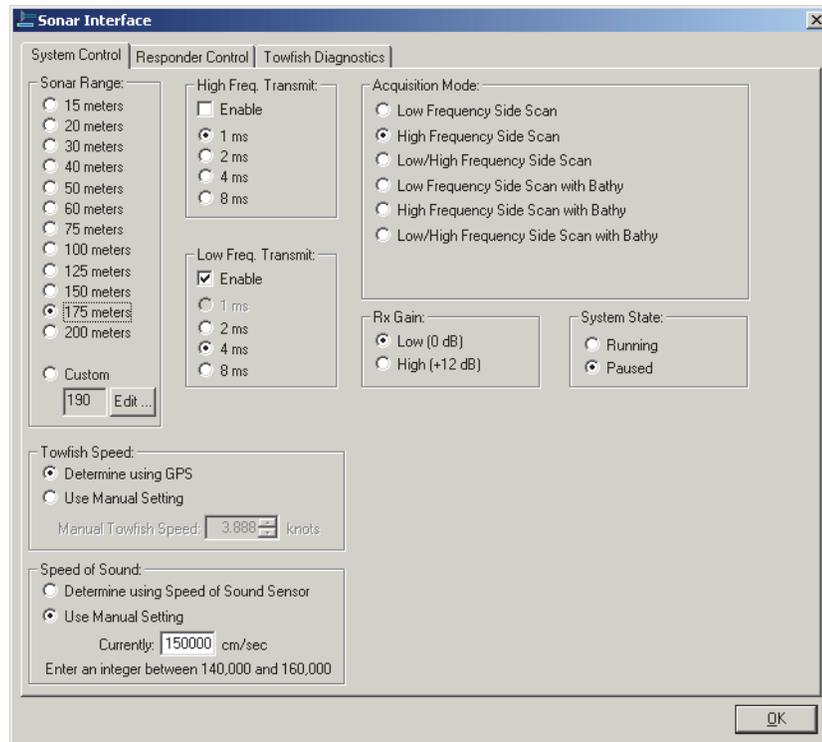**Figure 66:** *The Sonar Interface Dialog Box, D3500TF Sonar System—System D3500TF Control Tab*

The *System D3500TF Control* tab is the main control interface for the D3500TF Sonar System. It is used to configure the following towfish setup parameters:

Sonar Range. There are 16 range selections from 10 meters to 600 meters. However, for the high frequency sonar only, both the displayed range, as indicated by the ruler in the Sonar Viewer window, and the recorded range are typically limited to 200 meters regardless of the range selection.

System State. Select **Running** or **Paused**. These options function the same as the **Play** and **Stop** buttons on the Real-Time tool bar in the Sonar Viewer window.

Cable Length Equalization. Select the option in accordance with the tow cable length.

KLEIN
MARINE SYSTEMS, INC.

> **NOTE** *After making changes to any of the settings within the black frame on the D3500TF tab, click **Apply Settings** to apply them. To cancel any changes if they have not yet been applied, click **Cancel**.*

Towfish Power. Turns the towfish power on or off without affecting the power to any of the surface components. An hour glass icon is displayed while the towfish is initializing.

Towfish Speed. Accurate speed input is necessary for the sonar system to work properly. The system should always be used with a speed input device such as a GPS receiver. A manual setting is available should a failure occur.

Speed of Sound. The speed of sound in water. This setting may be adjusted for special conditions.

High Freq. Transmit and Low Freq. Transmit. Provides several pulse length settings, including continuous wave (CW) for the output sound waveforms for both the high frequency and low frequency transmitters. The optimum pulse length is selected automatically for the selected sonar range. However, you can select a different pulse length if desired. Some pulse length options are not available for some range selections. Selecting the **Enable** check box turns on the transmitter for that frequency; clearing it turns it off.

Acquisition Mode. Selects single or dual frequency side scan operation.

- Select **Low Frequency Side Scan** to acquire low frequency side scan data only.

- Select **High Frequency Side Scan** to acquire high frequency side scan data only.

- Select **Low/High Frequency Side Scan** to acquire both low and high frequency side scan data. Data are acquired even if one of the transmitters, the high frequency transmitter or the low frequency transmitter, is disabled.

Rx Gain. Select **High (+12 dB)** for a receiver gain setting that is 12 dB above that of the setting for the **Low (0 dB)** option; select **Low (0 dB)** for a receiver gain setting that is 12 dB below that of the setting for the **High (+12 dB)** option. The **High (+12 dB)** option is recommended.

1 PPS Trigger Source. Selects whether the sonars are synchronized to an internal or external timing source.

The *Responder Control* tab shown in Figure 67 is used when the towfish is equipped with an optional responder. Set the responder ping rate and the responder trigger pulse width here.

The *Towfish Diagnostics* tab shown in Figure 68 is used for testing the system. The **Operator Command** area of the dialog box allows you to send specialized commands to the towfish.
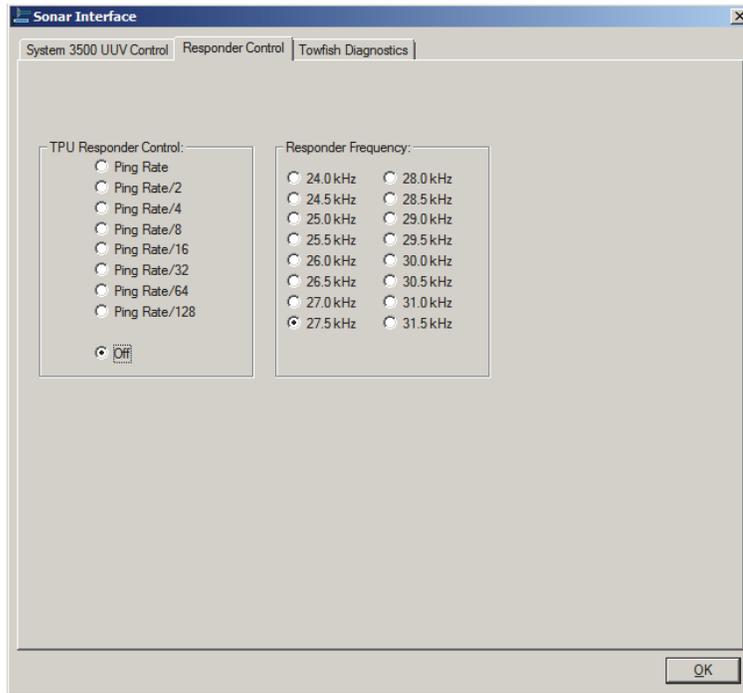
Figure 67: *The Sonar Interface Dialog Box, D3500TF Sonar System—Responder Control Tab*
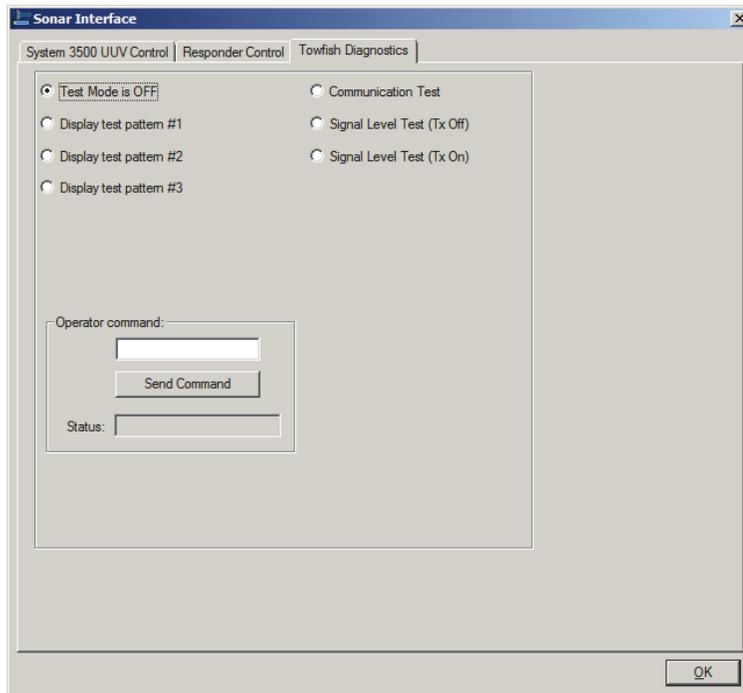

Figure 68: *The Sonar Interface Dialog Box, D3500TF Sonar System—Towfish Diagnostics Tab*

14.6 Series 3900 Sonar System Towfish Setup

🖼️ **Towfish Setup**

Click this button on the Real-Time tool bar to configure the towfish setup parameters for the Series 3900 Sonar System. The *Sonar Interface* dialog box will open to the *System 3000/3900 Control* tab as shown in Figure 69.
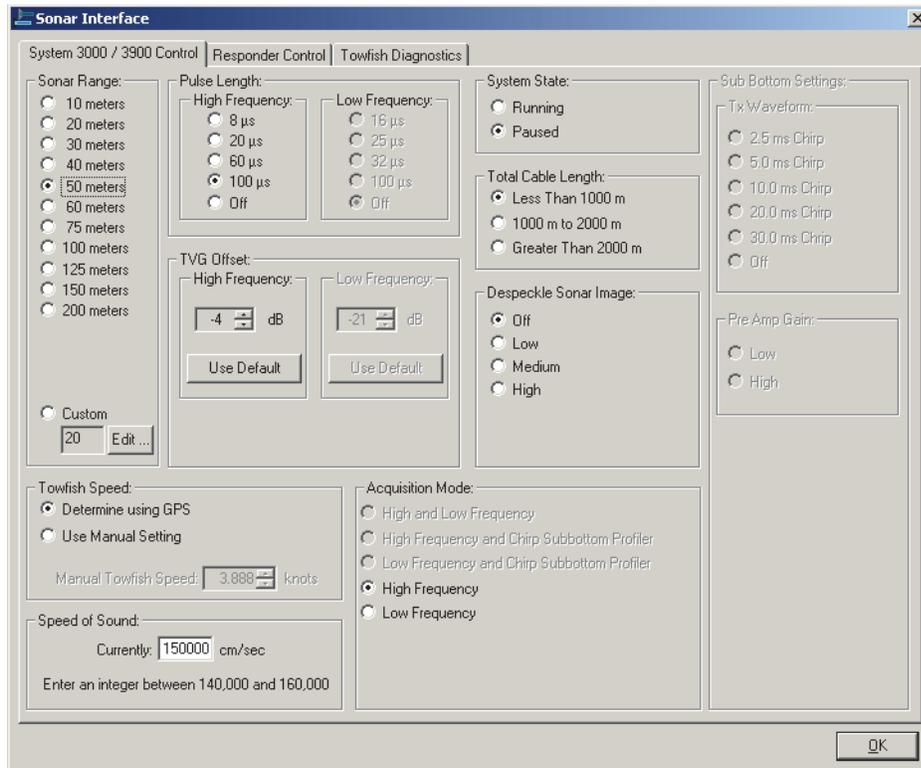
Figure 69: *The Sonar Interface Dialog Box, Series 3900 Sonar System—System 3000/3900 Control Tab*

The *System 3000/3900 Control* tab is the main control interface for the Series 3900 Sonar System. It is used to configure the following towfish setup parameters:

Sonar Range. There are 10 range scale settings from 20 meters to 200 meters for the low frequency sonar and 11 range settings from 10 meters to 200 meters for the high frequency sonar plus a custom setting.

To select the **Custom** range scale setting, click **Edit** to open the *Set Custom Range* dialog box as shown in Figure 70 for when operating at the high frequency or as shown in Figure 71 for when operating at the low frequency, and then enter the range in the **Range** scroll box directly or by using the up/down arrows. Click **OK** and the **Custom** scale setting option will be selected automatically, unless the entered range is equal to one of the standard range options, where in that case that one is selected.
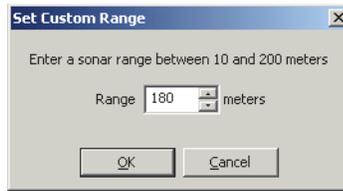
Figure 70: *The Set Custom Range Dialog Box, Series 3900 Sonar System—High Frequency Operation*
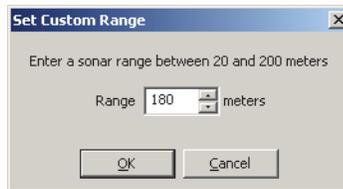
Figure 71: *The Set Custom Range Dialog Box, Series 3900 Sonar System—Low Frequency Operation*

Pulse Length. When applicable, you can have different pulse length selections for the high and low frequencies. When you select a range scale, the optimum pulse length will be selected. Keep in mind that longer pulse lengths put more power into the water but lower the resolution. You can select **Off** to turn the transmitter off.

System State. Select **Running** or **Paused**. These options function the same as the **Play** and **Stop** buttons on the Real-Time tool bar in the Sonar Viewer window.

TVG Offset. This setting should only be changed if you are having unsatisfactory results with the tuning or if you are working in unusual conditions, such as extremely soft mud. There are settings for both the low frequency (445 kHz) sonar and the high frequency (900 kHz) sonar, with 0 dB as the default setting for the low frequency, and -4 dB for the high frequency. Changing this setting will affect *both* the displayed and recorded data.

Total Cable Length. Determines the gain setting of the telemetry system in the towfish. This setting should only be changed with instructions from the factory.

Despeckle Sonar Image. Filter settings to smooth sonar images. For the highest resolution, select **Off**, as this function is applied to the raw data.

Towfish Speed. Accurate speed input is necessary for the sonar system to work properly. The system should always be used with a speed input device such as a GPS receiver. A manual setting is available should a failure occur.

Speed of Sound. The speed of sound in water. This setting may be adjusted for special conditions.

Acquisition Mode. Select the **Low Frequency** option to operate the low frequency (445 kHz) sonar; select the **High Frequency** option to operate the high frequency (900 kHz) sonar.

Sub Bottom Settings. These settings are not used for the Series 3900 Sonar System.

Pre Amp Gain. These settings are not used for the Series 3900 Sonar System.

The *Responder Control* tab shown in Figure 72 is used when the towfish is equipped with an optional responder. Set the responder ping rate and the responder frequency here.

The *Towfish Diagnostics* tab shown in Figure 73 is used for testing the system. The **Operator Command** area of the dialog box allows you to send specialized commands to the towfish. In addition, the *Towfish Diagnostics* tab provides access to the *Compass Calibration Wizard* dialog box. Click **Run Compass Calibration Wizard** to open the dialog box which is shown in Figure 48 on page 39. The *Compass Calibration Wizard* dialog box provides a fairly quick and accurate method for calibrating the towfish compass. (See page 39 for instructions on how to use the Compass Calibration Wizard.).
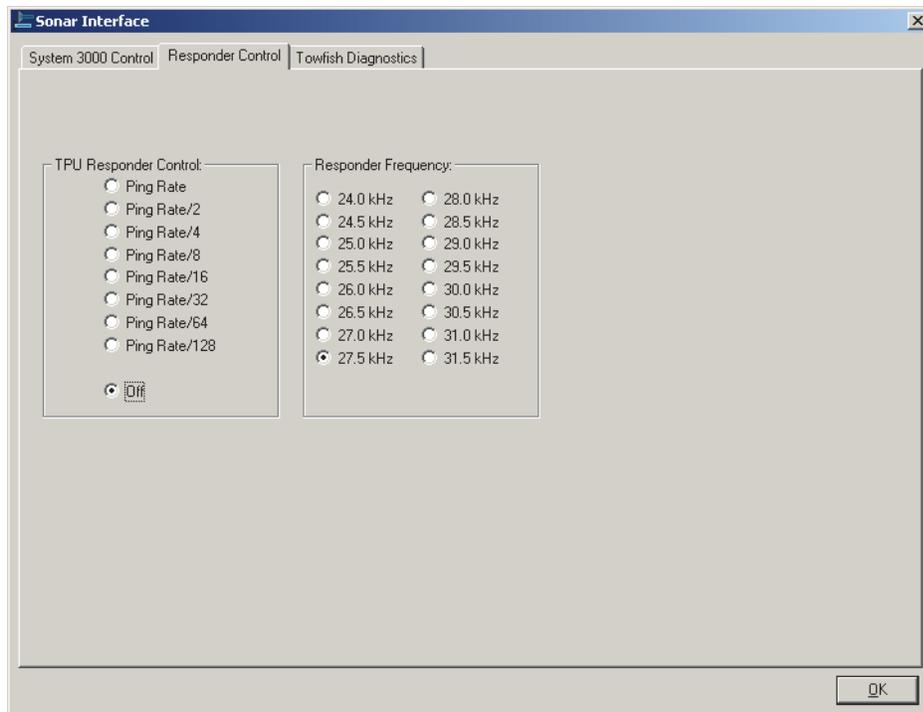
Figure 72: *The Sonar Interface Dialog Box, Series 3900 Sonar System—Responder Control Tab*
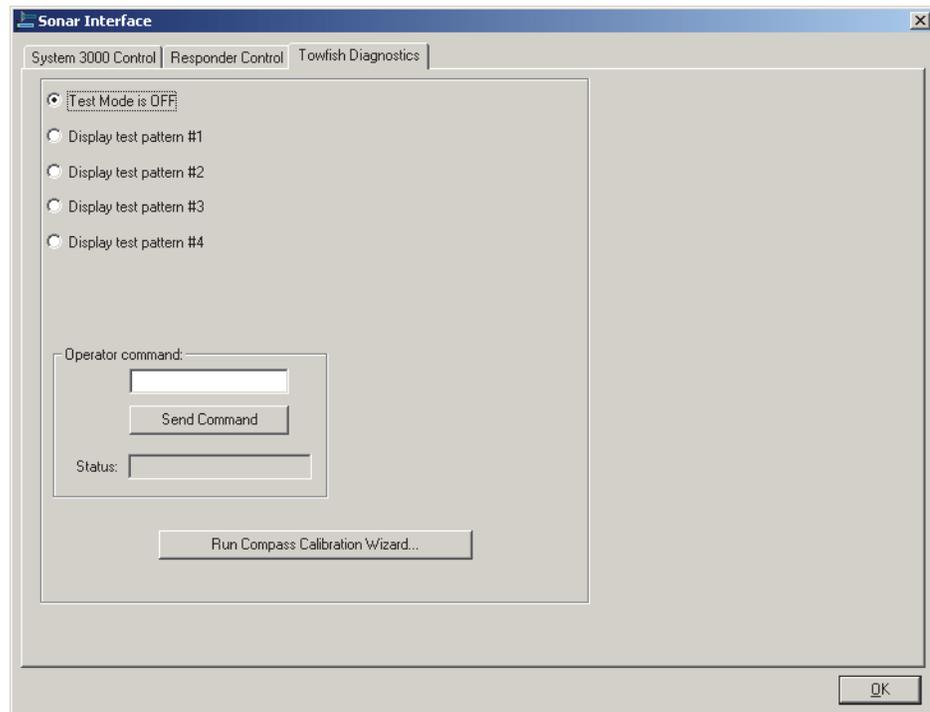
Figure 73: *The Sonar Interface Dialog Box, Series 3900 Sonar System—Towfish Diagnostics Tab*

The Series 3900 towfish uses a different pressure sensor than the Series 5000 towfish. If your towfish is equipped with a pressure sensor for towfish depth readings, choose *Sensor* from the *Window* menu to open the Sensor window, and then right-click in the window to open the *Sensor Configuration* dialog box shown in Figure 141 on page 127. Select the correct pressure sensor scale option. For the Series 3900, **1500 psia** is the default selection, and **300 psia** is the optional selection. These settings can be made permanent with a modification to the startup.ini file.

14.7 Series 4900 Sonar System Towfish Setup

Towfish Setup

Click this button on the Real-Time tool bar to configure the towfish setup parameters for the Series 4900 Sonar System. The *Sonar Interface* dialog box will open to the *System 4900 Control* tab as shown in Figure 74.
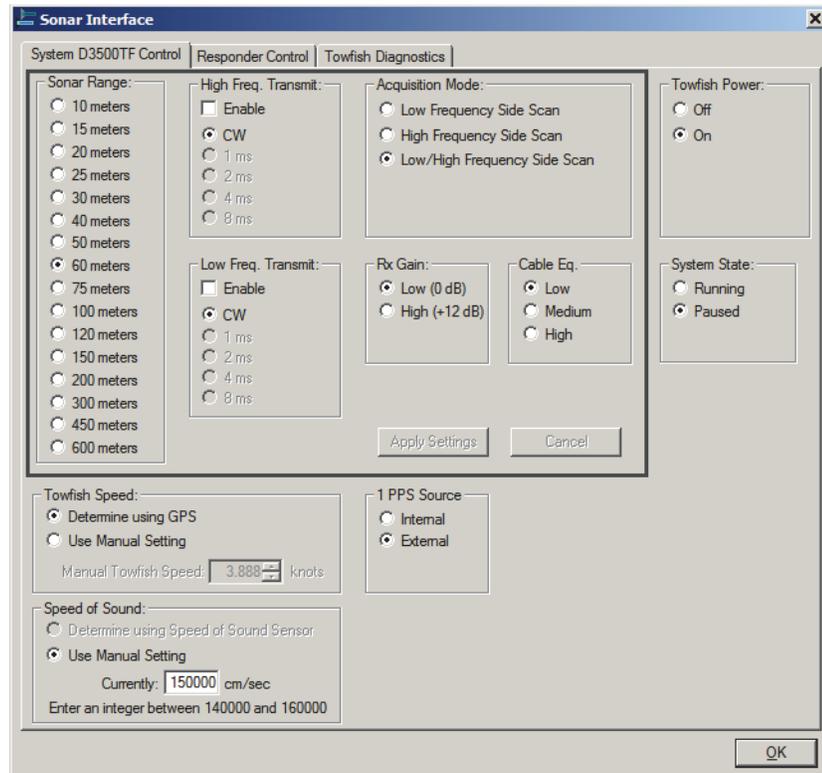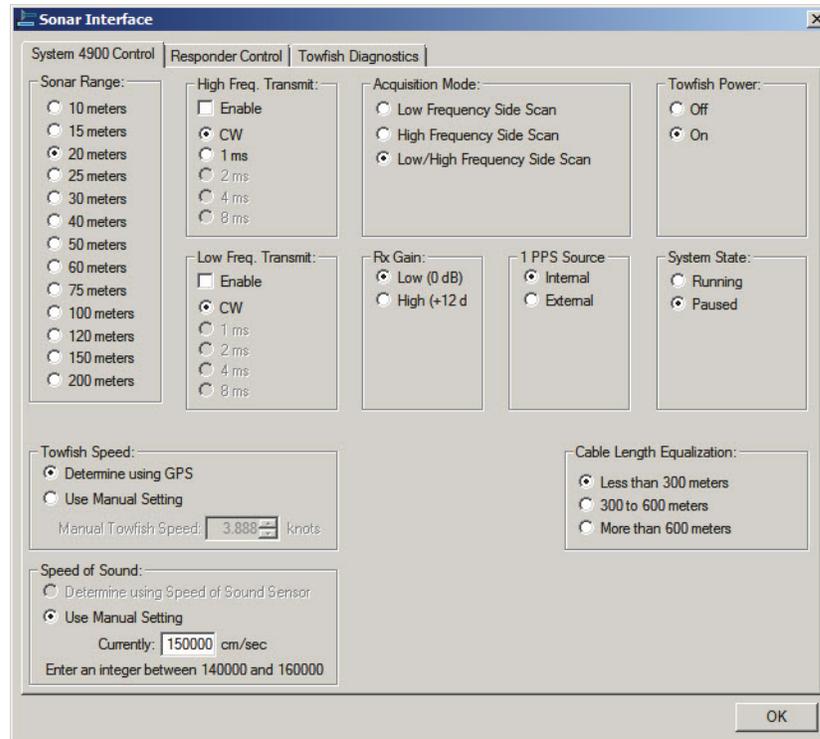

Figure 74: *The Sonar Interface Dialog Box, Series 4900 Sonar System—System 4900 Control Tab*

The *System 4900 Control* tab is the main control interface for the Series 4900 Sonar System. It is used to configure the following towfish setup parameters:

Sonar Range. There are 13 range selections from 10 meters to 200 meters. However, for the high frequency sonar only, both the displayed range, as indicated by the ruler in the Sonar Viewer window, and the recorded range are typically limited to 100 meters regardless of the range selection.

System State. Select **Running** or **Paused**. These options function the same as the **Play** and **Stop** buttons on the Real-Time tool bar in the Sonar Viewer window.

Cable Length Equalization. Select the option in accordance with the tow cable length.

Towfish Power. Turns the towfish power on or off without affecting the power to any of the surface components. An hour glass icon is displayed while the towfish is initializing.

Towfish Speed. Accurate speed input is necessary for the sonar system to work properly. The system should always be used with a speed input device such as a GPS receiver. A manual setting is available should a failure occur.

Speed of Sound. The speed of sound in water. This setting may be adjusted for special conditions.

High Freq. Transmit and Low Freq. Transmit. Provides several pulse length settings, including continuous wave (CW) for the output sound waveforms for both the high frequency and low frequency transmitters. The optimum pulse length is selected automatically for the selected sonar range. However, you can select a different pulse length if desired. Some pulse length options are not available for some range selections. Selecting the **Enable** check box turns on the transmitter for that frequency; clearing it turns it off.

Acquisition Mode. Selects single or dual frequency side scan operation.

- Select **Low Frequency Side Scan** to acquire low frequency side scan data only.

- Select **High Frequency Side Scan** to acquire high frequency side scan data only.

- Select **Low/High Frequency Side Scan** to acquire both low and high frequency side scan data. Data are acquired even if one of the transmitters, the high frequency transmitter or the low frequency transmitter, is disabled.

Rx Gain. Select **High (+12 dB)** for a receiver gain setting that is 12 dB above that of the setting for the **Low (0 dB)** option; select **Low (0 dB)** for a receiver gain setting that is 12 dB below that of the setting for the **High (+12 dB)** option. The **High (+12 dB)** option is recommended.

1 PPS Trigger Source. Selects whether the sonars are synchronized to an internal or external timing source.

The *Responder Control* tab shown in Figure 75 is used when the towfish is equipped with an optional responder. Set the responder ping rate and the responder trigger pulse width here.

The *Towfish Diagnostics* tab shown in Figure 76 is used for testing the system. The **Operator Command** area of the dialog box allows you to send specialized commands to the towfish.
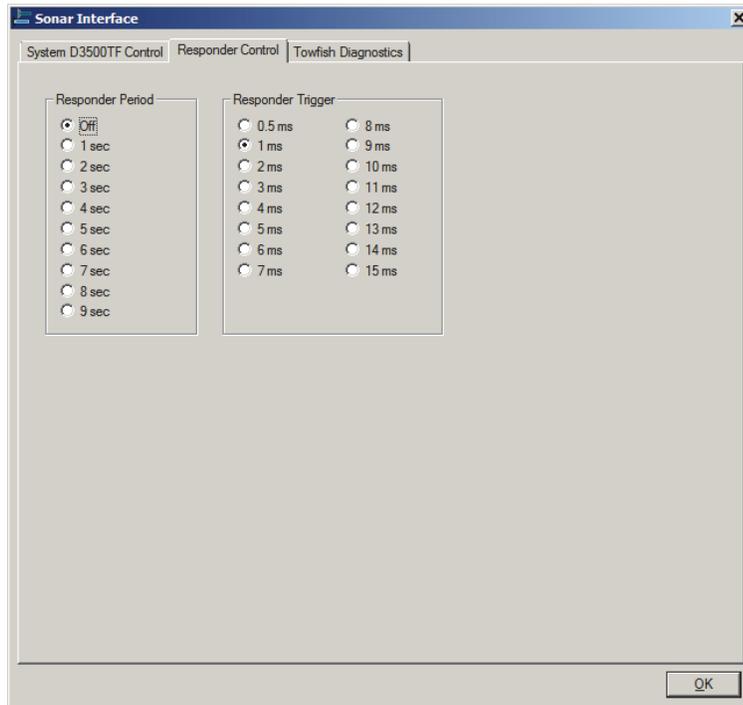
KLEIN
MARINE SYSTEMS, INC.
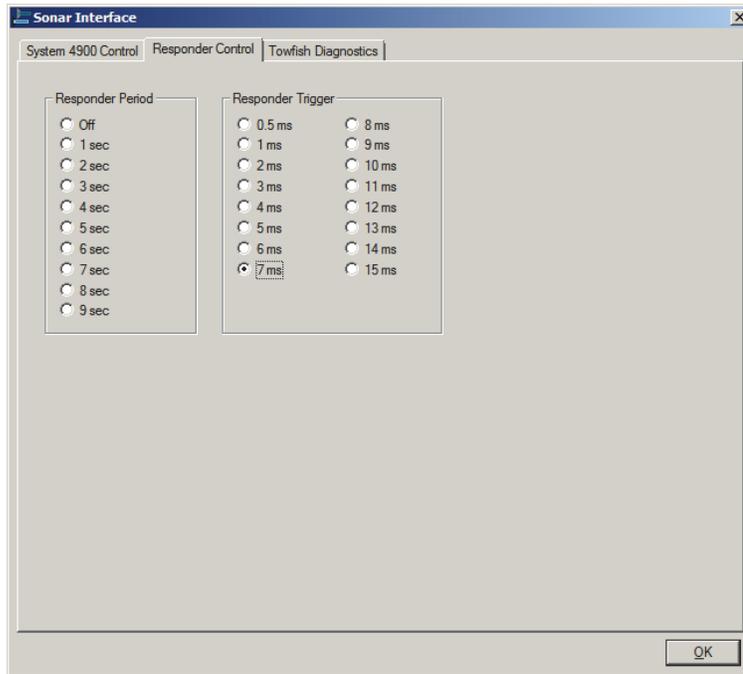
Figure 75: *The Sonar Interface Dialog Box, Series 4900 Sonar System—Responder Control Tab*
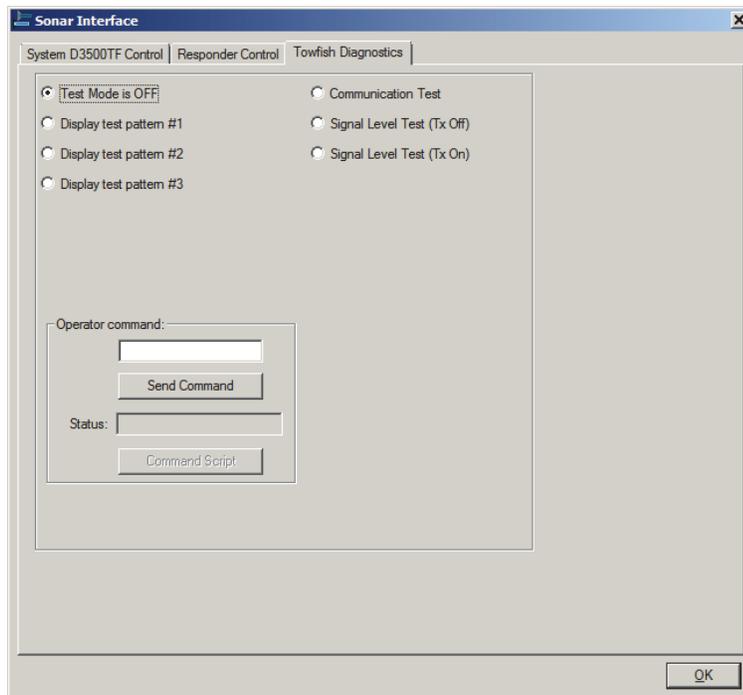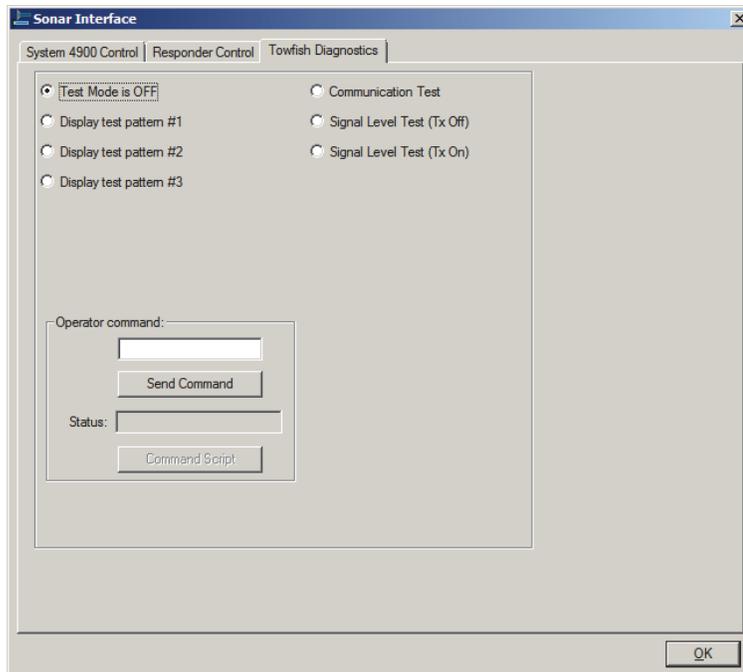

Figure 76: *The Sonar Interface Dialog Box, Series 4900 Sonar System—Towfish Diagnostics Tab*

14.8 Series 5900 Sonar System Towfish Setup

Towfish Setup

Click this button on the Real-Time tool bar to configure the towfish setup parameters for the Series 5900 Sonar System. If the optional gap filler sonar is *not* installed, the *Sonar Interface* dialog box will open to the *System 5900 Control* tab as shown in Figure 77; if it *is* installed, the *System 5900 Control* tab is as shown in Figure 78.
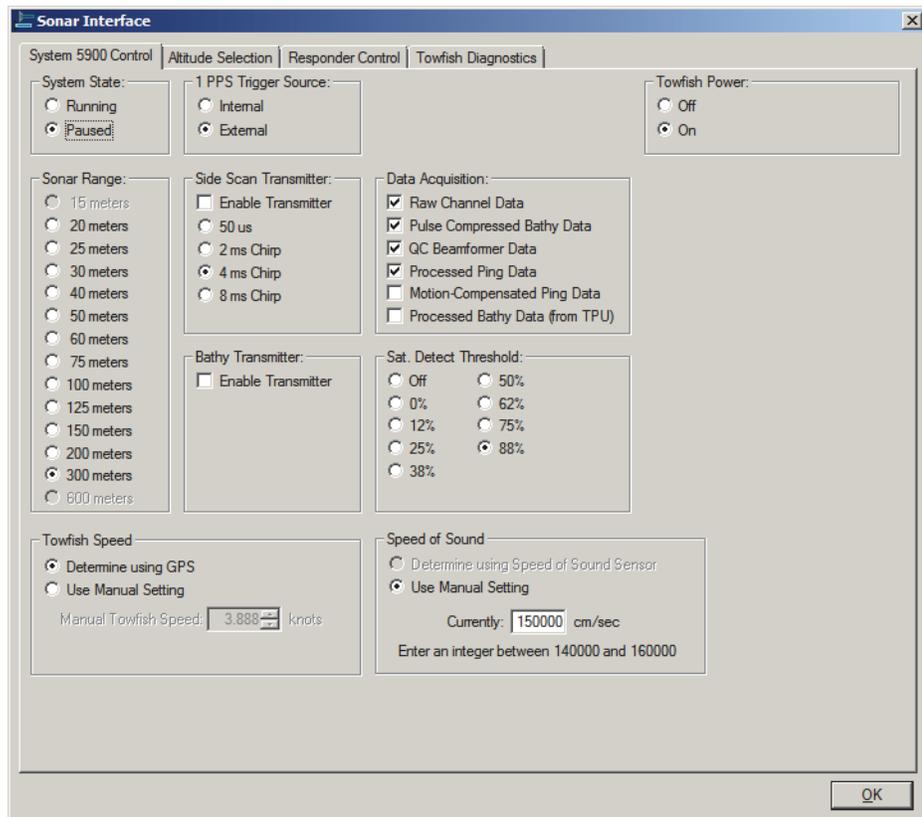
Figure 77: *The Sonar Interface Dialog Box—System 5900 Control Tab, without the Optional Gap Filler Sonar Installed*
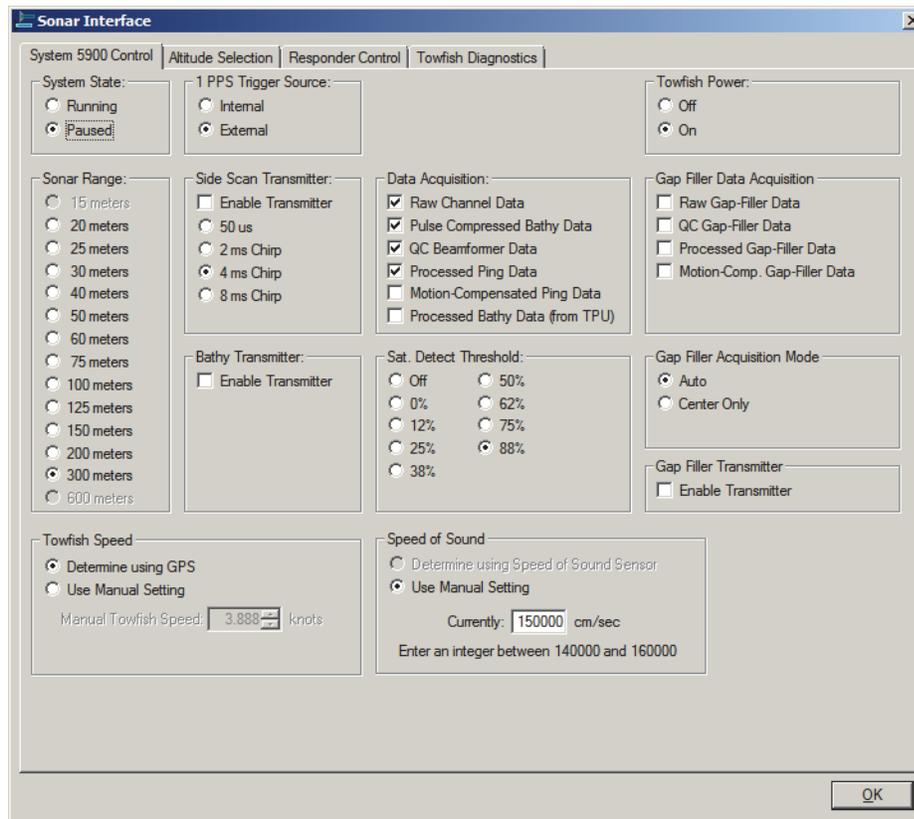
Figure 78: *The Sonar Interface Dialog Box—System 5900 Control Tab, with the Optional Gap Filler Sonar Installed*

The *System 5900 Control* tab is the main control interface for the Series 5900 Sonar System. It is used to configure the following towfish setup parameters:

Side Scan Transmitter. Provides several pulse length settings for the output sound waveforms. The optimum pulse length is selected automatically for the selected sonar range. However, you can select a different pulse length if desired. Some pulse length options are not available for some range selections. Selecting the **Enable Transmitter** check box turns on the side scan transmitter; clearing it turns it off.

Bathy Transmitter. Enables or disables the bathy transmitter. The pulse lengths are the same as that used for the side scan transmitter.

Sonar Range. There are 12 range selections from 20 meters to 300 meters

System State. Select **Running** or **Paused**. These options function the same as the **Play** and **Stop** buttons on the Real-Time tool bar in the Sonar Viewer window, and if the optional gap filler sonar is installed, also on the Real-Time tool bar in the Gap Filler Viewer window.

1 PPS Trigger Source. Selects whether the sonars are synchronized to an internal or external timing source.

Towfish Power. Turns the towfish power on or off without affecting the power to any of the surface components. An hour glass icon is displayed while the towfish is initializing.

Towfish Speed. Accurate speed input is necessary for the sonar system to work properly. The system should always be used with a speed input device such as a GPS receiver. A manual setting is available should a failure occur.

Speed of Sound. The speed of sound in water. This setting may be adjusted for special conditions.

Data Acquisition. Selects the data page types SonarPro acquires from the side scan and bathymetric sonars. The selected page types are recorded to SDF files and can be displayed. Both QC (quality control) ping data and high resolution beamformed processed ping data are acquired. QC ping data provides direct confirmation of sonar operation for each ping with minimum delay. Beamformed processed ping data uses a beamforming process and multiple pings data to derive the high resolution images. In addition, for the processed pings, there are selections for whether to apply motion compensation to remove to the extent possible the effect of towfish motion on the acquired image.

- Select **Raw Channel Data** to record raw side scan data which is the source data for all subsequent processing.

- Select **Pulse Compressed Bathy Data** to record and display pulse compressed bathymetric data.

- Select **QC Beamformer Data** to record and display QC beamformed data.

- Select **Processed Ping Data** to record and display processed ping data without motion compensation.

- Select **Motion-Compensated Ping Data** to record and display processed ping data with motion compensation.

- Select **Processed Bathy Data (from TPU)** to record and display processed bathymetric data. For instructions on how to enter the bathymetric processing setup parameters, refer to "Swath Bathymetric Sonar Setup" on page 73.

Sat. Detect Threshold. Selects the percentage of full scale at which the saturation indicator in the Scan window is set. This indicator provides a verification that the amplified analog signals from the transducers are not saturated.

KLEIN
MARINE SYSTEMS, INC.

With the optional gap filler sonar installed, the *System 5900 Control* tab additionally includes the following towfish setup parameters:

Gap Filler Data Acquisition. Selects the data page types SonarPro acquires from the gap filler sonar. The data page types are similar to that of the side scan and bathymetric data page types.

- Select **Raw Gap-Filler Data** to record and display raw gap filler sonar data.

- Select **QC Gap-Filler Data** to record and display QC gap filler sonar data.

- Select **Processed Gap-Filler Data** to record and display processed gap filler sonar data without motion compensation.

- Select **Motion-Comp. Gap-Filler Data** to record and display processed gap filler sonar data with motion compensation.

Gap Filler Acquisition Mode. Normally, the gap filler sonar acquires a 60-degree swath of data in 20-degree segments. If the altitude of the towfish above the bottom is so high that there is no time for three separate data acquisitions, the gap filler sonar can be set to acquire data for only the center segment.

- Select **Auto** to automatically determine whether to acquire data from all three segments or just the center one.

- Select **Center Only** to acquire data for only the center segment.

Gap Filler Transmitter. Selecting the **Enable Transmitter** check box turns on the gap filler sonar transmitter; clearing it turns it off.

The *Altitude Selection* tab is shown in Figure 79. On this tab you can override the altimeter in an attempt to manually track the bottom in adverse operating conditions.

- Select **Use Measured Altitude** to run with the altimeter on. This is the default setting when starting SonarPro and should be used almost all of the time. When this option is selected, the **Altimeter Controls** area appears on the *Altitude Selection* tab as shown in Figure 79. During real-time operation these controls allow you to select the gain, low or high, of the altimeter receiver, and allow you to set the receive threshold level above which a received bottom echo is accepted.
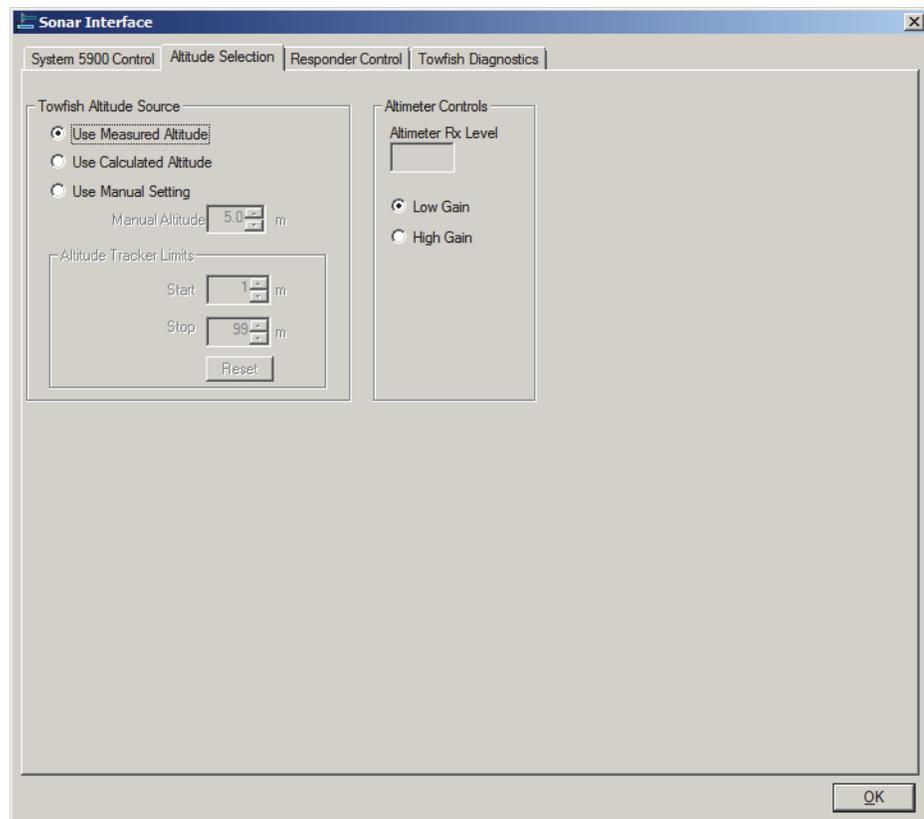
Figure 79: *The Sonar Interface Dialog Box, Series 5900 Sonar System—Altitude Selection Tab with the Use Measured Altitude Option Selected*

KLEIN
MARINE SYSTEMS, INC.

- Select **Use Calculated Altitude** to use the bathymetric channel returns instead of the altimeter to determine the altitude of the towfish. This option is available as a backup altitude tracker should the environmental conditions be too complex for the altimeter to function properly or if the altimeter is not functioning. When selected, the **Altitude Tracker Limits** scroll box appears on the *Altitude Selection* tab as shown in Figure 80. During real-time operation these controls allow you set lower and upper altitude tracker limits between which altitude tracking will track the bottom. Altitude tracking will not be performed outside these limits. The limit settings are especially useful when operating in shallow water where surface returns may interfere with altitude tracking. To return the altitude tracker limit settings to their original settings, click **Reset**.
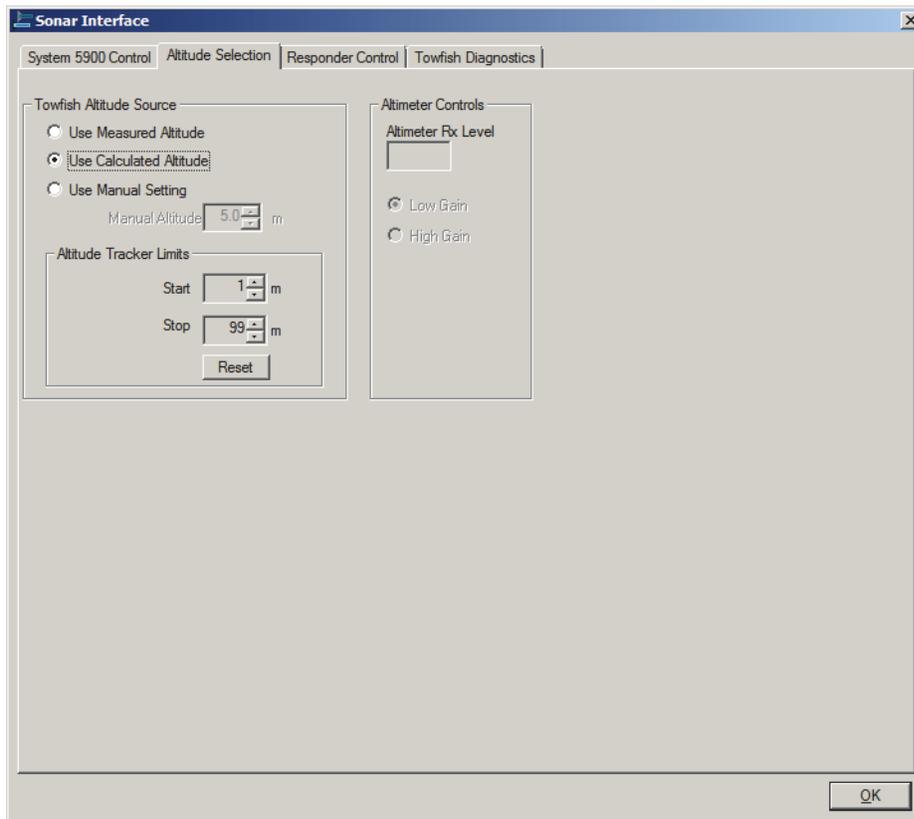
Figure 80: *The Sonar Interface Dialog Box, Series 5900 Sonar System—Altitude Selection Tab with the Use Calculated Altitude Option Selected*

- Select **Use Manual Setting** to enter an estimated altitude for the towfish. When this option is selected, the **Manual Altitude** scroll box appears on the *Altitude Selection* tab as shown in Figure 81. In this scroll box enter the estimated altitude, which will remain fixed.
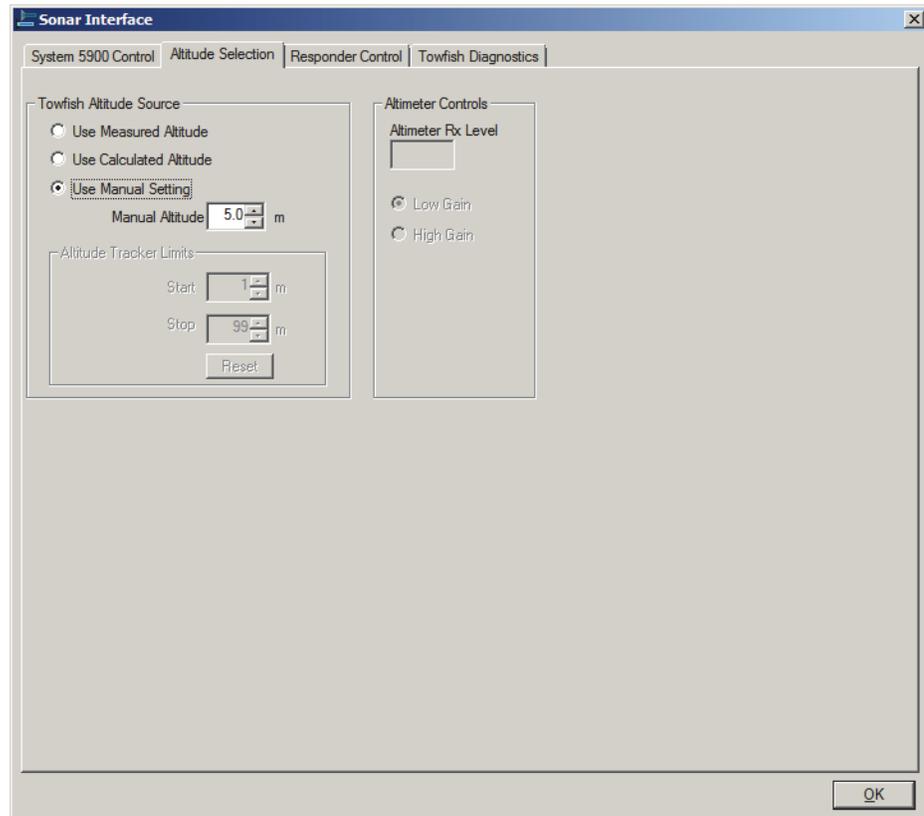
Figure 81: *The Sonar Interface Dialog Box, Series 5900 Sonar System—Altitude Selection Tab with the Use Manual Setting Option Selected*

The *Responder Control* tab shown in Figure 82 is used when the towfish is equipped with an optional responder. Set the responder ping rate period here.
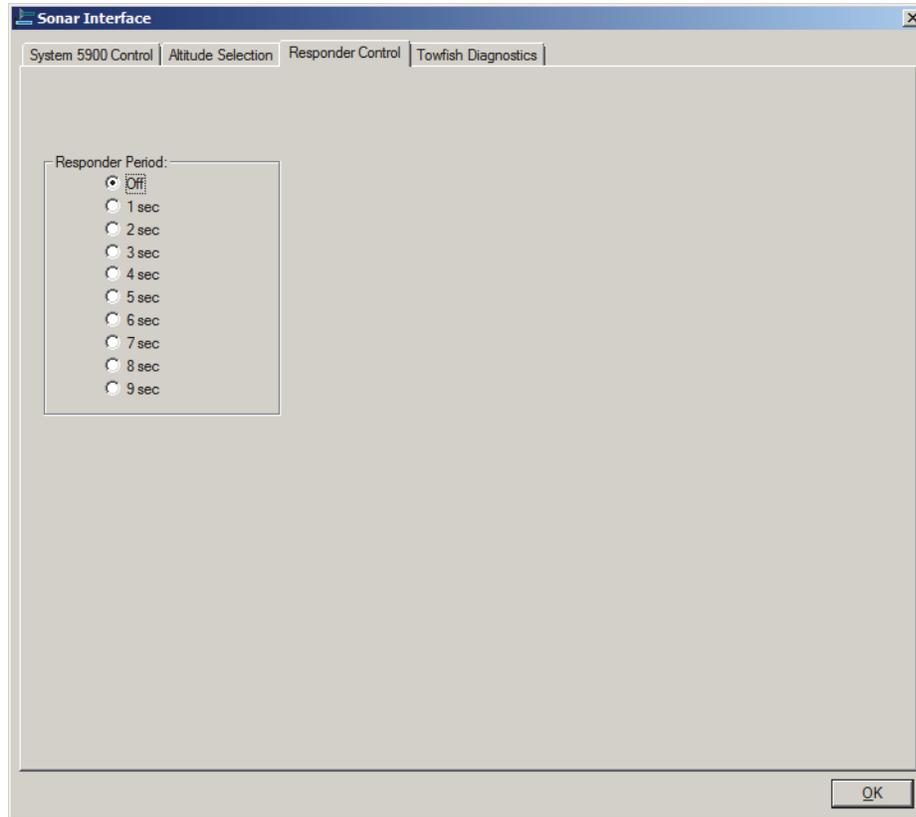
Figure 82: *The Sonar Interface Dialog Box, Series 5900 Sonar System—Responder Control Tab*

The *Towfish Diagnostics* tab shown in Figure 83 is used for testing the system. The **Operator Command** area of the dialog box allows you to send specialized commands to the towfish. The Towfish Diagnostics tab also provides the following diagnostic checks:

- End-to-End, 600 kHz

- End-to-End, 455 kHz

- End-to-End, 750 kHz

- Demux Ramp Insertion

- Uplink Multiplexer Ramp Insertion

- Rx Multiplexer Ramp Insertion

- Receivers Ramp Insertion

For instructions on how to perform these tests and view the results, refer to Chapter 4, "Maintenance and Troubleshooting" of the "Series 5900 Sonar System Operations and Maintenance Manual" (P/N 11214589).
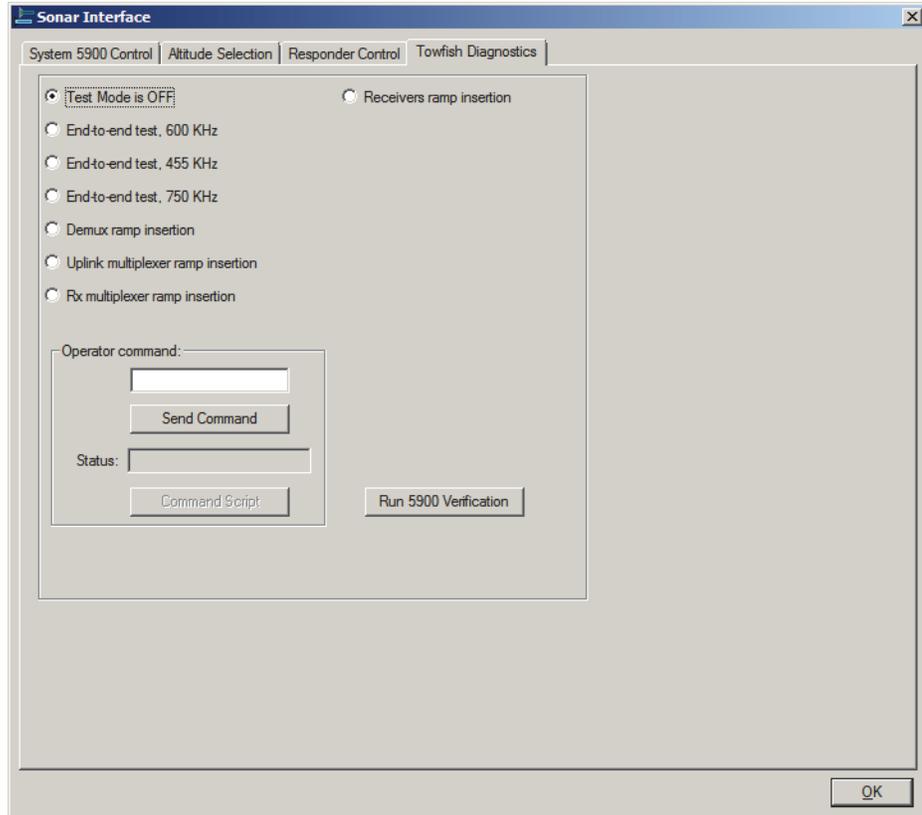
Figure 83: *The Sonar Interface Dialog Box, Series 5900 Sonar System—Towfish Diagnostics Tab*

In addition to the diagnostic checks, a hardware verification test is available. This test is performed from the *System 5900 Hardware Verification* dialog box. To open this dialog box, click **Run 5900 Verification**. To run the test when SonarPro is connected to a 5900 Sonar System, select the **Always run this test when connecting to a System 5900 sonar** check box in the *System 5900 Hardware Verification* dialog box. To cycle power and re-run the test if the test fails, select the **Cycle power and retry when test fails** check box. The test will run up to five times. To run the test, click **Start Test**; to pause the test, click **Pause**.

The tests are performed for the side scan sonar, the bathymetric sonar and the gap filler sonar. The tests involve noise level measurements, center frequency checks, amplitude checks, and phase checks. Shown in Figure 84 are the test results as would be viewed when scrolling down the display. To copy the test results to the Windows clipboard, click **Copy Log**, and to close the dialog box, click **Close**.
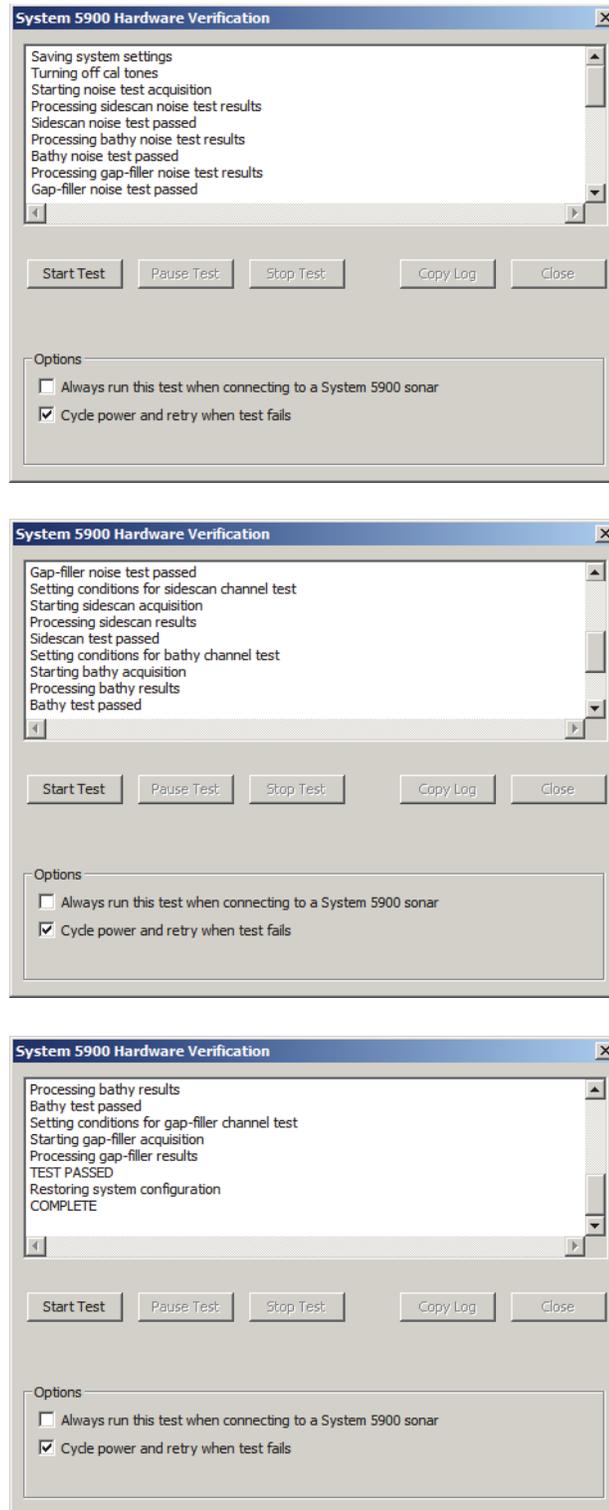
Figure 84: *System 5900 Hardware Verification Dialog Box—Test Results as Viewed when Scrolling Down through the Display*

15.0 Swath Bathymetric Sonar Setup

Bathy Setup

Click this button to enter the bathymetric processing setup parameters. The *Bathymetry Processing Setup* dialog box will open as shown in Figure 85.
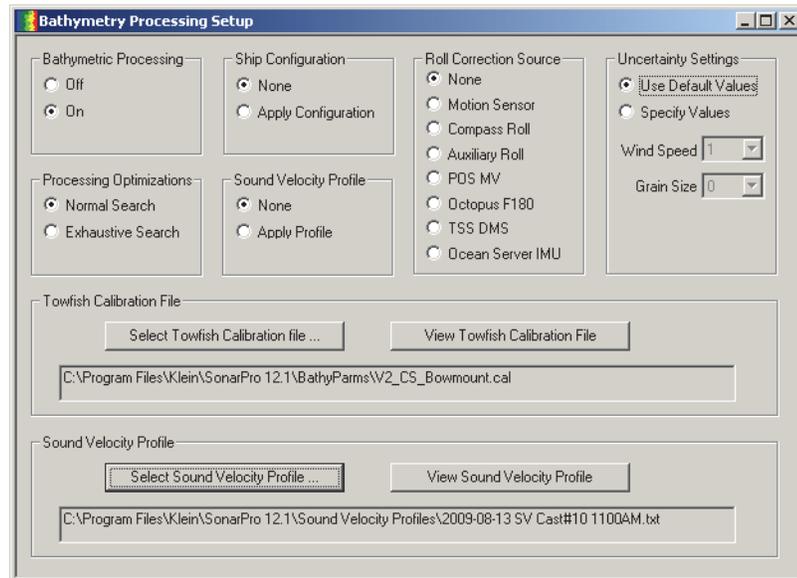
Figure 85: *The Bathymetry Processing Setup Dialog Box*

15.1 Entering the Swath Bathymetric Sonar Setup Parameters

The swath bathymetric sonar parameters are entered in the *Bathymetry Processing Setup* dialog box as follows:

Bathymetric Processing. Turns the bathymetric processing on or off. When off, all other controls in the dialog box are disabled. This option is not available for Series 5900 Sonar Systems, as the processing is performed in the TPU; however, all the other controls are available. To turn on bathymetric processing for this system, select the **Processed Bathy Data (from TPU)** check box on the *System 5900 Control* tab in the *Sonar Interface* dialog box.

Ship Configuration. Specifies whether the bathymetric measurements should take into account the ship geometry. Select **Apply Configuration** to include the relative positions of the position sensor, the motion sensor and the sonar arrays on the ship in the pitch and heave calculations. Select **None** to not include the ship geometry in the bathymetric measurements. Refer to "Entering the Ship Configuration Setup Parameters" on page 75 for instructions on how to enter the ship configuration setup parameters, which includes the relative positions of the sensors and sonar arrays.

NOTE *The Ship Configuration options are applicable to hull mounted systems only. They have no effect on towed systems.*

Sound Velocity Profile. Specifies whether sound velocity corrections are to be applied to the bathymetric measurements. Select **Apply Profile** to correct the X and Y (horizontal) and Z (depth) measurements for the refractive effects of depth dependent variations in the sound velocity. Select **None** to not include the sound velocities in the bathymetric measurements. Refer to "Selecting a Sound Velocity Profile" on page 78 for instructions on how to select a sound velocity profile. These options are applicable to hull mounted systems only. They have no effect on towed systems.

Roll Correction Source. Selects the source of the data used for roll compensation in the bathymetric processing. Not all selections will be valid for all towfish configurations.

- Select **None** to disable roll compensation.

- Select **Motion Sensor** to use the roll output from the a Klein Motion sensor. This option applies only to towfish equipped with a Klein Motion sensor.

- Select **Compass Roll** to use the roll output from a towfish compass. This option applies only to towfish equipped with a compass.

- Select **Auxiliary Roll** to use the roll output from an auxiliary source that is providing a $PAUV message to the TPU. This option applies only when $PAUV messages are being sent to the TPU.

- Select **POS MV** to use the roll, pitch and heave outputs from an Applanix POS MV MRU. This option applies only to hull mounted systems equipped with a POS MV.

- Select **Octopus F180** to use the roll, pitch and heave outputs from a Coda-Octopus Model F180 Motion Sensor.

- Select **TSS DMS** to use the roll, pitch and heave outputs from a Teledyne TSS Model DMS-05, DMS-10, or DMS25 Dynamic Motion Sensor.

- Select **Ocean Server IMU** to use the roll and pitch outputs from an Ocean Server motion sensor.

Processing Optimizations. Selects the type of search that is used in the bathymetric processing.

- Select **Normal Search** to use a normal search method in the bathymetric processing. This option must be selected when computing bathymetry in real time. Failure to do so in this case may cause SonarPro to lag. In

general, this search method produces an acceptable bathymetric result. However, depending on the environmental conditions, it is possible that a better result can be achieved using the exhaustive search.

- Select **Exhaustive Search** to use an exhaustive search method in the bathymetric processing. This option requires extensive processing and should only be used during playback.

Uncertainty Settings. Selects the default or manually entered values for the wind speed and grain size used in the generation of uncertainty estimates.

- Select **Use Default Values** to use the default values for wind speed and grain size in the uncertainty estimates.

- Select **Specify Values** to manually enter the values for wind speed and grain size to use for the uncertainty estimates. Enter the values in the **Wind Speed** and **Grain Size** scroll boxes directly or by using the up/down arrows. The range for wind speed is 1 to 8, and for grain size, -1 to 8.

15.2 Entering the Ship Configuration Setup Parameters

The ship configuration setup parameters are entered in the *Ship Geometry Setup* dialog box shown in Figure 86. To open this dialog box, choose *Ship Geometry* from the *Windows* menu or click the **Ship Geometry** button 🔲 on the Main tool bar.
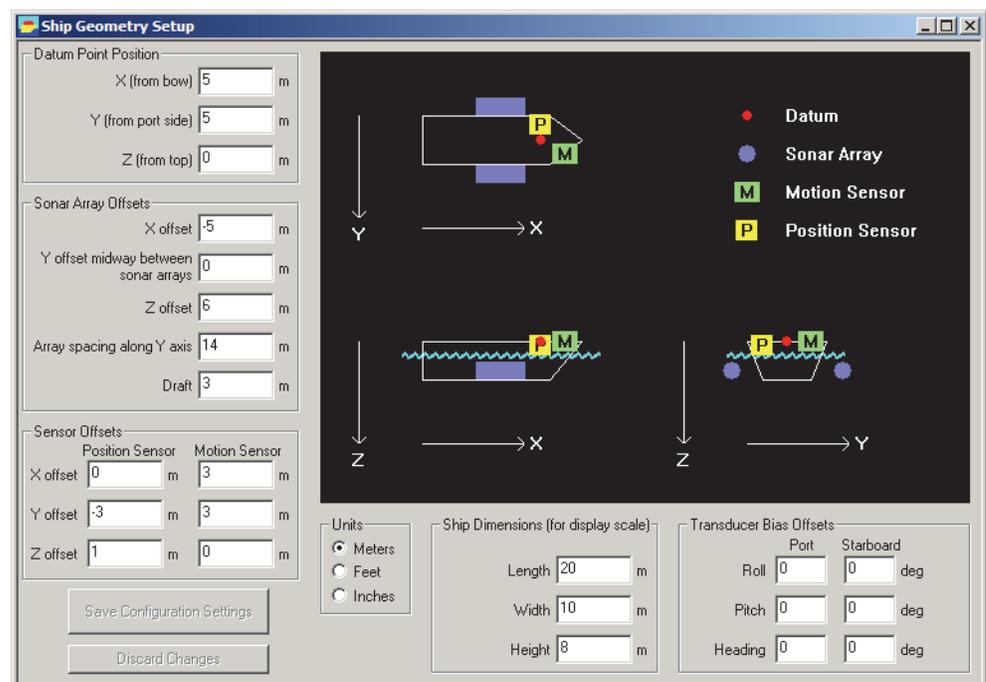
Figure 86: *The Ship Geometry Setup Dialog Box*

For hull mounted systems only, the ship configuration specifies the relative positions of the position sensor, the motion sensor and the sonar arrays. This information, which has no effect on towed systems, is used to determine the absolute position of the sonar arrays and the motion effects on them.

The ship configuration setup parameters are entered in the *Ship Geometry Setup* dialog box as follows:

Ship Dimensions. Enter the length, width and height in meters of the ship into the **Length**, **Width** and **Height** text boxes in the **Ship Dimensions** area. These values are used to establish the display scale for the graphical ship diagram.

Datum Point Position. Enter an XYZ coordinate in meters of a datum point in the **X**, **Y** and **Z** text boxes in the **Datum Point Position** area. This point is an arbitrary one, chosen for convenience, to which the sensor positions and array positions are referenced. It can be the same as one of the sensor positions or the array position, or it can be the position of a particular ship feature that serves as a common reference. The datum point is displayed in the graphic as a red dot.

> **NOTE** *The coordinate system used is that shown in the graphical display. X values increase toward the bow, Y values increase toward starboard, and Z values increase downwards.*

Sonar Array Offsets. Specifies the relative position of the sonar array to that of the datum point.

- In the **X offset** text box, enter the distance in meters from the datum point along the length of the ship to the point half way along the length of the sonar arrays. Enter a positive number if this point is forward of the datum point; enter a negative number if it is aft of the datum point.

- In the **Y offset midway between sonar arrays** text box, enter the distance in meters from the datum point across the width of the ship to the point midway between the two sonar arrays. Enter a positive number if this point is to starboard of the datum point; enter a negative number if it is to port of the datum point.

- In the **Z offset** text box, enter the distance in meters above or below the datum point to the sonar arrays. Enter a positive number if the sonar array is below the datum point; enter a negative number if it above the datum point.

- In the **Array spacing along Y axis** text box, enter the distance in meters between the port and starboard sonar arrays.

- In the **Draft** text box, enter the distance in meters that the sonar arrays are below the waterline.

Sensor Offsets. Specifies the relative position of the position and motion sensors to that of the datum point.

- In the **Position Sensor** and **Motion Sensor X offset** text boxes, enter the distance in meters from the datum point along the length of the ship to the position and motion sensors, respectively. Enter a positive number if the sensor is forward of the datum point; enter a negative number the sensor is aft of the datum point.

- In the **Position Sensor** and **Motion Sensor Y offset** text boxes, enter the distance in meters from the datum point across the width of the ship to the position and motion sensors, respectively. Enter a positive number if the sensor is starboard of the datum point; enter a negative number the sensor is to port of the datum point.

- In the **Position Sensor** and **Motion Sensor Z offset** text boxes, enter the distance in meters above or below the datum point to the position and motion sensors, respectively. Enter a positive number if the sensor is below the datum point; enter a negative number if the sensor is above the datum point.

Units. Select **Meters** to change the distances in 1-meter increments; **Feet** for 1-foot increments; or **Inches** for 1-inch increments.

Transducer Bias Offsets. Specifies the pitch, roll and heading offsets to compensate for errors in the leveling and heading of the sonar array.

- In the **Port** and **Starboard Roll** text boxes, enter the roll offset, if any, in degrees from horizontal of the short axis of the port and starboard sonar arrays, respectively. Enter a positive number if the array is twisted such that the port side is higher than the starboard side; enter a negative number if the array is twisted such that the port side is lower than the starboard side.

NOTE *The roll offset does not include the downward angle of the sonar array. For example, if the downward angle of the starboard sonar array is set at 30 degrees, but is measured to be 32 degrees, the roll offset is positive 2 degrees. If measured to be 28 degrees, the roll offset is negative 2 degrees.*

- In the **Port** and **Starboard Pitch** text boxes, enter the pitch offset, if any, in degrees from horizontal of the long axis of the port and starboard sonar arrays, respectively. Enter a positive number if the array is tilted such that the bow end is higher than the aft end; enter a negative number if the array is tilted such that the bow end is lower than the aft end.

KLEIN
MARINE SYSTEMS, INC.

- In the **Port** and **Starboard Heading** text boxes, enter the heading offset in degrees from the ship's center line for the port and starboard sonar arrays, respectively. The heading offset is the relationship of the mounted transducers to the center line of the ship. When the transducers are mounted parallel to the center line, enter 0 for the heading offset. Enter a positive number if the array is oriented such that it is pointing starboard of the center line with respect to the bow; enter a negative number if the array is oriented such that it is pointing to port of the center line with respect to the bow.

Save Configuration Settings. Click this button to apply and save changes made to the configuration settings.

Discard Changes. Click this button to discard changes made to the configuration settings and return the settings to what they were prior to the changes.

15.3 Selecting a Towfish Calibration File

To ensure valid bathymetric results, a bathymetric calibration file must be selected *before* performing bathymetric processing, and this file must be particular to the towfish that is providing the sonar data. A bathymetric calibration file should have been copied to the BathyParms directory in the SonarPro install directory for each towfish during SonarPro installation as described in "Installing SonarPro 14.0" on page 1.

⚠ **CAUTION** *Selecting the incorrect bathymetric calibration file will produce invalid bathymetric results. Be sure to select the correct file and to select it <u>before</u> beginning bathymetric processing.*

To select the towfish calibration file, click **Select Towfish Calibration File** in the *Bathymetry Processing Setup* dialog box. Then select the file from the *Open - Bathymetry Towfish Calibration File* dialog box. To view the calibration file after selecting it, click **View Towfish Calibration File**.

15.4 Selecting a Sound Velocity Profile

To correct the bathymetric results for the refractive effects of sound velocity with depth, a sound velocity profile, if available, must be selected *before* performing bathymetric processing. A sound velocity profile specifies the sound velocity as a function of water depth. It is a text file that contains, as a minimum, two columns of data. One column lists incremental water depths, and the other, the speed of sound at each depth. Because different sound velocity measurement systems may use different formats to represent the data they acquire, SonarPro includes a flexible file reader that can accommodate a variety of formats.

The sound velocity profile is selected from the *Import Sound Velocity Profile* dialog box shown in Figure 87. To open this dialog box, click **Select Sound Velocity Profile** in the *Bathymetry Processing Setup* dialog box. To preview and select a sound velocity profile, click **Select Sound Velocity Profile File** in the *Import Sound Velocity Profile* dialog box and then browse to and open the file. When opened, the profile is displayed in the graph in the lower right area of the dialog box. In the upper right area, the data are displayed in two columns, with depth in the left column and sound velocity in the right column. Above the graph the number of lines of data read is displayed.
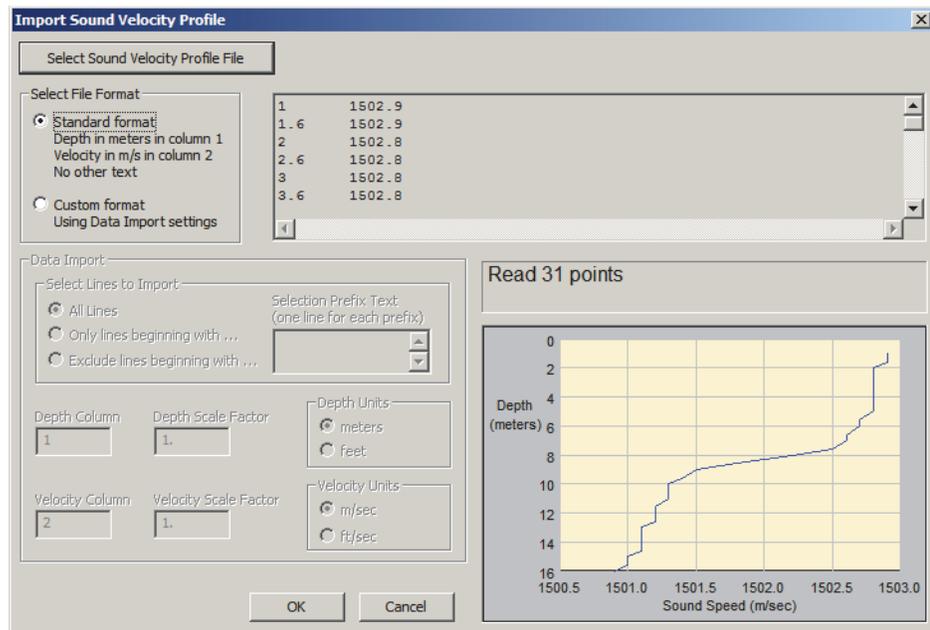
Figure 87: *Import Sound Velocity Profile Dialog Box*

Included in the *Import Sound Velocity Profile* dialog box are settings that control how sound velocity information is extracted from the selected file as follows:

Select File Format: Select **Standard Format** to read the input file in standard format. Standard format files have two tab, space or comma separated columns, the first with depth in meters and the second with velocity in meters per second. There is no other text. Select **Custom Format** to read the input file with user specified parse settings. When this format is selected, the **Data Import** area of the dialog box is enabled.

Select Lines to Import: Selects the lines to be considered by the parser.

- Select **All Lines** to read all the lines in the file.

- Select **Only lines beginning with ...** to read *only* the lines that begin with one of the prefixes listed in the **Selection Prefix Text** drop-down list box. The prefix must first be added to the list by entering it directly into the box as a single line only.

- **Select Exclude lines beginning with** ... to read all lines in the file *excluding* those that begin with one of the prefixes listed in the **Selection Prefix Text** drop-down list box. The prefix must first be added to the list by entering it directly into the box as a single line only.

Depth Column. Specifies the column number listing depth. Columns are numbered left to right beginning with 1.

Velocity Column. Specifies the column number listing sound velocity. Columns are numbered left to right beginning with 1.

Depth Scale Factor. Specifies the multiplier to apply to the depth values read from the file to convert them to the units selected in the **Depth Units** area. For example, if the depths in the file are in centimeters and the selected units are meters, the multiplier should be set to 0.01.

Velocity Scale Factor. Specifies the multiplier to apply to the sound velocity values read from the file to convert them to the units selected in the **Velocity Units** area. For example, if the sound velocities in the file are in centimeters/second and the selected units are meters/second, the multiplier should be set to 0.01.

Depth Units. Select meters to read depth in the file in meters; select feet to read depth in feet.

Velocity Units. Select m/s to read sound velocity in the file in meters/second; select ft/sec to read sound velocity in feet/second.

15.5 Viewing the Sound Velocity Profile

To view the sound velocity profile in a separate window after selecting it, click **View Sound Velocity Profile** in the *Bathymetry Processing Setup* dialog box. An example of a sound velocity profile is shown in Figure 88.
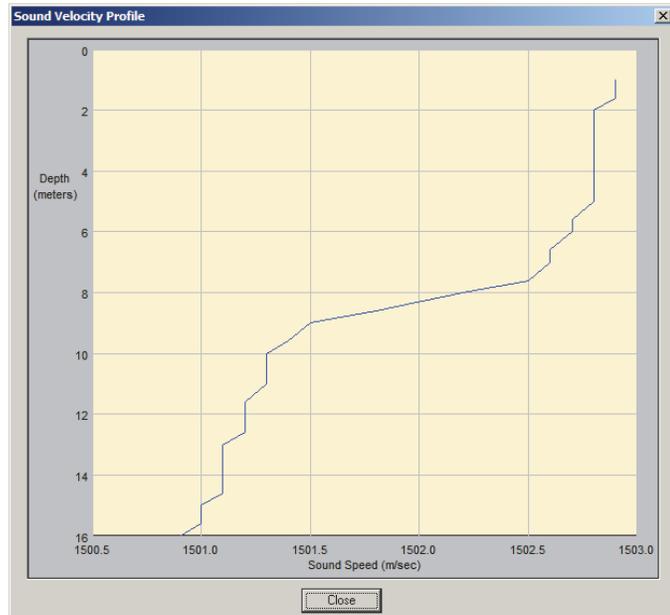
Figure 88: *Example Sound Velocity Profile*

16.0 Operating SonarPro

SonarPro operates with the Series 3000, UUV-3500, 3900, 4900, 5000, 5000 V2, 5900, HydroChart 3500, and HydroChart 5000 Sonar Systems. However, except for the UUV-3500 Sonar System, each system has a different Startup.ini file so that SonarPro will automatically detect and configure the system that it is connected to.

16.1 Operating SonarPro with a Series 5000, 5000 V2 or HydroChart 5000 Sonar System

The Series 5000, 5000 V2 and HydroChart 5000 Sonar Systems include a multibeam sonar. The Series 5000 and 5000 V2 optionally include a swath bathymetry sonar (SBS); the SBS is standard for a HydroChart 3500 and a HydroChart 5000. For instructions on how to display swath bathymetry data, refer to "Operating SonarPro with a Swath Bathymetric Sonar" on page 97. Shown in Figure 89 is an image from a Series 5000 Sonar System. Setup instructions are provided in "Series 5000, 5000 V2 and HydroChart 5000 Sonar Systems Towfish Setup" on page 36.
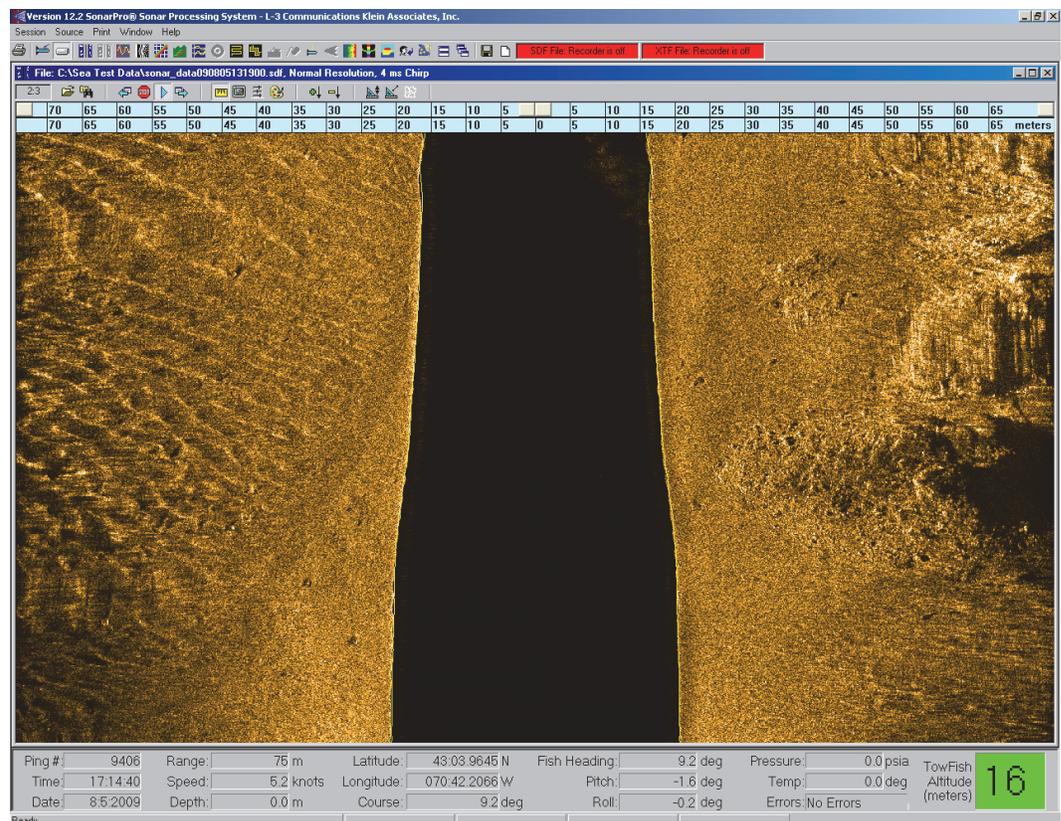
Figure 89: *Sonar Viewer Window—Series 5000 Sonar System*

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18, and to record sonar data, refer to "Recording Sonar Data" on page 19. To run SonarPro in playback, refer to "Running SonarPro in Playback" on page 22.

16.2 Operating SonarPro with a Series 3000 Sonar System

The Series 3000 Sonar System includes a dual frequency towfish and an optional chirp sub bottom profiler. You can operate and display the sonar data from both the low and high frequency sonars simultaneously as shown in Figure 90, or you can operate and display the data from either the low or the high frequency sonar and the chirp sub bottom profiler simultaneously as shown in Figure 91. Which sonars to operate are selected in the **Acquisition Mode** area on the *System 3000/3900 Control* tab of the *Sonar Interface* dialog box as described in "Series 3000 Sonar System Towfish Setup" on page 41. To display both the low and the high frequency sonar data simultaneously, open a second Sonar Viewer window, right-click in this window to open the *Sonar Viewer Properties* dialog box to the *Plan View Configuration* tab, and then select the sonar frequency option, usually **Low**. To display sub bottom profile data with either the low or the high frequency sonar data, choose *Sub Bottom Viewer* from the *Window* menu or click the **New Sub-Bottom Viewer** button ▓ on the Main tool bar.
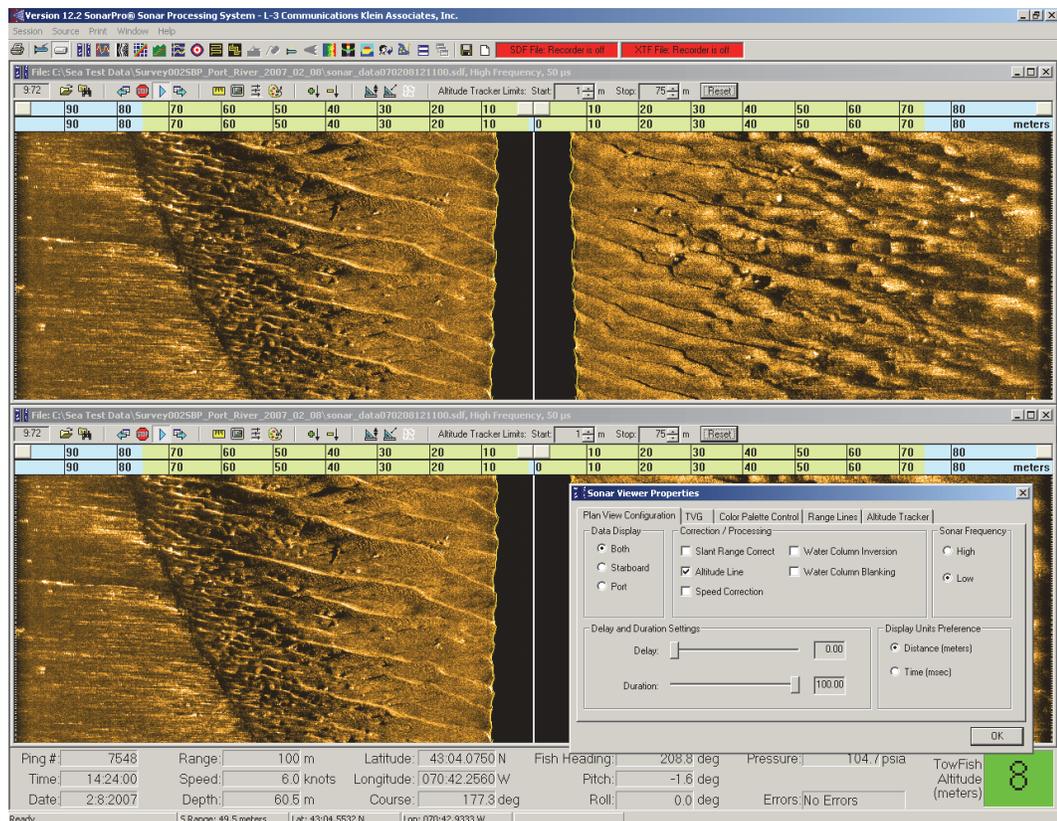
Figure 90: *Sonar Viewer Windows—High and Low Frequency Sonar Operation with the Series 3000 Sonar System*
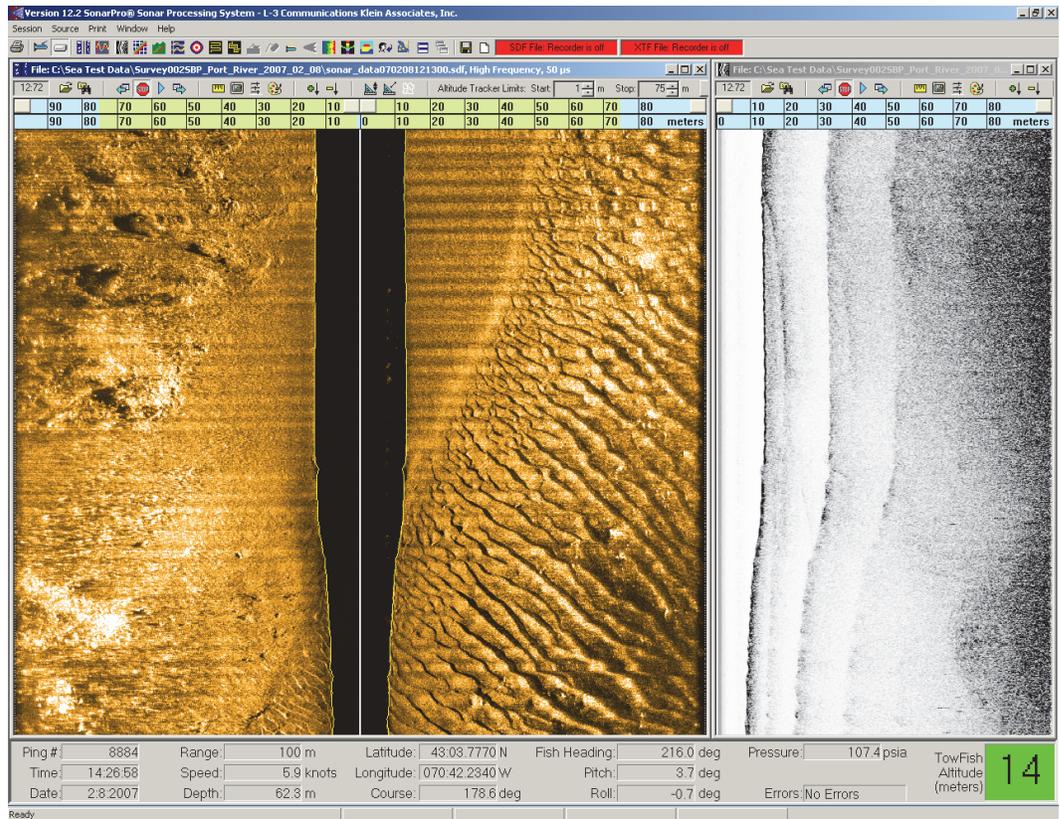
Figure 91: *Sonar and Sub Bottom Viewer Windows—Simultaneous High Frequency Sonar and Chirp Sub Bottom Operation with the Series 3000 Sonar System*

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18. When running in real time, the Sub Bottom Viewer window includes the real-time tool bar shown in Figure 92. Most of the buttons on this tool bar function the same as those on the corresponding tool bar in the Sonar Viewer window. However, the **Ruler**, **Display**, **TVG** and **Palette** buttons each open the *Sub Bottom Profiler Viewer Properties* dialog box where you can adjust the display settings in the Sub Bottom Viewer window.

Figure 92: *The Real-Time Tool Bar—Sub Bottom*

To run SonarPro in playback, refer to "Running SonarPro in Playback" on page 22. When running in playback, the Sub Bottom Viewer window includes the playback tool bar shown in Figure 93. Again, except for the **Ruler**, **Display**, **TVG** and **Palette** buttons, the buttons on this tool bar also function the same as those on the corresponding tool bar in the Sonar Viewer window.

Figure 93: *The Playback Tool Bar—Sub Bottom*

To record sonar data, refer to "Recording Sonar Data" on page 19.

▦ Ruler

Click this button to show or hide the ruler in the Sub Bottom Viewer window. The ruler is displayed in cyan below the tool bar and has two scales. The top scale is a fixed reference based on the range selection and is either in meters or in time, depending on whether the **Distance** or **Time** option is selected on the *Plan View Configuration* tab of the *Sub Bottom Profiler Viewer Properties* dialog box as described below. The lower scale is variable. By adjusting the sliders on the top scale, you can zoom in or out of any water column segment of the displayed sub bottom profile data. Effectively, the left slider selects the distance or time from the start of each scan to where or when the display of data starts. The right slider selects the distance or time in each scan at which the display of data ends. When adjusting the sliders, the scaling of the lower scale adjusts automatically, and double clicking either slider returns the lower scale to the range selection.

▣ Display

Click this button to open the *Sub Bottom Profiler Viewer Properties* dialog box to the *Plan View Configuration* tab as shown in Figure 94. You can set the properties of the Sub Bottom Viewer window here.
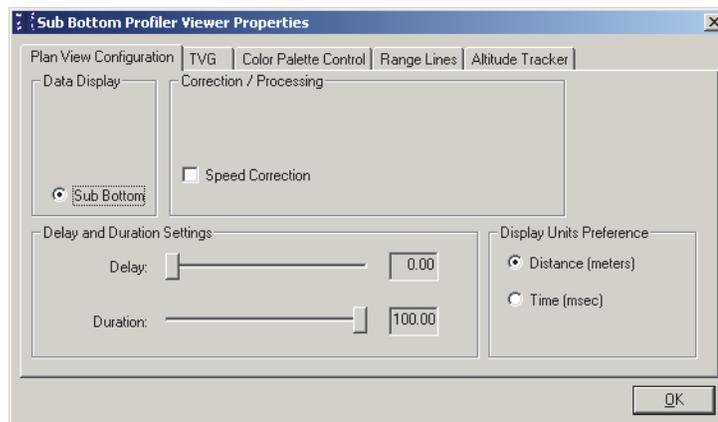
Figure 94: *The Sub Bottom Profiler Viewer Properties Dialog Box—Plan View Configuration Tab*

On the *Plan View Configuration* tab you can make the following selections and adjustments:

- The **Sub Bottom** option is only an indicator. It is there to notify you that adjustments made in this dialog box apply to the Sub Bottom Viewer window only.

- Select the **Speed Correction** check box to turn on speed correction. There is an 8-ping delay when selecting this check box.

- Select the **Distance** option to scale the ruler in meters; select the **Time** option to scale the ruler in milliseconds.

- Adjust the **Delay** and **Duration** settings to zoom in or out of any water column segment of the displayed sub bottom profile data. The **Delay** adjustment postpones the display of data in distance or time from the start of each scan, depending on whether the **Distance** or **Time** option is selected. Effectively it selects where or when in each scan the display of data starts. The **Duration** adjustment selects the distance or time in each scan over which data are displayed. Effectively it selects where or when in each scan the display of data ends. The ruler scale and its units are automatically adjusted accordingly.

TVG

Click this button to open the *Sub Bottom Profiler Viewer Properties* Dialog box to the *TVG* tab as shown in Figure 95. By adjusting the sliders you can control the initial, end and overall intensity of the displayed sub bottom profile data. The TVG starts when the bottom is automatically detected or in accordance with a manual entry for altitude, the selection of which is made on the *Altitude Tracker* tab of the *Sub Bottom Profiler Viewer Properties* dialog box.
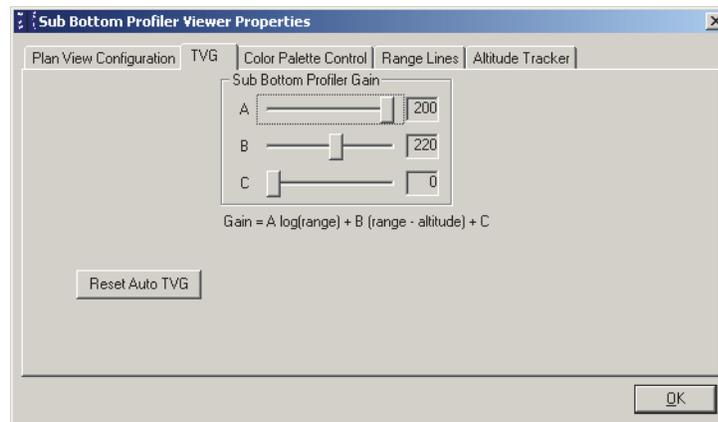
Figure 95: *The Sub Bottom Profiler Viewer Properties Dialog Box—TVG Tab*

![Palette] **Palette**

Click this button to open the *Sub Bottom Profiler Viewer Properties* dialog box to the *Color Palette Control* tab as shown in Figure 96. You can adjust the color of the data being displayed. Select **Inverse Video** to display stronger returns as dark and weaker ones as light. It is the default selection and is usually preferred. To return to the default color palette at any time, click **Use Default Palette**.
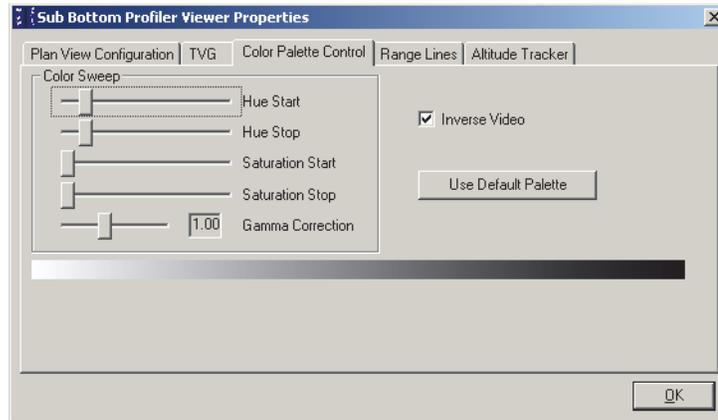
Figure 96: *The Sub Bottom Profiler Viewer Properties Dialog Box—Color Palette Control Tab*

The *Range Lines* tab is shown in Figure 97. To open this tab right-click anywhere in the Sub Bottom Viewer window to open the *Sub Bottom Profiler Viewer Properties* dialog box, and then click the tab. On this tab you can turn the range lines on or off in the Sub Bottom Viewer window. The distance between the range lines and the color of the lines can also be set here. Click **Specify Range Line Color** to open a color selection box.
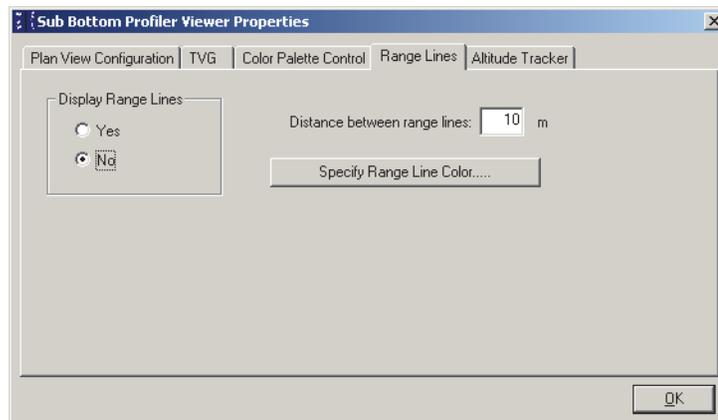
Figure 97: *The Sub Bottom Profiler Viewer Properties Dialog Box—Range Lines Tab*

The *Altitude Tracker* tab is shown in Figure 98. To open this tab right-click anywhere in the Sub Bottom Viewer window to open the *Sub Bottom Profiler Viewer Properties* dialog box, and then click the tab. On this tab you can override the altitude tracker in an attempt to manually track the bottom in adverse operating conditions. The altitude determines the start of TVG when auto TVG is on which affects the display of the sonar data and allows for dynamic tuning. The altitude has no effect on the TVG or the display when the TVG is set manually.

Figure 98: *Sub Bottom Viewer Properties Dialog Box—Altitude Tracker Tab*

Select **Use Altitude from Towfish** to run with the altitude tracker on. This is the default setting when starting SonarPro and should be used almost all of the time.

If conditions warrant, select **Use Manual Setting** to enable manual altitude tracking, or select **Use Altitude from Towfish plus Manual Offset** to enable the sum of both the altitude tracker and manual tracking. Selecting a manual setting may be necessary when trying to track a very soft bottom, or when operating in shallow water where surface reflections may interfere.

When selecting the **Use Manual Setting** option, the **Manual Towfish Altitude** scroll box appears on the *Altitude Tracker* tab as shown in Figure 99. In this scroll box enter an estimated altitude for the towfish. This altitude will remain fixed. When selecting the **Use Altitude from Towfish plus Manual Offset** option, the **Manual Towfish Altitude Offset** scroll box appears as shown in Figure 100. Enter an estimated altitude offset within which the altitude tracker will ignore any bottom detections. Once the offset is exceeded, the altitude tracker will look for the bottom. In both cases a display with a cyan background will appear in the Sonar Viewer window tool bar indicating either "Manual Altitude" followed by the altitude as shown in Figure 99 for the **Use Manual Setting** option, or "Offset Altitude" followed by the altitude as shown in Figure 100 for the **Use Altitude from Towfish plus Manual Offset** option.
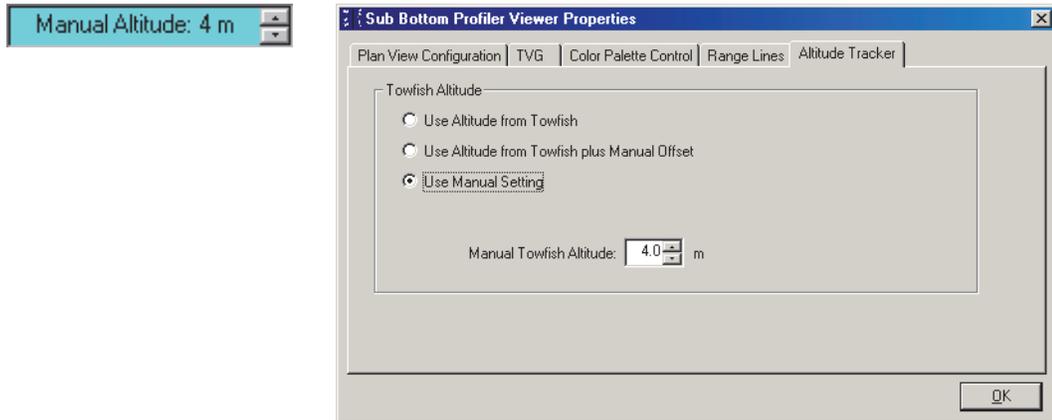
Figure 99: *Sub Bottom Viewer Properties Dialog Box—Altitude Tracker Tab with Manual Towfish Altitude Scroll Box*
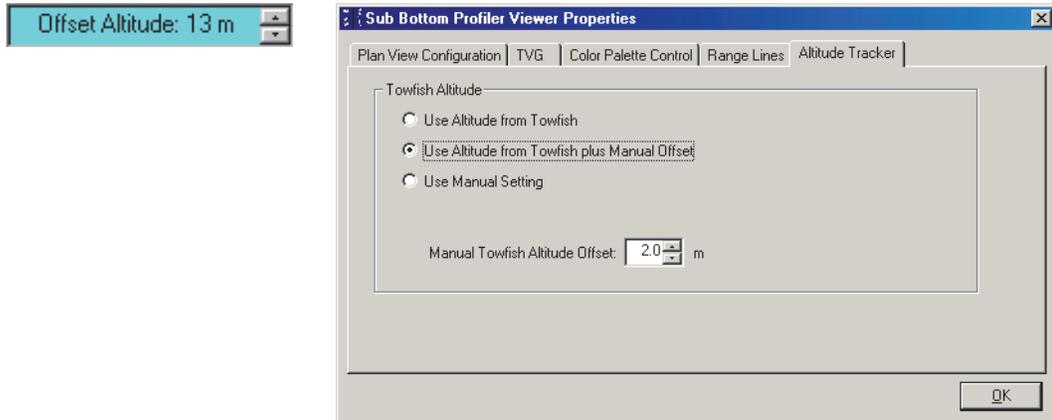
Figure 100: *Sub bottom Viewer Properties Dialog Box—Altitude Tracker Tab with Manual Towfish Altitude Offset Scroll Box*

The Sub Bottom Profiler Scan window, which is shown in Figure 101, displays the signal intensities of the sub bottom profile data similar to how they would be seen on an oscilloscope. To open the Sub Bottom Profiler Scan window, choose *Sub Bottom Scan* from the *Window* menu.
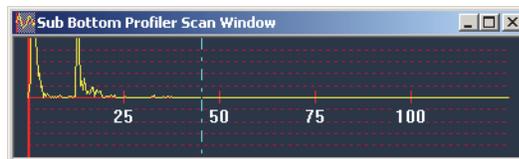
Figure 101: *The Sub Bottom Profiler Scan Window*

Right-clicking in the Sub Bottom Scan window opens the *SBP A-Scan Display Configuration* dialog box shown in Figure 102. In this dialog box you can use the Gain slider to adjust the gain of the signal being displayed.
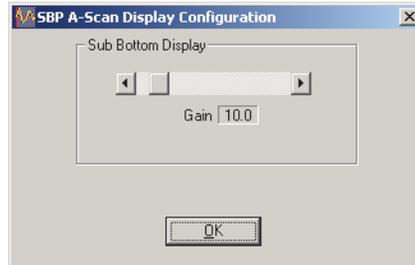
Figure 102: *The SBP A-Scan Display Configuration Dialog Box*

New Sub-Bottom Viewer

Click this button on the Main tool bar to open additional Sub Bottom Viewer windows.

16.3 Operating SonarPro with a Series UUV-3500 Sonar System

The Series UUV-3500 Sonar System includes both a high frequency and a low frequency sonar. In addition, an SBS is optionally available. You can display the sonar data from both the low and high frequency sonars simultaneously as shown in Figure 103, or individually, and with or without the SBS data. The decision of which sonars to operate and display the data from is made in the **Acquisition Mode** area on the *System Control* tab of the *Sonar Interface* dialog box as described in "Series UUV-3500 Sonar System Setup" on page 45. To display both the low and the high frequency sonar data simultaneously, open a second Sonar Viewer window, right-click in this window to open the *Sonar Viewer Properties* dialog box to the *Plan View Configuration* tab, and then select the sonar frequency option, usually **Low**. For instructions on how to display swath bathymetry data, refer to "Operating SonarPro with a Swath Bathymetric Sonar" on page 97.

Figure 103: *Sonar Viewer Windows—High and Low Frequency Sonar Operation with the Series UUV-3500 Sonar System*

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18, and to record sonar data, refer to "Recording Sonar Data" on page 19. To run SonarPro in playback, refer to "Running SonarPro in Playback" on page 22.

16.4 Operating SonarPro with a Series HydroChart 3500 Sonar System

The Series HydroChart 3500 Sonar System includes both a side scan sonar and an SBS. You can display the sonar data with the SBS data as shown in Figure 104, or display the data from each individually. The decision of which sonars to operate and display the data from is made in the **Acquisition Mode** area on the *System Control* tab of the *Sonar Interface* dialog box as described in "Series HydroChart 3500 Sonar System Towfish Setup" on page 49. For instructions on how to display swath bathymetry data, refer to "Operating SonarPro with a Swath Bathymetric Sonar" on page 97.
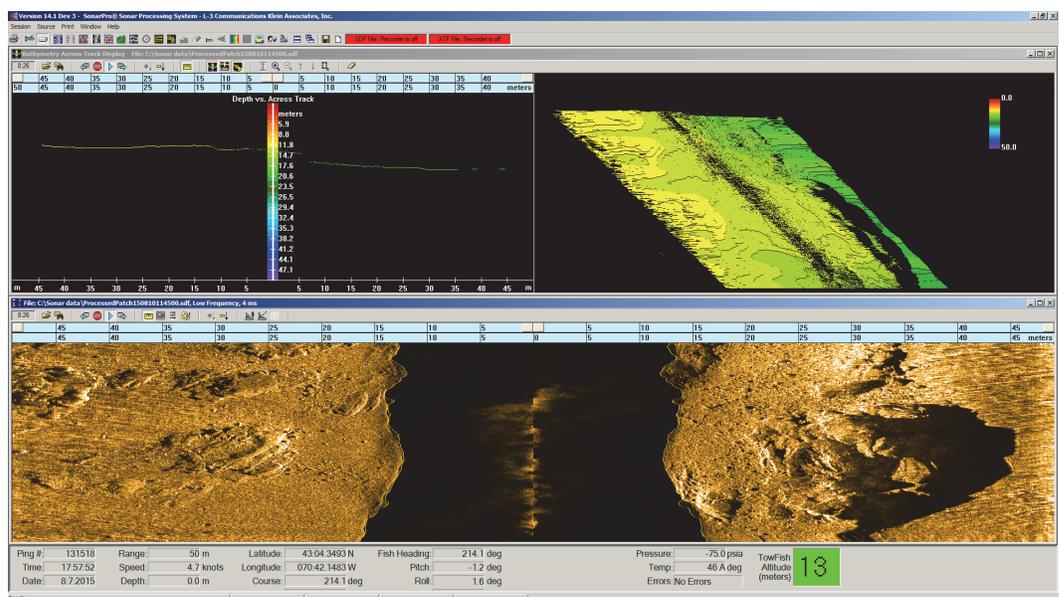
Figure 104: *Sonar Viewer Windows—Side Scan Sonar and Swath Bathymetry Sonar Operation with the Series HydroChart 3500 Sonar System*

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18, and to record sonar data, refer to "Recording Sonar Data" on page 19. To run SonarPro in playback, refer to ."Running SonarPro in Playback" on page 22.

KLEIN
MARINE SYSTEMS, INC.

16.5 Operating SonarPro with a D3500TF Sonar System

The D3500TF Sonar System includes both a high frequency and a low frequency sonar. You can operate and display the sonar data from both the low and high frequency sonars simultaneously as shown in Figure 105, or individually. Which sonars to operate are selected in the **Acquisition Mode** area on the *System D3500TF Control* tab of the *Sonar Interface* dialog box as described in "D3500TF Sonar System Towfish Setup" on page 53. To display both the low and the high frequency sonar data simultaneously, open a second Sonar Viewer window, right-click in this window to open the *Sonar Viewer Properties* dialog box to the *Plan View Configuration* tab, and then select the sonar frequency option, usually **Low**.

Figure 105: *Sonar Viewer Windows—High and Low Frequency Sonar Operation with the D3500TF Sonar System*

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18, and to record sonar data, refer to "Recording Sonar Data" on page 19. To run SonarPro in playback, refer to "Running SonarPro in Playback" on page 22.

16.6 Operating SonarPro with a Series 3900 Sonar System

The Series 3900 Sonar System includes both a high frequency and a low frequency sonar. You can operate and display the sonar data from either sonar. Shown in Figure 106 is an image from the high frequency sonar. Which sonar to operate and display is selected in the **Acquisition Mode** area on the *System 3000/3900 Control* tab of the *Sonar Interface* dialog box as described in "Series 3900 Sonar System Towfish Setup" on page 56.
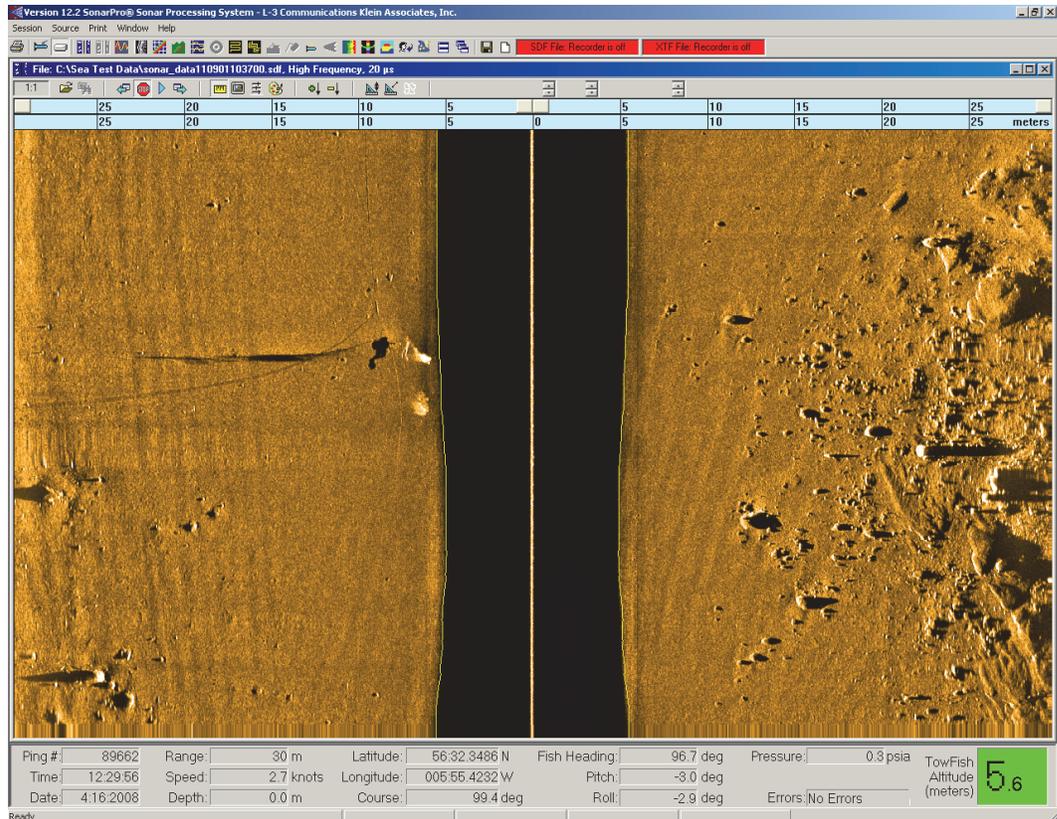
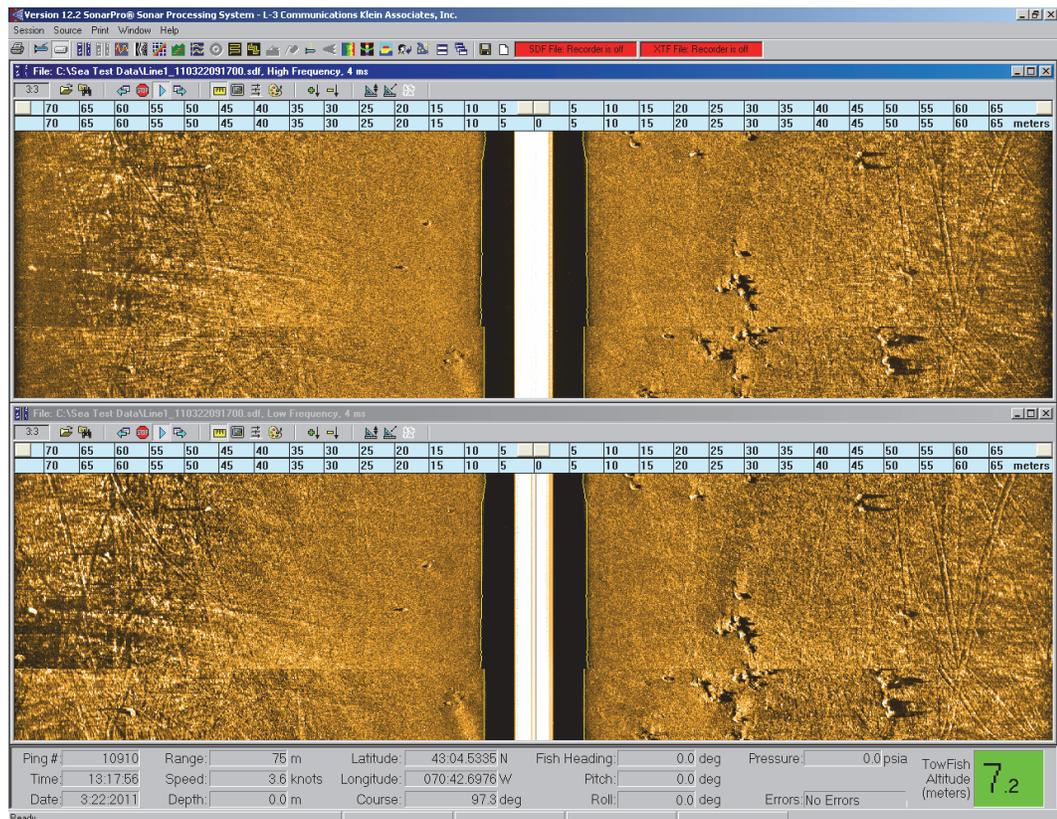**Figure 106:** *Sonar Viewer Window—High Frequency Sonar Operation with the Series 3900 Sonar System*

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18, and to record sonar data, refer to "Recording Sonar Data" on page 19. To run SonarPro in playback, refer to "Running SonarPro in Playback" on page 22.

16.7 Operating SonarPro with a Series 4900 Sonar System

The Series 4900 Sonar System includes both a high frequency and a low frequency sonar. You can operate and display the sonar data from both the low and high frequency sonars simultaneously as shown in Figure 107, or individually. Which sonars to operate are selected in the **Acquisition Mode** area on the *System 4900 Control* tab of the *Sonar Interface* dialog box as described in "Series 4900 Sonar System Towfish Setup" on page 60. To display both the low and the high frequency sonar data simultaneously, open a second Sonar Viewer window, right-click in this window to open the *Sonar Viewer Properties* dialog box to the *Plan View Configuration* tab, and then select the sonar frequency option, usually **Low**.
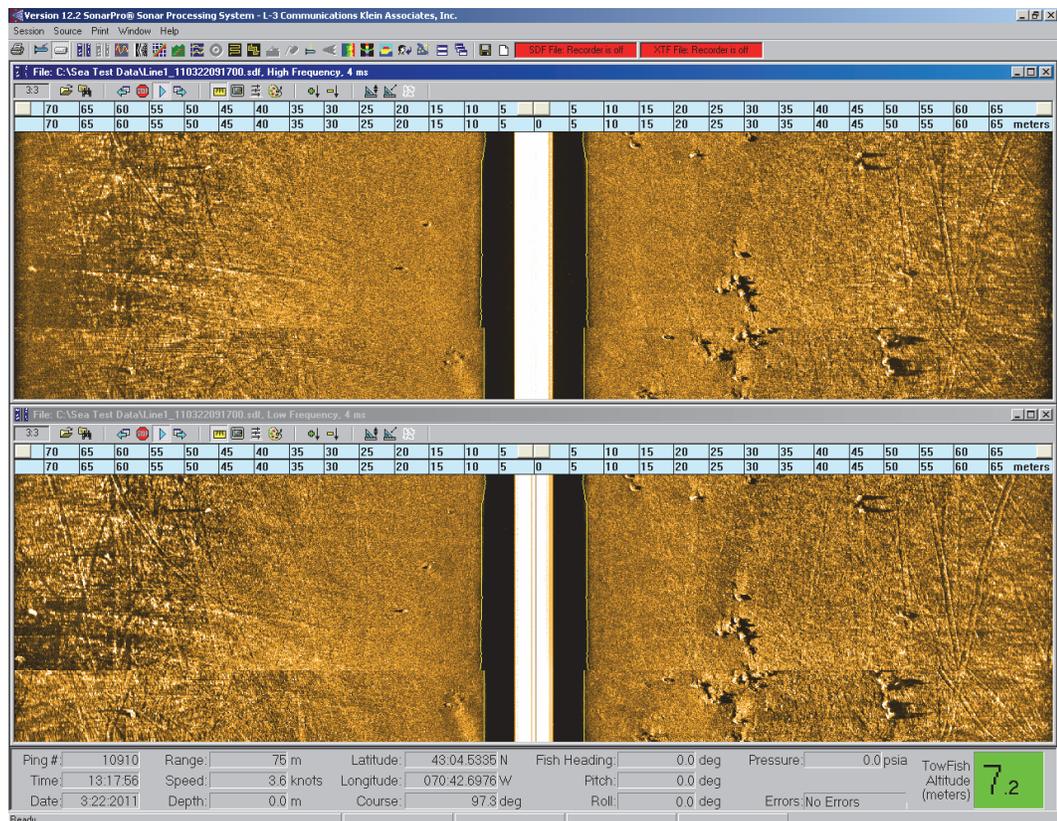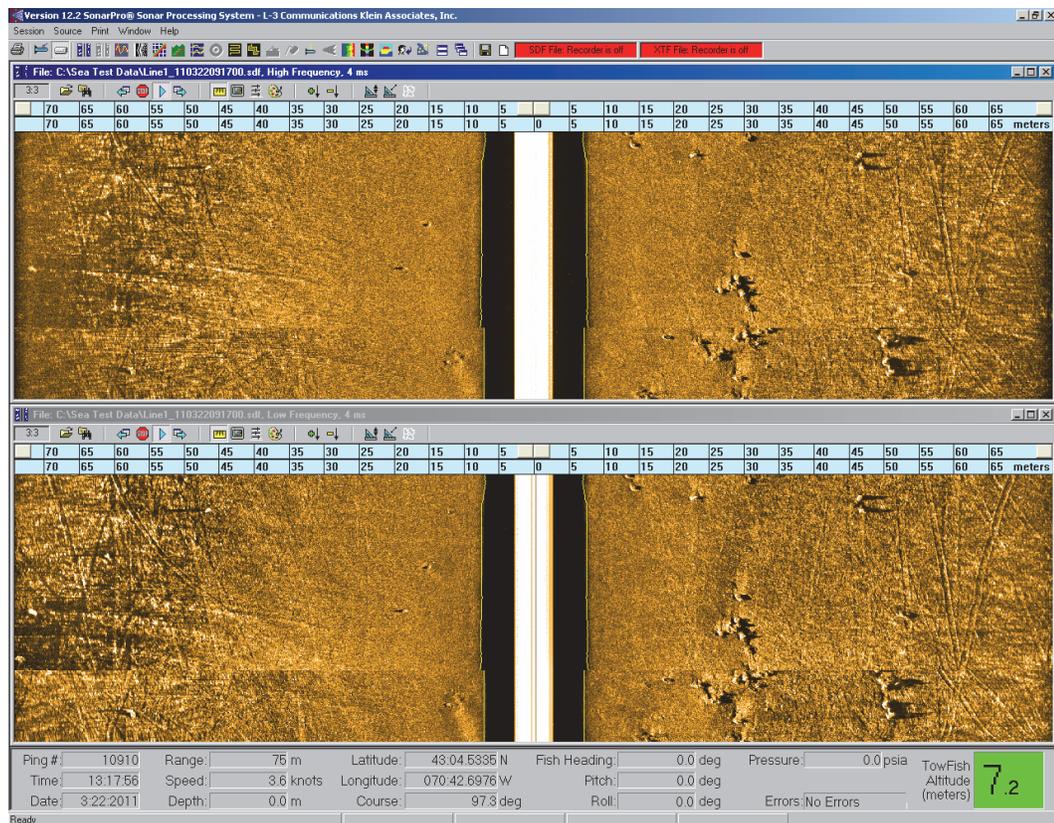

Figure 107: *Sonar Viewer Windows—High and Low Frequency Sonar Operation with the Series 4900 Sonar System*

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18, and to record sonar data, refer to "Recording Sonar Data" on page 19. To run SonarPro in playback, refer to "Running SonarPro in Playback" on page 22.

16.8 Operating SonarPro with a Series 5900 Sonar System

The Series 5900 Sonar System includes a multibeam side scan sonar and an optional gap filler sonar. You can operate and display the sonar data from either sonar or both sonars simultaneously. Which sonar to operate is selected on the *System 5900 Control* tab of the *Sonar Interface* dialog box as described in "Series 5900 Sonar System Towfish Setup" on page 63. The multibeam sonar transmitter is turned on by selecting the **Enable Transmit** check box in the **Pulse Length** area of the tab. The gap filler sonar is turned on by selecting **Enable Transmitter** in the **Gap Filler Transmitter** area. For instructions on how to display swath bathymetry data, refer to "Operating SonarPro with a Swath Bathymetric Sonar" on page 97.

Shown in Figure 89 are scan displays and sonar images from a Series 5000 Sonar System. The three wide windows in the middle are, from top to bottom, the Sonar Scan, QC Sonar Viewer and Processed Ping Viewer windows. To the right of these windows, also from top to bottom, are the Gap Filler Scan, Gap Filler QC Viewer and Gap Filler Processed Ping Viewer windows

> **QC Sonar Viewer window.** Displays QC (quality control) multibeam side scan sonar ping data to provide direct confirmation of sonar operation for each ping with minimum delay. The displayed data are in *slant* range to the bottom from the towfish. To open the QC Sonar Viewer window, choose *QC Sonar Viewer* from the *Window* menu.
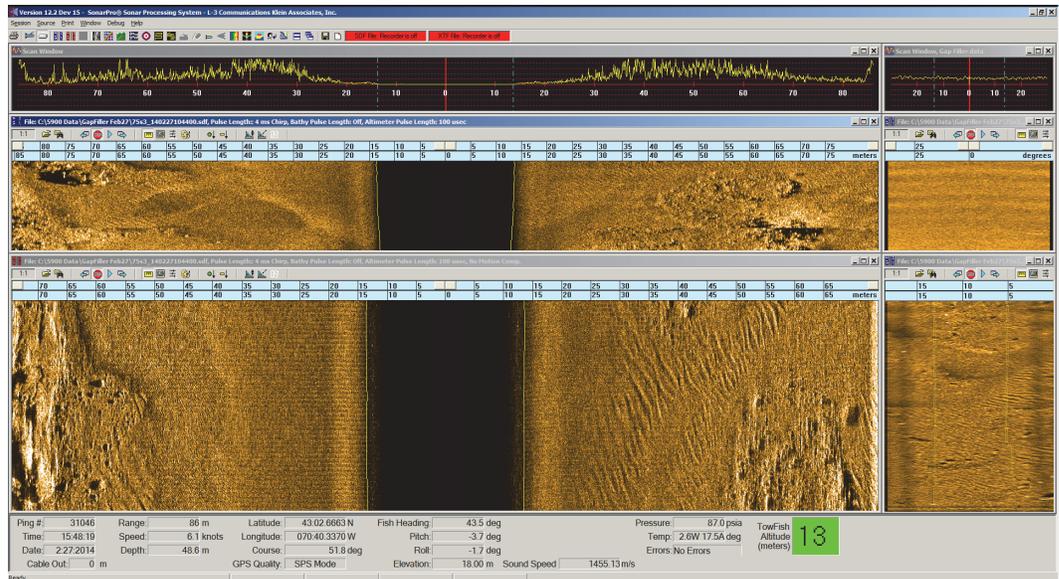
Figure 108: *Sonar Scan, QC Sonar Viewer, Processed Ping Viewer, Gap Filler Scan, Gap Filler QC Viewer, and Gap Filler Processed Ping Viewer Windows—Series 5900 Sonar System*

Processed Ping Viewer window. Displays beamformed processed side scan sonar ping data using a beamforming process and multiple pings data to derive the high resolution images. The displayed data are in *slant* range to the bottom from the towfish when motion compensation is off and in *ground* range when motion compensation is on. Similarly, when opening a Target window in the Processed Ping Viewer window, the displayed data are also in slant range or ground range accordingly. To open the *Processed Ping Viewer* window, choose *Processed Ping Viewer* from the *Window* menu.

Gap Filler Scan window. Displays gap filler sonar signal intensities for a selected channel. To open the Gap Filler Scan window, choose *Gap Filler Scan* from the *Window* menu. To select the channel to view, right-click in the window to open the A-Scan Display Configuration dialog box and select it from the **Channel** scroll box.

Gap Filler QC Viewer window. Displays QC gap filler sonar ping data to provide direct confirmation of sonar operation for each ping with minimum delay. The displayed data are in *ground* range. To open the Gap Filler QC Viewer window, choose *Gap Filler QC Viewer* from the *Window* menu.

Gap Filler Processed Ping Viewer window. Displays beamformed processed gap filler sonar ping data using a beamforming process and multiple pings data to derive the high resolution images. The displayed data are in *ground* range. When opening a Target window in the Gap Filler Processed Ping Viewer window, the displayed data are also in ground range. To open the Gap Filler Processed Ping Viewer window, choose *Gap Filler Processed Ping Viewer* from the *Window* menu.

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18, and to record sonar data, refer to "Recording Sonar Data" on page 19. To run SonarPro in playback, refer to "Running SonarPro in Playback" on page 22.

16.9 Operating SonarPro with a Swath Bathymetric Sonar

The SBS is optionally available on Series UUV-3500, 5000 V2, AUV 5000 V2, and 5900 Sonar Systems and is standard on the HydroChart 3500 and HydroChart 5000 Sonar Systems. The SBS uses advanced interferometric signal processing techniques to produce simultaneous estimates of the seabed topography out to the full swath extent of the sonar, typically 10 to 12 times the altitude of the towfish. The collected data are co-registered with the side scan imagery data and can be used to more accurately position seabed targets.

To view the swath bathymetry data, first turn the bathymetric processing on in the *Bathymetry Processing Setup* dialog box and verify that the proper towfish calibration file is selected along with the sound velocity profile, if applicable, as described in "Swath Bathymetric Sonar Setup" on page 73. For the Series 5900 Sonar System only, bathymetric processing is turned on by selecting the **Processed Bathy Data (from TPU)** check box in the **Data Acquisition** area of the *System 5900 Control* tab of the *Sonar Interface* dialog box as described in "Series 5900 Sonar System Towfish Setup" on page 63.
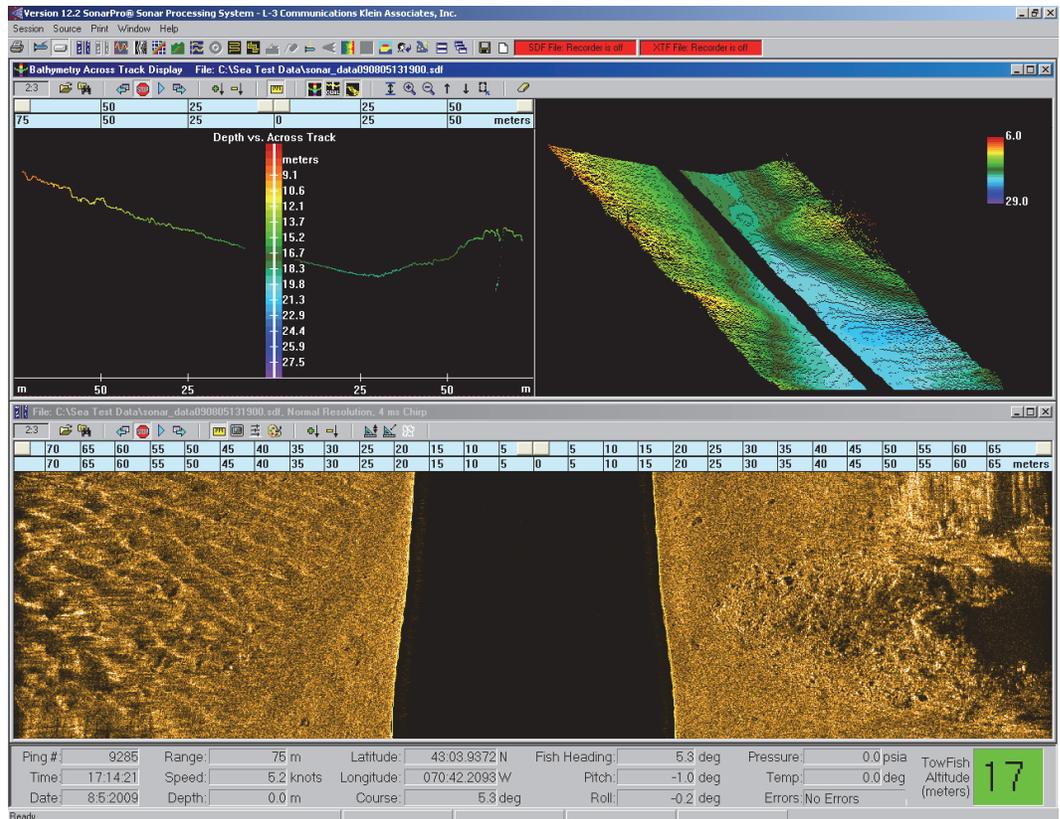
Figure 109: *Bathymetry Across Track Display Window Depth vs. Across Track Display with Sonar Viewer Window*

In the *Bathymetry Processing Setup* dialog box, verify that the correct roll correction source is selected, and then choose *Bathy Across Track* from the *Window* menu or click the **Bathy Across Track** button 🟦 on the Main tool bar. The Bathymetry Across Track Display window opens as shown in Figure 109 on page 97 where it is above a Sonar Viewer window.

The Bathymetry Across Track Display window has two sections. The left section comprises the Depth vs. Across Track display which displays across track distance in meters on the horizontal axis and the water depth or altitude of the towfish in meters on the vertical axis, or the Quality vs. Range display which displays the distance in meters and the quality of the depth signal. Both displays can also be shown simultaneously. The Depth vs. Across Track display is shown in Figure 109 on page 97 and the Quality vs. Range display is shown in Figure 110. The right section comprises the 3D Depth display which displays depth as determined from the across track distance data. This display is shown in both Figure 109 and Figure 110. All bathymetric points are plotted in the display.
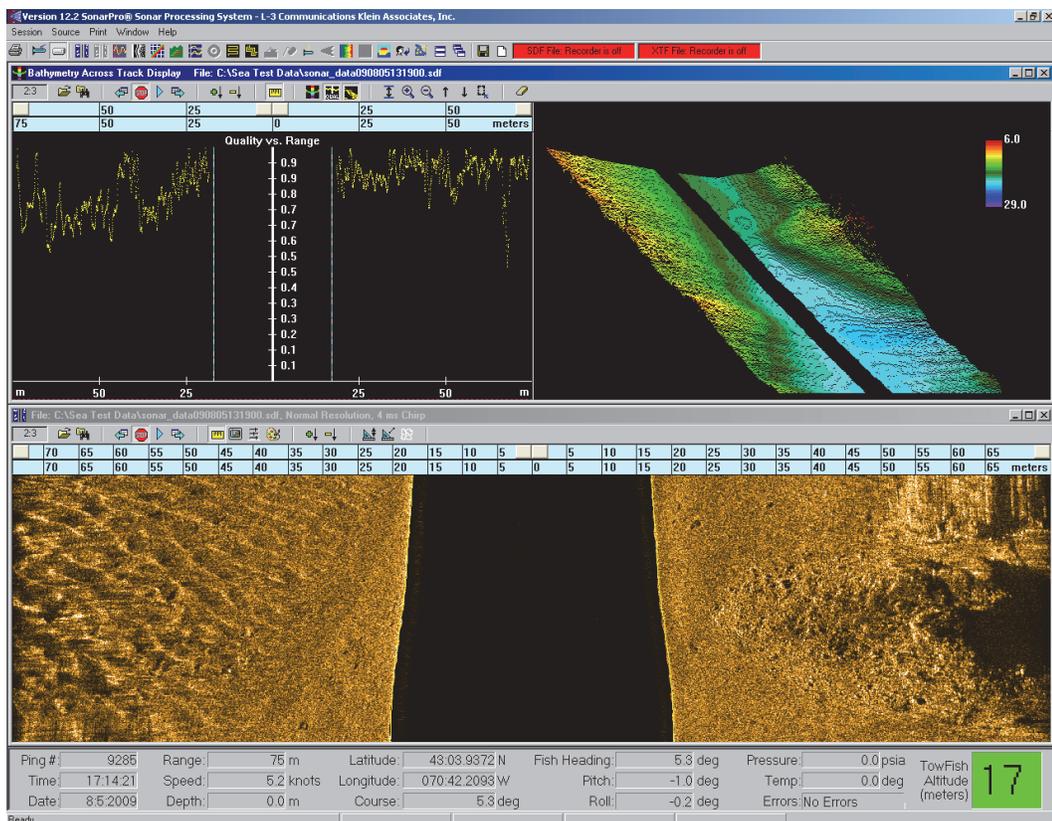
Figure 110: *Bathymetry Across Track Display Window Quality vs. Range Display with Sonar Viewer Window*

The SBS processing calculates the following values for both the port and starboard side scan channels:

Angle. The best direction of arrival relative to the towfish transducer.

Quality. The quality associated with the computed angle of arrival.

X: The motion corrected along track bathymetry, calculated for hull mounted systems only.

Y: The motion corrected across track bathymetry.

Z: The motion corrected depth bathymetry relative to the towfish.

Signal-to-Noise Ratio (SNR). A measure in dB of the quality of the bathymetric results of angle, across-track distance, and depth as determined by the quality of the received sonar signals.

Uncertainty. A measure in radians of the uncertainty of the angle to the sea floor. It is dependent on the measured angle, the signal-to-noise (SNR) ratio, the wind speed, and the bottom grain size. When combined with uncertainties from other sensors, total uncertainty surfaces of angle can be generated.

The SBS processing also calculates the following motion compensation vectors:

Roll Vector: The roll correction value applied to the bathymetry angle for the Y and Z bathymetry solutions.

Pitch Vector: The pitch correction value applied to the bathymetry angle for the X and Y bathymetry solutions.

Heave Vector: The heave correction value applied to the bathymetry depth for the Z bathymetry solution.

NOTE *The pitch and heave vectors are calculated only for hull mounted systems and require that a motion sensor with pitch and heave measurement capabilities is present.*

To run SonarPro in real time, refer to "Running SonarPro in Real Time" on page 18. When running in real time, the Bathymetry Across Track Display window includes the real-time tool bar shown in Figure 111. Some of the buttons on this tool bar function the same as those on the corresponding tool bar in the Sonar Viewer window. The functions of the other buttons are described below.

Figure 111: *The Real-Time Tool Bar—Swath Bathymetry*

To run SonarPro in playback, refer to "Running SonarPro in Playback" on page 22. When running in playback, the Bathymetry Across Track Display window includes the playback tool bar shown in Figure 112. Again, some of the buttons on this tool bar function the same as those on the corresponding tool bar in the Sonar Viewer window. The functions of the other buttons are described below.

Figure 112: *The Playback Tool Bar—Swath Bathymetry*

Ruler

Click this button to show or hide the ruler in the Bathymetry Across Track Display window. The ruler is displayed in cyan below the tool bar and has two scales. The top scale is a fixed range in meters. The lower scale is variable. By adjusting the sliders on the top scale, you can zoom in or out of any swath segment in either the Depth vs. Across Track or the Quality vs. Range display, both port and starboard simultaneously. Effectively, the right slider for the port channel selects the distance from the start of each scan to where the display of data starts. The left slider for the port channel selects the distance in each scan at which the display of data ends. The reverse is true for the starboard channel. When adjusting the sliders, the scaling of the lower scale adjusts automatically, and double clicking any slider returns the lower scale to the range selection.

Toggle Depth Display

Click this button to turn on or off the Depth vs. Across Track display in the Bathymetry Across Track Display Window.

Toggle Quality Display

Click this button to turn on or off the Bathymetry Across Track window Quality vs. Range display.

Toggle 3D Depth Display

Click this button to turn on or off the 3D Depth display.

Full Depth Range

Click this button to zoom the display to the full depth range, which is from zero to the selected maximum. The maximum depth is set when configuring the Bathymetry Across Track Display window as described in "Configuring the Bathymetry Across Track Display Window" on page 101.

Zoom In

Click this button to zoom in on the Bathymetry Across Track Display window.

⊖ **Zoom Out**

Click this button to zoom out of the Bathymetry Across Track Display window.

↑ **Move Up**

Click this button to move up in the Bathymetry Across Track Display window.

↓ **Move Down**

Click this button to move down in the Bathymetry Across Track Display window.

⬚ **Click and Drag to Set Depth Range**

Click this button to select a specific depth range in the Bathymetry Across Track Display window. Click the button and then drag from the minimum depth to the maximum desired depth.

⬦ **Erase 3D Depth Display**

Click this button to erase the 3D Depth display.

16.10 Configuring the Bathymetry Across Track Display Window

The Bathymetry Across Track Display window is configured in the *Across Track Display Configuration* dialog box shown in Figure 113. To open this dialog box, right-click in the Bathymetry Across Track Display window.
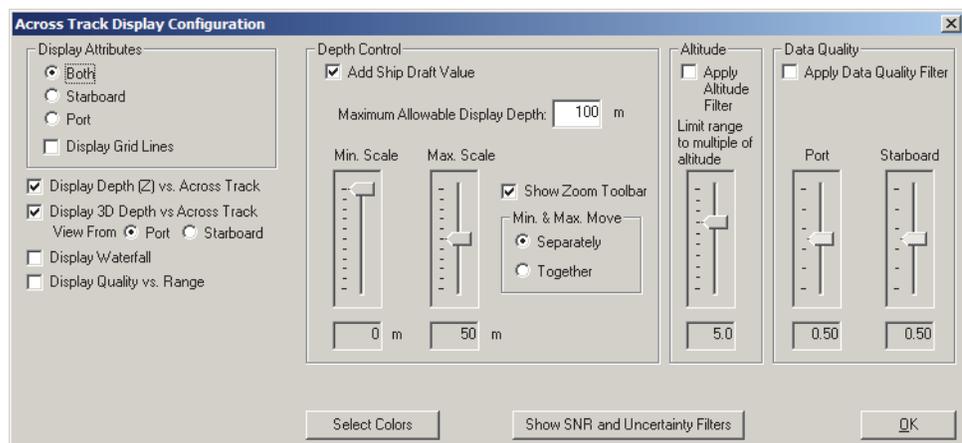

Figure 113: *The Across Track Display Configuration Dialog Box*

KLEIN
MARINE SYSTEMS, INC.

The Bathymetry Across Track Display window setup parameters are entered in the *Across Track Display Configuration* dialog box as follows:

Display Attributes. Selects what data to display and whether to display horizontal grid lines.

- Select **Both** to display data from both the port and starboard sides.

- Select **Starboard** to display data only from the starboard side.

- Select **Port** to display data only from the port side.

- Select the **Display Grid Lines** check box to display a horizontal grid in the Across Track Distance display.

Display Depth (Z) vs. Across Track. Select this check box to open the Across Track Distance display.

Display 3D Depth vs. Across Track. Select this check box to open the 3D Depth display. Select **View From Port** to display the image as if viewed from the port; select **View From Starboard** for a starboard view.

Display Quality vs. Range. Select this check box to display the bathymetry quality versus range. This parameter is a measure of how well the detected bathymetric solutions agree and can be used as a measure of confidence in how well the bathymetric solutions represents reality. The range is from 0 to 100 percent.

Depth Control. Specifies how the depth data are displayed.

- Select the **Add Towfish Depth Values** check box to add the towfish depth to the bathymetric depth solution.

- In the **Maximum Allowable Display Depth** text box, enter the maximum depth for which data are displayed. Set the depth to a value slightly larger than the maximum expected depth. This value affects the settings of the **Min. Scale** and **Max. Scale** slider controls.

- Adjust the **Min. Scale** slider to set the minimum depth in meters for which data are displayed. For example, setting this value to 10 meters will cause all values less than 10 meters to be plotted at the top of the window. The minimum depth is displayed below the slider.

- Adjust the **Max. Scale** slider to set the maximum depth in meters for which data are displayed. For example, setting this value to 50 meters will cause all values greater than 50 meters to be plotted on the horizontal axis. The maximum depth is displayed below the slider.

- Select **Min. & Max. Move Separately** to enable adjustment of the **Min. Scale** and **Max. Scale** sliders separately. The maximum setting will always be

greater that the minimum. Select **Min. & Max. Move Together** to move the sliders together when adjusting either one. The difference between the two sliders, which is the depth range, will remain constant.

- Select the **Show Zoom Toolbar** check box to display the real-time or playback tool bar in the Bathymetry Across Track Display window.

Altitude. Applies an altitude filter to the display. Bathymetric solutions for towfish altitudes above the threshold will not be displayed.

- Select the **Apply Altitude Filter** check box to enable filtering of the displayed data with the towfish altitude.

- Adjust the **Limit range to multiple of altitude** slider to set the altitude threshold for the bathymetry solution. The setting is in multiples of towfish altitude.

Applies a data quality filter to the display. Bathymetric solutions with a quality value below the threshold will not be displayed. This setting is available for a HydroChart 3500 Sonar System only.

- Select the **Apply Data Quality Filter** check box to enable filtering of the displayed data with the quality value.

- Adjust the **Port** slider to set the quality threshold for the port bathymetry solution. The quality threshold is displayed below the slider.

- Adjust the **Starboard** slider to set the quality threshold for the starboard bathymetry solution. The quality threshold is displayed below the slider.

NOTE *The data quality filter settings do not affect the stored data.*

Select Colors. Click this button to show the **Display Color Setup** area of the *Across Track Display Configuration* dialog box as shown in Figure 114 where separate colors for the bathymetry data that lie within corresponding depth range segments can be selected.

- Adjust the **No. of Colors** slider to set the number of different colors used to represent the depth segments and therefore the number of segments into which the depth range is divided. The list box shows the color and depth range of each segment. The number of segments range from 1 to 32 and is displayed below the slider.

- Select **Color Palette Standard Colors** to use colors chosen from a standard set of colors that range from red for minimum depth to violet for maximum depth. Select **Color Palette User Defined Colors** to use a set of colors that
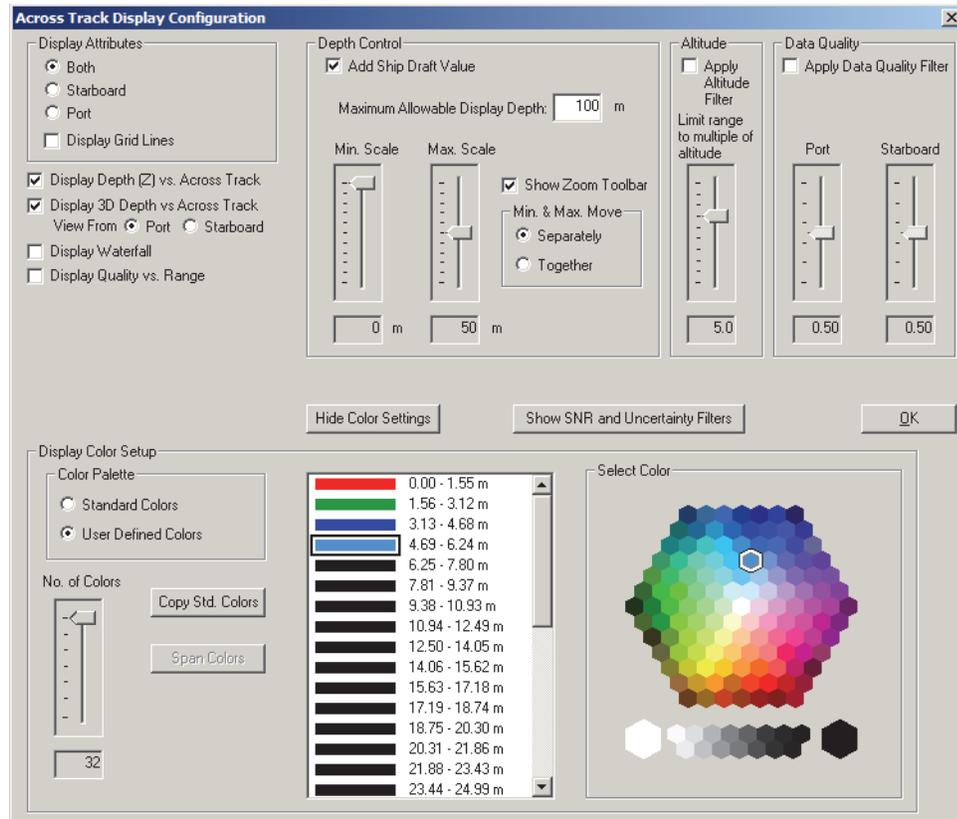
Figure 114: *The Across Track Display ConfiguratIon Dialog Box with Display Color Setup Area Shown*

can be customized for individual preference. To select a color for a segment, first click the segment. The **Select Color** palette becomes enabled as shown in Figure 115. Next, choose the color from this palette. Repeat for all the segments.

- Click **Copy Std Colors** to reset the custom color defined segments to match the standard color settings. The custom defined color selections will be lost. This button is available only when **Color Palette User Defined Colors** is selected.

- Click **Span Colors** to enable the choosing of two non adjacent color segments and filling the segments between them by interpolation. First, select a color for each of the two non adjacent segments as described above. Next, while holding down the CTRL key, click the first color segment to select both segments. Then click **Span Colors** to assign colors to the segments in between by interpolation.

Hide Color Settings. Click this button to hide the **Display Color Setup** area of the *Across Track Display Configuration* dialog box.
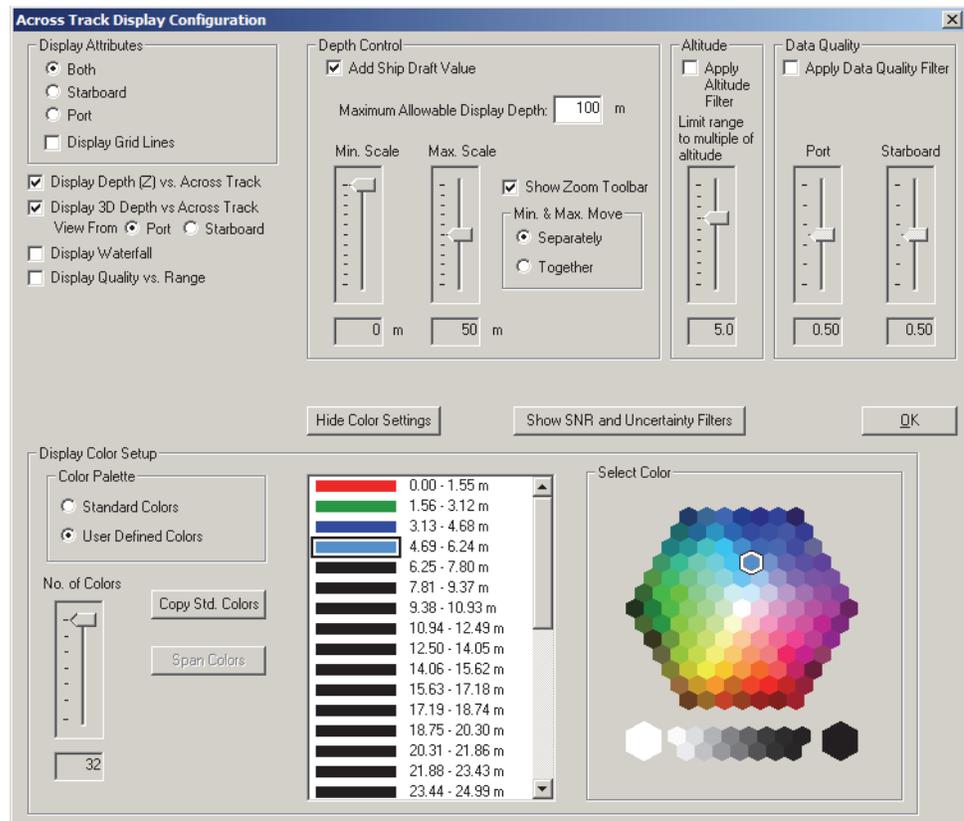
Figure 115: *The Across Track Display ConfiguratIon Dialog Box with Display Color Setup Area Shown and Select Color Palette Enabled*

Show SNR and Uncertainty Filters. Click this button to show the **Signal to Noise Ratio** and **Uncertainty** areas of the *Across Track Display Configuration* dialog box as shown in Figure 116.

Signal to Noise Ratio. Applies a signal to noise ratio filter to the display. Bathymetric solutions with a signal to noise ratio value *below* the threshold will not be displayed.

• Select the **Apply S/N Ratio Filter** check box to enable filtering of the displayed data with the signal to noise ratio value. When selected, "SNR and/or Uncertainty Filter is On" is displayed above the **Show SNR and Uncertainty Filters** button.

• Adjust the **Port** slider to set the signal to noise threshold for the port bathymetry solution. The signal to noise threshold is displayed in dB below the slider.

• Adjust the **Starboard** slider to set the signal to noise threshold for the starboard bathymetry solution. The signal to noise threshold is displayed in dB below the slider.
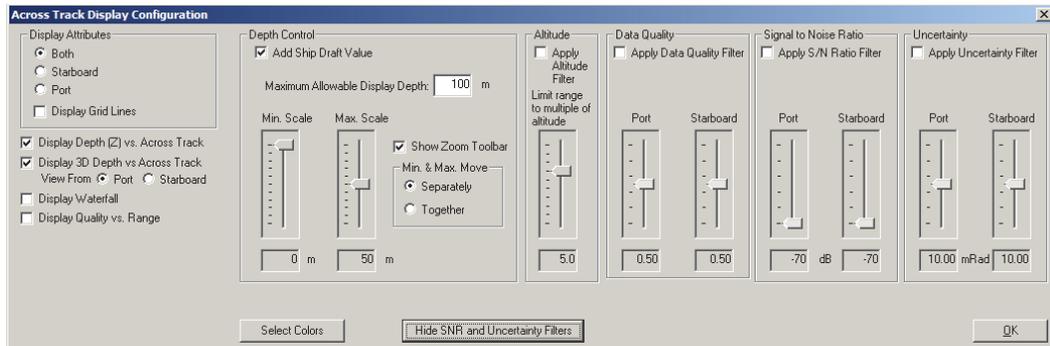
KLEIN
MARINE SYSTEMS, INC.

Figure 116: *The Across Track Display Configuration Dialog Box with Signal to Noise Ratio and Uncertainty Areas Shown*

NOTE *The signal to noise filter settings do not affect the stored data.*

Uncertainty. Applies an uncertainty ratio filter to the display. Bathymetric solutions with an uncertainty value *above* the threshold will not be displayed.

- Select the **Apply Uncertainty Filter** check box to enable filtering of the displayed data with the uncertainty value. When selected, "SNR and/or Uncertainty Filter is On" is displayed above the **Show SNR and Uncertainty Filters** button.

- Adjust the **Port** slider to set the uncertainty threshold for the port bathymetry solution. The uncertainty threshold is displayed in mRad below the slider.

- Adjust the **Starboard** slider to set the uncertainty threshold for the starboard bathymetry solution. The uncertainty threshold is displayed in mRad below the slider.

NOTE *The uncertainty filter settings do not affect the stored data.*

17.0 Navigation Window

🖼️ **Navigation**

Click this button to plot the track of the boat and the sonar data collection coverage. The Navigation window will open as shown in Figure 117.
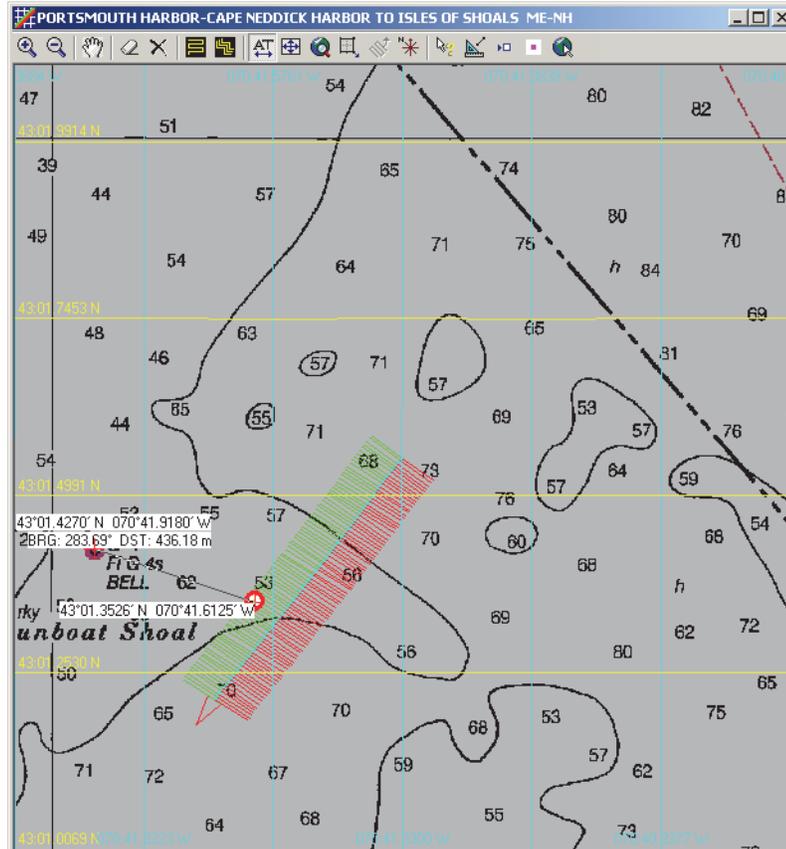

Figure 117: *The Navigation Window*

The Navigation window also displays the location of the targets that are selected or outlined. This window has the option of displaying the data collection track over a chart of the area. SonarPro is compatible with the MAPTECH digital charts (www.maptech.com)*.bsb file format, and C-MAP Global Electronic Chart Service (http://www.c-map.no). If you are using a demo CD, there is a folder on the CD labeled MAPTECH, which has charting information for the sample data.

KLEIN MARINE SYSTEMS, INC.

17.1 Setting up the Navigation Window Properties

Right-click in the Navigation Window to open the *Navigation Properties* dialog box to the *General* tab as shown in Figure 118.
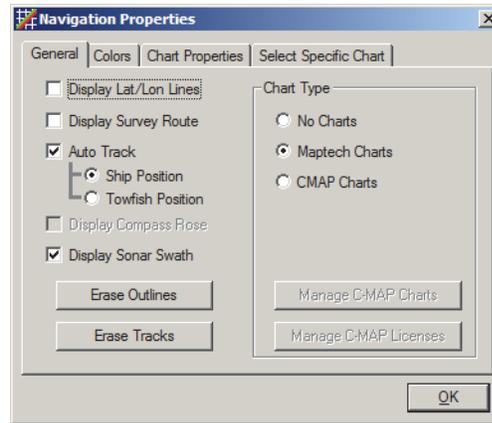

Figure 118: *The Navigation Properties Dialog Box—General Tab*

On the *General* tab you can make the following selections:

- Select **Display Lat/Lon Lines** to display the latitude and longitude lines.

- Select **Display Survey Route** to display the survey route.

- Select **Auto Track** to have the Navigation window re-center on the sonar coverage track automatically when it goes off the edge of the window. You can also use the **Drag Tool** button at the top of the window to re-center it manually.

- Select **Display Compass Rose** to place a compass rose icon in the upper right corner of the Navigation window for orientation. The compass rose is used with the C-MAP charts.

- Select **Display Sonar Swath** to display sonar swath lines. When not selected, the survey route is displayed as a dotted line.

- Click **Erase Outlines** to erase any outlined targets.

- Click **Erase Tracks** to erase the sonar collection track.

- Select **No Charts** to not display a chart.

- Select **Maptech Charts** to display Maptech charts.

- Select **CMAP Charts** to display C-MAP charts. When this option is selected, the **Manage C-MAP Charts** and **Manage C-MAP Licenses** buttons become available.

The *Colors* tab shown in Figure 119 allows you to separately select the colors of the port and starboard data collection tracks. To select a color, first click **Set Color** for the track, and then choose the color in the *Select Color* window. To return to the default colors at any time, click **Set Default Colors**.
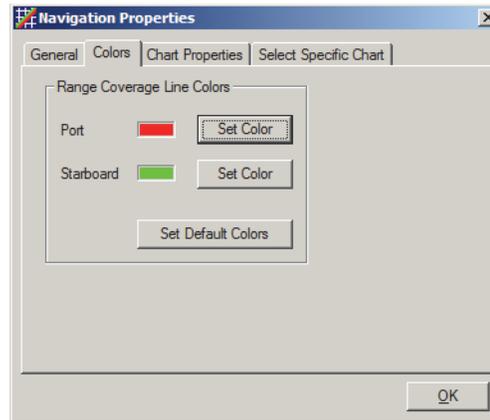

Figure 119: *The Navigation Properties Dialog Box—Colors Tab*

17.2 Using the Navigation Window Tool Bar

The Navigation window tool bar is shown in Figure 120.

Figure 120: *The Navigation Window Tool Bar*

Zoom In

Click this button to zoom in on the Navigation window.

Zoom Out

Click this button to zoom out of the Navigation window.

Drag Tool

Click this button to pan the chart in any direction. It makes for easy browsing of the chart in the Navigation window. The button is on by default.

Erase Outlines

Click this button to erase the outlines that have been drawn around targets.

✕ Erase Tracks

Click this button to erase the data collection track.

▤ Survey Grid

Click this button to open the *Survey Grid* dialog box which allows you to set up a survey grid as described in "Setting up a Survey Grid" on page 134.

▥ Survey Route

Click this button to open the *Survey Route* dialog box which allows you to set up a survey route as described in "Setting up a Survey Route" on page 136.

AT Auto Track

Click this button to automatically center the data collection track in the Navigation window when the track reaches the edge of the window.

⊕ Center

Click this button to center the data collection track in the Navigation window.

⊙ Mag All

Click this button to quickly zoom out to display all of the data collection tracks, targets and the survey route.

⊡ Zoom Window

Click this button to select an area in the Navigation window to zoom in on.

◈ Align Survey Route

This button is only active with the C-MAP charts or no charts. Click the button once to rotate the view so the survey grid is oriented up and down. The current ship heading, if following the survey grid, will be up. This is a good function for use by the person steering the boat on a survey grid. Click the button a second time to rotate the chart 180 degrees. Right-click in the Navigation window to open the *Navigation Properties* dialog box to the *General* tab and select the **Display Survey Route** and **Display Compass Rose** check boxes to display the survey grid and the compass rose for orientation.

Align North

This button is only active with the C-MAP charts or no charts. Click the button to align north up.

Location

Click this button to move the cursor over to a location of interest in the Navigation window. The location of the cursor will be displayed in the Status bar in the Main window.

Distance

Click this button to locate the bearing and distance to a previous target. Click the button, move the cursor to a start point, hold the left mouse button down and drag to the target or end location. The position, bearing and distance information will be displayed as shown in the example in Figure 121.
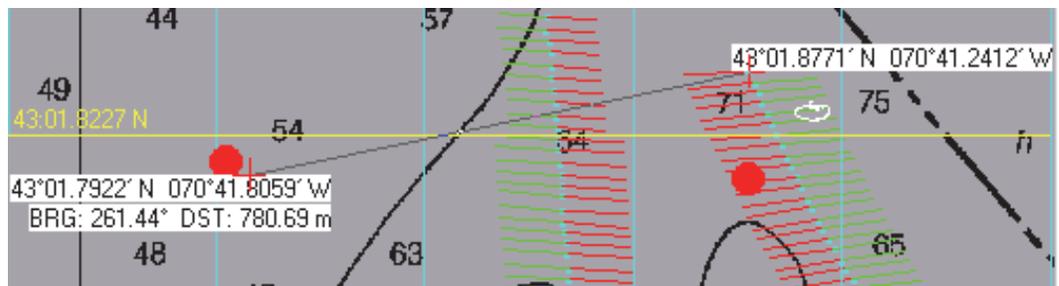

Figure 121: *Position, Bearing and Distance Display Example in the Navigation Window*

ID Target

Click this button to identify the targets that you have selected or marked in the Navigation window. Click the button, place the cursor over the target and hold the mouse button down to view the target. Releasing the mouse button will erase the target image. The data image of the target will appear in the Navigation Window.

Zoom Target

Click this button to zoom in close to a target that has been logged. Click the button and then a target along the data collection track. The Navigation window will zoom in on the selected target.

Move Location

Click this button to open a window that allows you to enter a location.

17.3 Managing C-MAP Charts

Click **Manage C-MAP Charts** on the *General* tab of the *Navigation Properties* dialog box. The *C-Map Management* dialog box shown in Figure 122 opens to the *Display Options* tab.

This dialog box allows you to choose from five different palettes and two presentation styles for map and symbols displayed on the C-MAP charts. The symbols can be customized by selecting **Custom Display** and moving items from the **Available Options** list into the **Current Options** list.

Figure 122: *The C-MAP Management Dialog Box—Display Options Tab*

Changing the presentation style can take several seconds before the image is updated. S-52 is an international standard for navigation. S-52 Base and S-52 Standard Display are defined in the S-52 Standard.

The *Chart Updates* tab shown in Figure 123 allows you to download and update your chart profile directly from C-MAP. C-MAP issues updates to charts on a regular basis and makes them available though their Web site. An Internet connection is required.
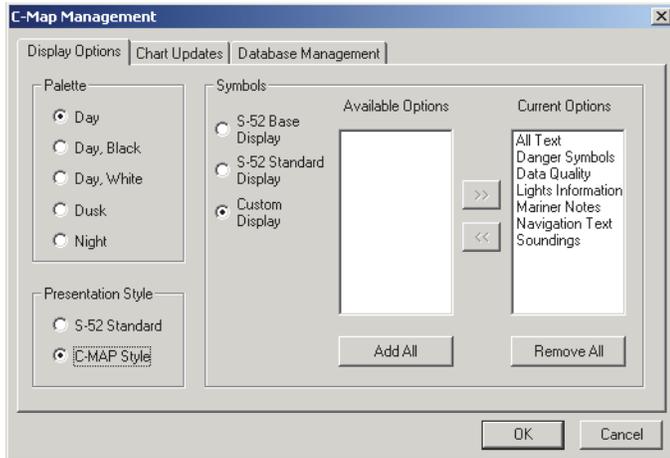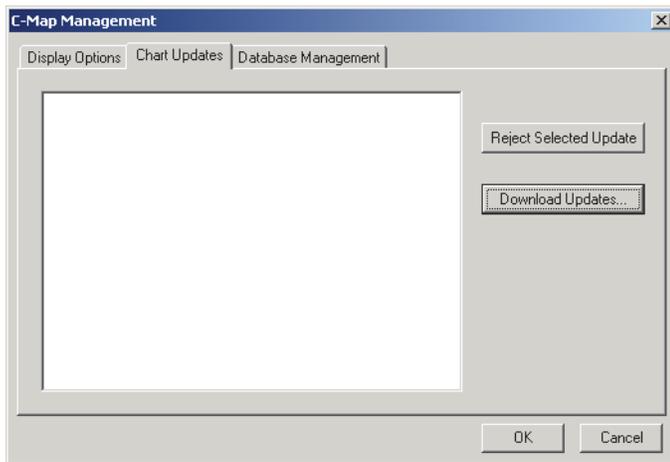

Figure 123: *The C-MAP Management Dialog Box—Chart Updates Tab*

To update a chart profile, select the profile of interest, and then click **Reject Selected Update**. To get the latest updates, click **Download Updates**. The *Download C-MAP Chart Updates* dialog box shown in Figure 124 opens. Downloads can be quite large, so you can check the size of the data file by clicking **Check Download Size**. When satisfied click **Download All Updates**.
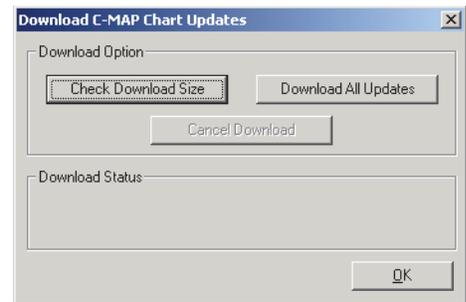

Figure 124: *The Download C-MAP Chart Updates Dialog Box*

You can cancel the download at any time by clicking **Cancel Download**.

The *Database Management* tab shown in Figure 125 allows you to manage multiple C-MAP databases. (Normally, SonarPro will come with the database already loaded and registered, and there will be only one database.) You can use this tab to load your C-MAP database from the distribution CD. We recommend that you copy the database to your hard drive. Put the CD in the drive, click **Copy Database to HD** and follow the instructions. Then register the database and set it as the default. To delete a database from the hard drive, click **Unregistered Database**. Disregard the **Check Signature** buttons.
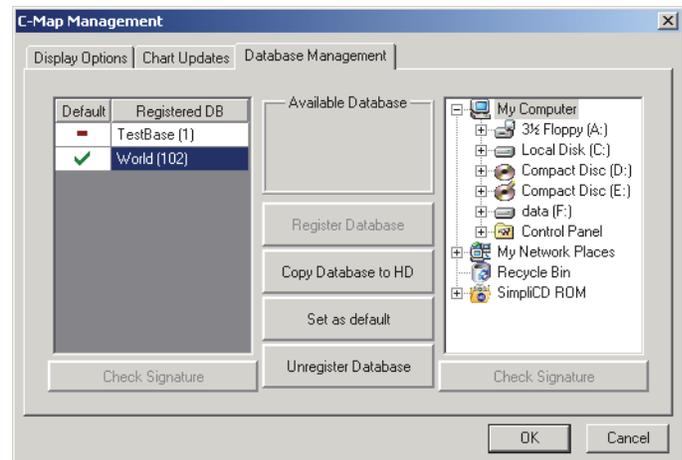

Figure 125: *The C-MAP Management Dialog Box—Database Management Tab*

KLEIN
MARINE SYSTEMS, INC.

17.4 Managing C-MAP Licenses

Click the **Manage C-MAP Licenses** button on the *General* tab of the *Navigation Properties* dialog box. The *C-MAP License Registration* Dialog Box shown in Figure 126 opens. This dialog box allows you to manage C-MAP licenses. For more information read the SENC Distribution End User Info PDF file located in the manual folder under your SonarPro folder and the SonarPro installation section.

Figure 126: *The C-MAP License Registration Dialog Box—Add License Manually*

If you have the C-MAP charts loaded on a PC unlicensed, SonarPro will display the charts, but they will be displayed at a low resolution. If you are seeing this happen we suggest checking your license validation.

To add a license manually, select the region on the right, enter the license number obtained from C-MAP, and then click **Add License manually**.

To get an expired license, enter the date in the **Expiry Date** text box, and then click **Get expired licenses**. You can enter the current date or a date in the future. Or click the **Automatically check for license expiration** check box.

Click the **Licenses list** button to list all the current licenses, the expiration date, the zone, and the license string as shown in Figure 127.

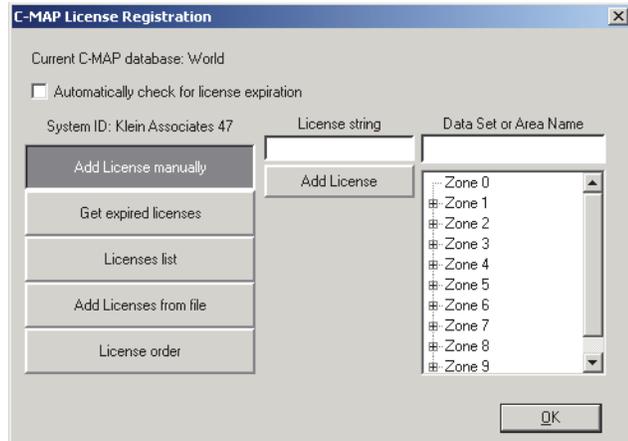Click the **Add Licenses from file** to browse for the file. To add the license click **OK**.
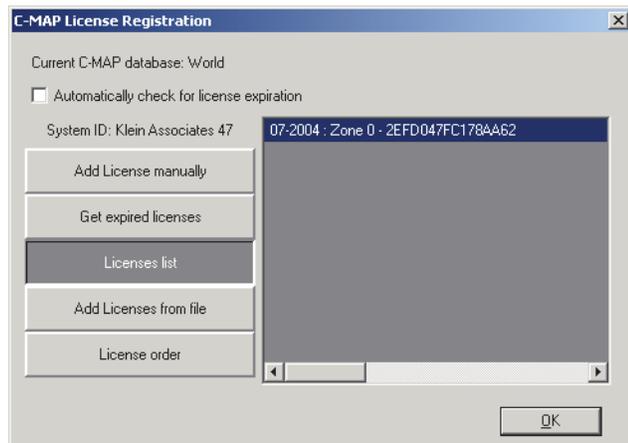

Figure 127: *The C-MAP License Registration Dialog Box—License List*

17.5 Managing Maptech Charts

When the **Maptech charts** option is
selected on the *General* tab of the
Navigation Properties dialog box,
SonarPro will search for the proper chart.
If it cannot be located, a Windows file
search dialog will open. Browse for the
chart folder. SonarPro will then extract
the proper chart. The chart of the area
that the sonar is working in will then be
displayed in the Navigation window as
long as the zoom is set at a reasonable
level. If the zoom level is too far out, the
chart will not display. Check that the
Auto Track check box is selected.

The *Specific Chart* tab is available in the
Navigation Properties dialog box with
Maptech charts as shown in Figure 128. Here you can select a different chart if you
do not like the chart coverage that was selected by default; for example, you can
use a more detailed chart. The charts may be sorted by chart number, chart name or
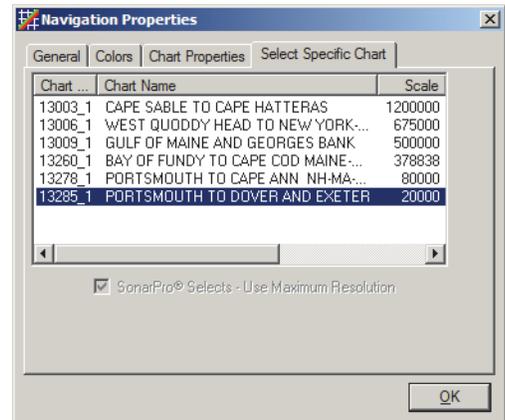scale. Click the appropriate button above the charts.

Figure 128: *The Navigation Properties Dialog Box—Select Specific Chart Tab*

17.6 Configuring the Chart Properties

The *Chart Properties* tab of the
Navigation Properties dialog box is
shown in Figure 129. This tab allows you
to vary the chart's background intensity
by using the **Palette Intensity** slider.

The **Use Original Palette Intensity**
button resets the intensity of the
background chart to the default setting.

The **Specify Chart Folder** button allows
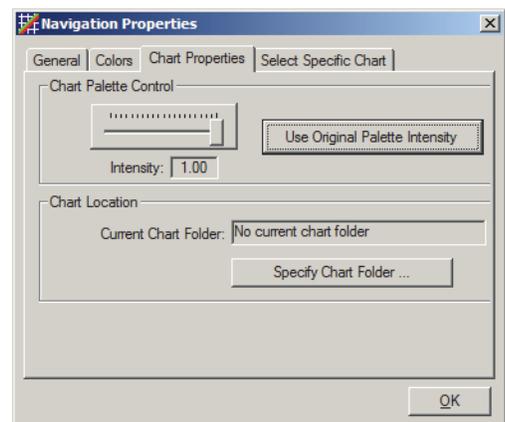you to select the location of the charts.

Figure 129: *The Navigation Properties Dialog Box—Chart Properties Tab*

17.7 Displaying Outlines

Outline

By selecting this button in the Sonar Viewer window and outlining an area, the area outlined will be marked both in the Sonar Viewer Window and in the Navigation window as shown in Figure 130. Right-click in the Navigation window, select the *Chart Properties* tab in the *Navigation Properties* dialog box, and lower the **Chart Palette Control** to see the outline. To erase outlines, right-click in the Navigation window, select the *General* tab and click **Erase Outlines**.
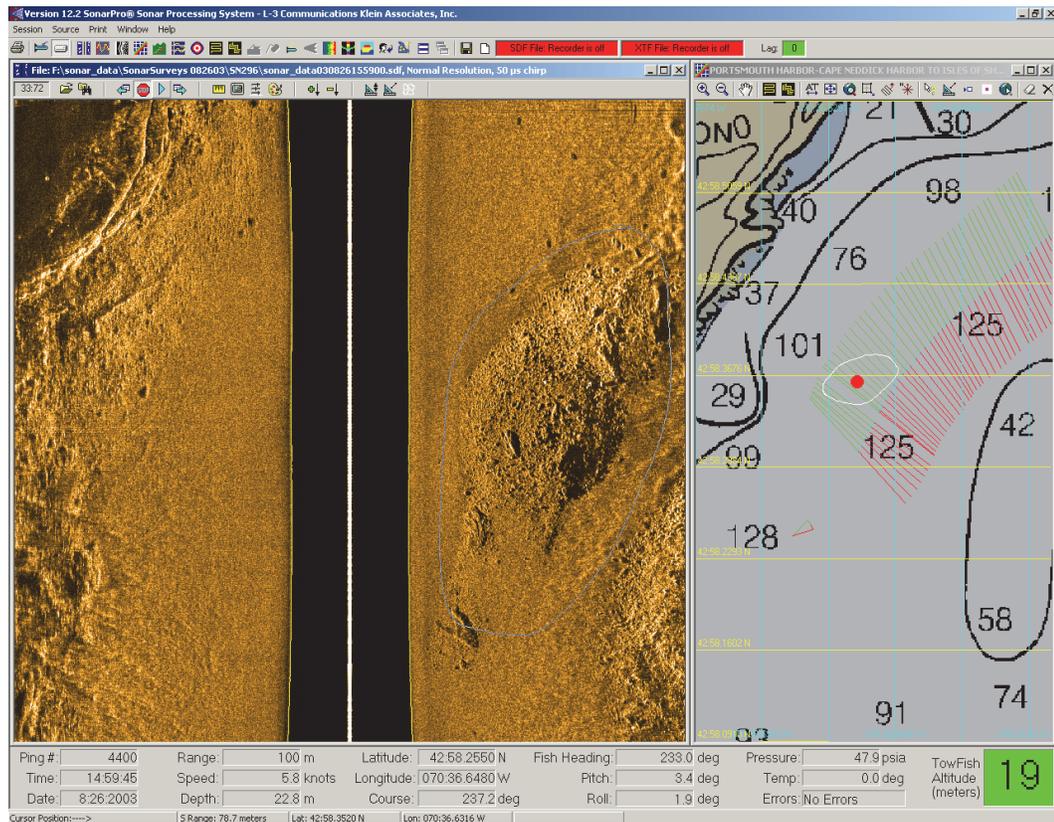

Figure 130: *Outlines in the Sonar Viewer and Navigation Windows*

18.0 3D Terrain Window

3D Terrain

Click this button on the Main tool bar to view a 3D terrain of the data. The 3D Terrain window will open as shown in Figure 131. This window is only available when the C-MAP navigation charts are loaded. The 3D Terrain window tool bar is shown in Figure 132.
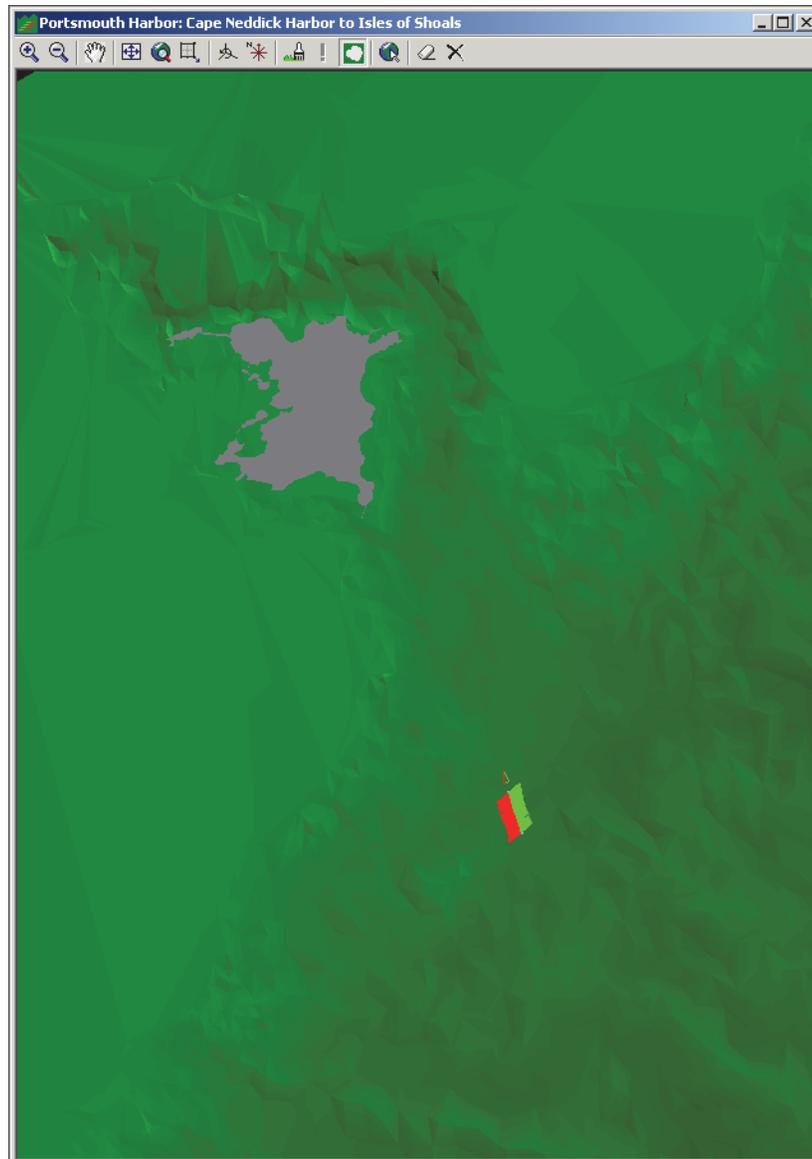
Figure 131: *The 3D Terrain Window*

Figure 132: *The 3D Terrain Window Tool Bar*

Zoom In

Click this button to zoom in on the 3D Terrain window.

Zoom Out

Click this button to zoom out of the 3D Terrain window.

Drag Tool

Click this button to pan the chart in any direction. It makes for easy browsing of the chart in the 3D Terrain window. The button is on by default.

Center

Click this button to center the data in the 3D Terrain window.

Mag All

Click this button to quickly zoom out to display all of the data collection tracks and targets.

Zoom Window

Click this button to select an area in the 3D Terrain window to zoom in on.

Rotate Window

Click this button to rotate the scene with respect to the camera in 3D as shown in Figure 133.

Align North

Click this button to align north up and position the camera directly over the view.

Regenerate Mesh

Click this button to regenerate mesh data.

Mesh Data

This display changes from gray to black when there is no mesh data available for display at the survey area.

Land Boundaries

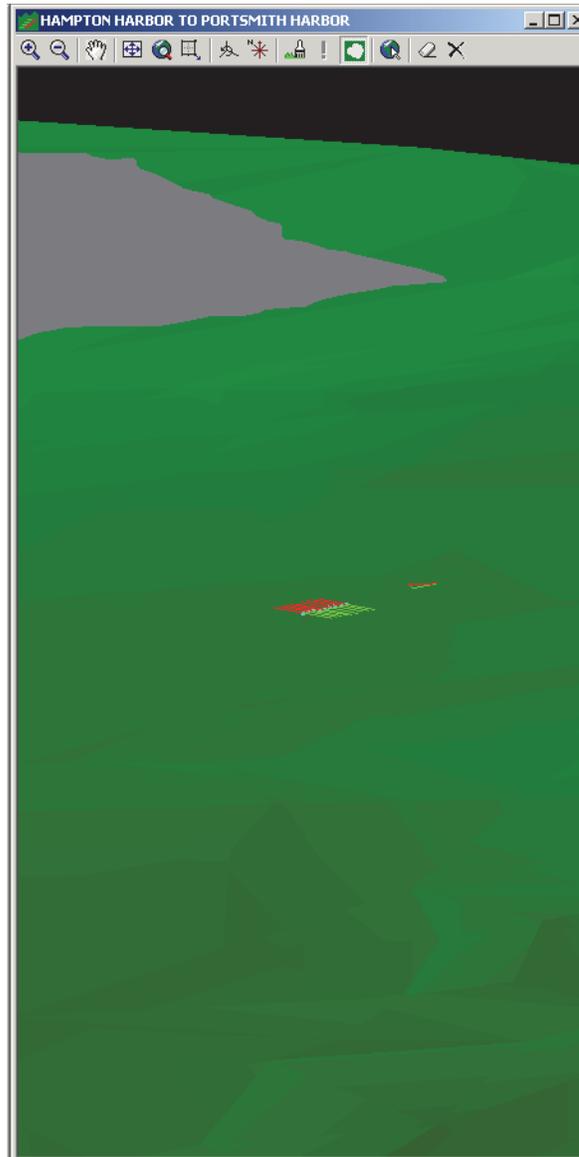Click this button to turn on or off the land boundaries on the 3D mesh information.

Figure 133: *The 3D Terrain Window Rotated*

Move Location

Click this button to open a window that allows you to enter a location.

Erase Outlines

Click this button to erase the outlines that have been drawn around targets.

Erase Tracks

Click this button to erase the data collection track.

KLEIN
MARINE SYSTEMS, INC.

19.0 Targets And Target Management

By placing the pointer over a target in the Sonar Viewer window and double-clicking, you can log a target into a target catalog, open a Target window for the target as shown in Figure 134, and place a target mark in the Navigation Window. You can use the Target window to zoom, pan, save, get the location, and adjust the TVG gain and color palette of the target. You can also select a target classification, such as a cable, rock, pipe, or wreck. Coordinates around the edge of the target window are measured in meters or feet. For target catalog setup information, refer to "Setting up the Target Preferences" on page 132.
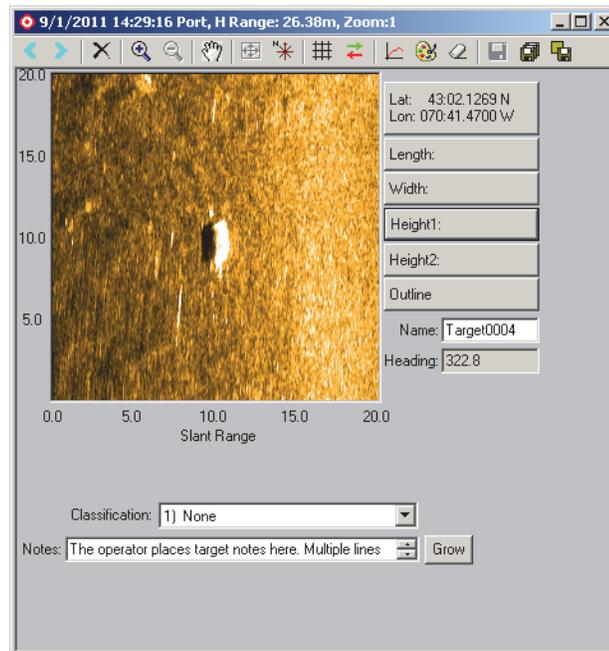

Figure 134: *The Target Window*

19.1 Ensuring Target Position Accuracy

Before selecting and logging targets, it is important to ensure that the ship's cable layback parameters have been entered and are accurate, as these parameters determine the relative position of the towfish to the GPS antenna on the ship. For a description of the cable layback parameters and how to enter them, refer to "Layback" on page 1-140. The more accurate the parameter entries are, the more accurate will the position measurement of a marked target be. In addition to the cable layback parameters, it is important to verify the correct towfish heading selection, either magnetic or true heading and whether to use the towfish heading or the ship's heading when calculating the target positions. For a description of these parameters and how to enter them, refer to "Setting up the Compass Preferences" on page 1-131. Ship heading is displayed in the Target window.

19.2 Setting up the Target Window Properties

Right-click on the Target window to open the *Target Properties* dialog box to the *Target Gain* tab as shown in Figure 135. On this tab use the **Intensity** slider to adjust the gain of the target data being displayed. Click **Use Original Gain Value** to select the default gain.
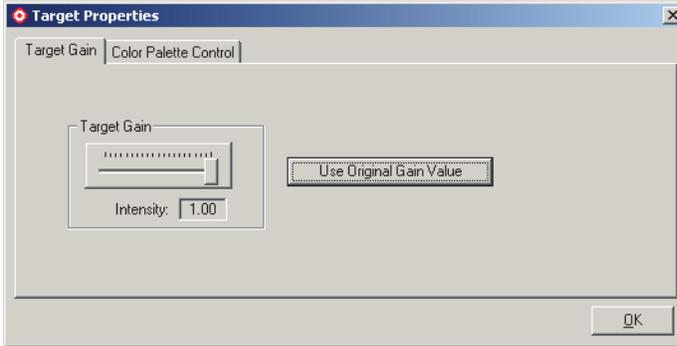

Figure 135: *The Target Properties Dialog Box—Target Gain Tab*

The *Color Palette Control* tab shown in Figure 136 allows you to adjust the color of the target data being displayed. Select **Inverse Video** to display shadows as light and the contacts as dark. Return to the default color palette by clicking **Use Default Palette**.
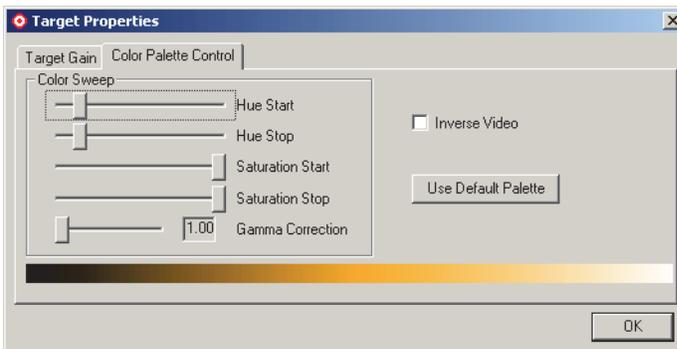

Figure 136: *The Target Properties Dialog Box—Color Palette Control Tab*

19.3 Using the Target Window Tool Bar

The Target window tool bar is shown in Figure 137.

Figure 137: *The Target Window Tool Bar*

Previous Target

Click this button to display the previous Target window.

Next Target

Click this button to display the next Target window.

Delete

Click this button to delete a selected Target window from the target catalog.

Zoom In

Click this button to zoom in on the Target window.

Zoom Out

Click this button to zoom out of the Target window.

Drag Tool

Click this button to pan the target data in any direction. The button is on by default.

Center

Click this button to center the target data in the Target window.

Align North

Click this button to align north up and position the camera directly over the view.

Toggle Grid

Click this button to place or remove a grid over the target data for estimating target parameters.

Toggle Shadow

Click this button to place or remove an arrow in the target window that indicates the sound direction. The arrow is red when the direction is to port; green if to starboard.

Gain

Click this button to open the *Target Properties* dialog box to the *Target Gain* tab shown in Figure 135 on page 121 where you can adjust the gain of the target data being displayed.

Palette

Click this button to open the *Target Properties* dialog box to the *Color Palette Control* tab shown in Figure 136 on page 121 where you adjust the color of the target data being displayed.

Erase

Click this button to erase any measurement marks in the Target window.

Save

Click this button to save a target.

Save All

Click this button to save all targets. (See "Setting up the Target Preferences" on page 132 for instructions on how to automatically save targets.)

Save Image

Click this button to save the target image in a GEOTIFF Image (.tif) or Windows Bitmap (.bmp) file.

KLEIN
MARINE SYSTEMS, INC.

19.4 Managing Targets

Target Management

Click this button on the Main tool bar to view a list of the targets you are working with. *The Detailed Target Window Management* dialog box will open as shown in Figure 138. The targets have a color code for the different layers, and specific data on each target are listed. The main purpose of this window is for selecting, displaying and editing targets in the Main window.
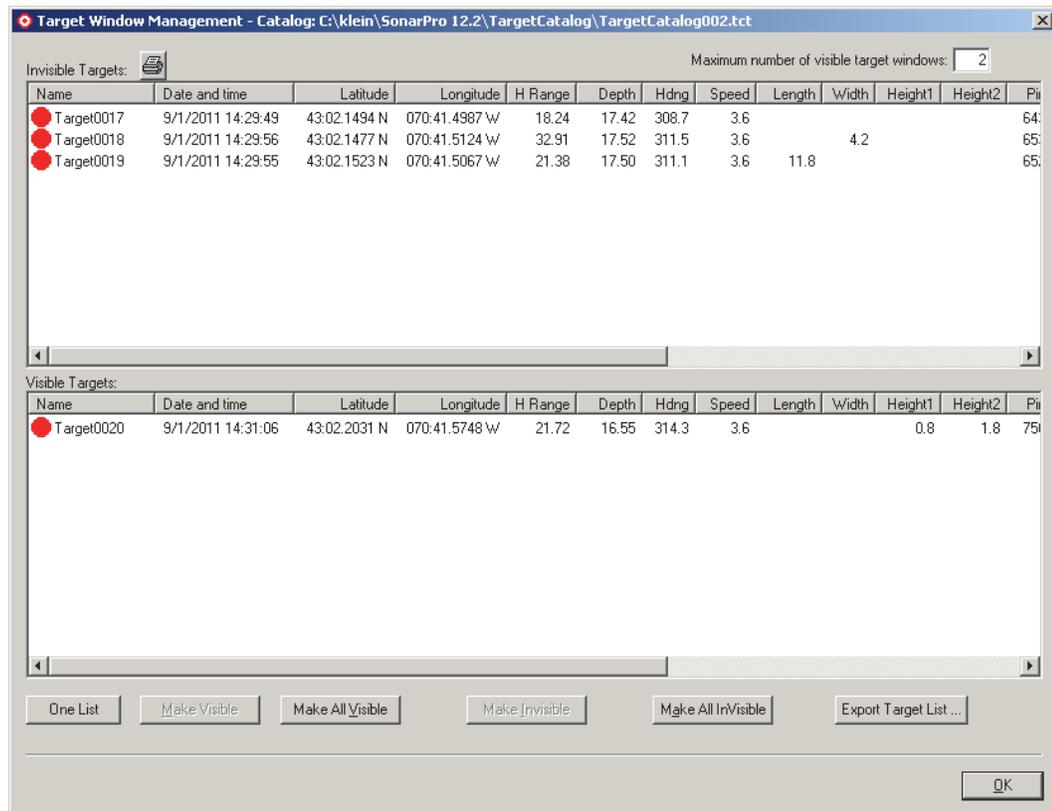

Figure 138: *The Detailed Target Window Management Dialog Box*

Two lists of targets are shown by default: the **Invisible Targets** list, which are the targets that are stored in the target catalog but are not visible in the Main Window, and the **Visible Targets** list, which are separate, visible Target windows displayed in the Main Window. The maximum number of visible windows can be set by entering a value in the **Maximum number of visible target windows** text box in the upper right corner. Targets in the lists may be sorted by name, date and time, latitude, longitude, horizontal range, depth, heading, speed, length, width, height, ping number, layer, or annotation by clicking the corresponding column title. Hidden rows and columns can be viewed by dragging the vertical and horizontal scroll bars, respectively.

The following buttons in the *Detailed Target Window Management* dialog box are used to manage the target lists.

One List/Two List. Click **One List** to change the display to only one list called the **All Targets** list. In this mode you will not know which targets are being displayed, but the list is more suitable for printing. The **One List** button will change to **Two List**. Click **Two List** to revert to two lists.

Make Visible. By selecting a target from the **Invisible Targets** list, this button will become available. Click the button to move the selected target into the **Visible Targets** list and display its Target window in the Main Window.

Make All Visible. Click this button to move all of the targets in the **Invisible Targets** list into the **Visible Targets** list and display their Target windows in the Main Window. The maximum number of visible targets is 12.

Make Invisible. By selecting a target from the **Visible Targets** list, this button will become available. Click the button to move the selected target into the **Invisible Targets** list and close its Target window.

Make All Invisible. Click this button to move all the targets in the **Visible Targets** list into the **Invisible Targets** list and close all the Target windows.

Export Target List. Click this button to output the target list to a text file, a file of extension *.txt*, for viewing and printing in word processors.

When a target is selected and made visible, it will be identified in the Navigation window as a red target with a white center as shown in Figure 139.

To edit a target, select the target and click **Make Visible**. Then go to its Target window, make the changes and resave the target. To delete a target from the target catalog, select the target and click **Make Visible**. Then go to its target window and delete the target.
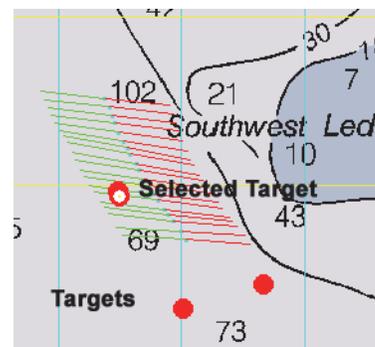

Figure 139: *Visible Target in Navigation Window*

19.5 Target Measurement

In the Target window on the right side is a list of measurement parameters as shown in Figure 134 on page 120: Lat/Lon, Length, Width, Height1, and Height2. These are all active tools. Click a parameter to activate it, move the cursor to the target, and then click and drag to make the desired measurement.

The **Outline** button operates the same as the one in the Sonar Viewer window. Click the button, and with your mouse, outline a target. The outline will be placed in the Target window as well as in the Navigation window. Right-click in the Navigation window, select the *Chart Properties* tab in the *Navigation Properties*

dialog box, and lower the **Chart Palette Control** to see the outline. To erase outlines, right-click in the Navigation window, select the *General* tab and click **Erase Outlines**.

At the bottom of the Target window there is a text box for entering notes about the target. The target can also be renamed from its default name by entering the name in the **Name** text box.

20.0 Towfish Sensor Information

Sensor

Click this button to display towfish sensor information. The Sensor window will open as shown in Figure 140. The towfish sensor information is also displayed in the Information Window at the bottom of the Main window.
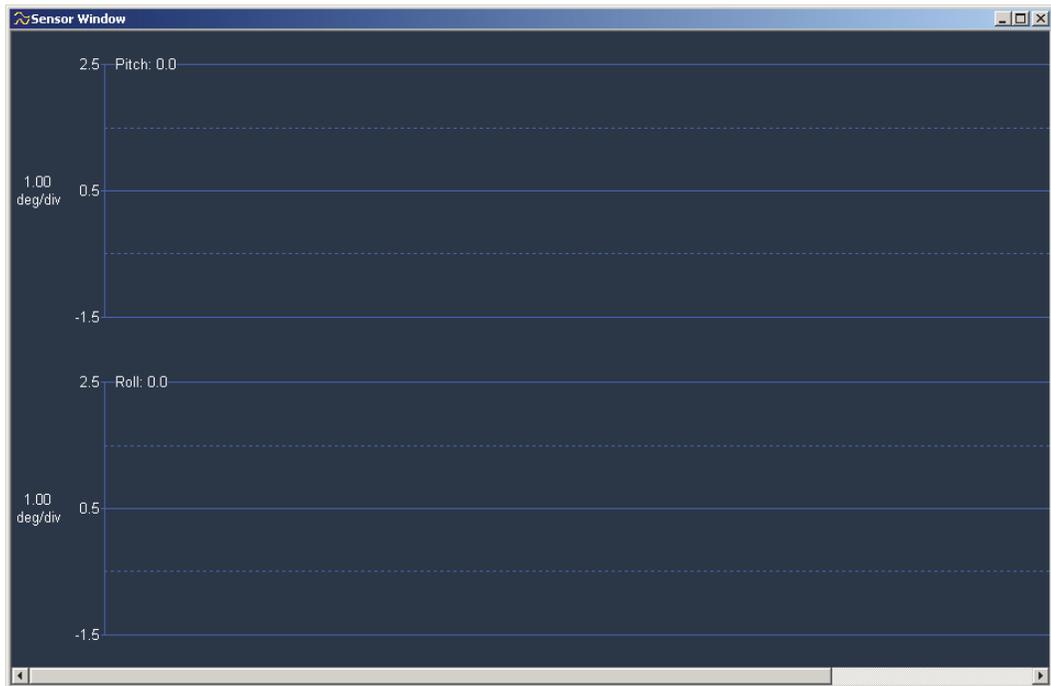
Figure 140: *The Sensor Window*

Right-click in the Sensor Window to open the *Sensor Configuration* dialog box shown in Figure 141. This dialog box allows you to select which sensors you want to monitor, configure the scale for a custom pressure sensor, enter a magnetic heading offset, select the display font, and adjust the display width.

NOTE *Note that any changes to the pressure scale values should be done with care, as they are used to calculate the towfish depth, and incorrect parameters will cause incorrect readings.*
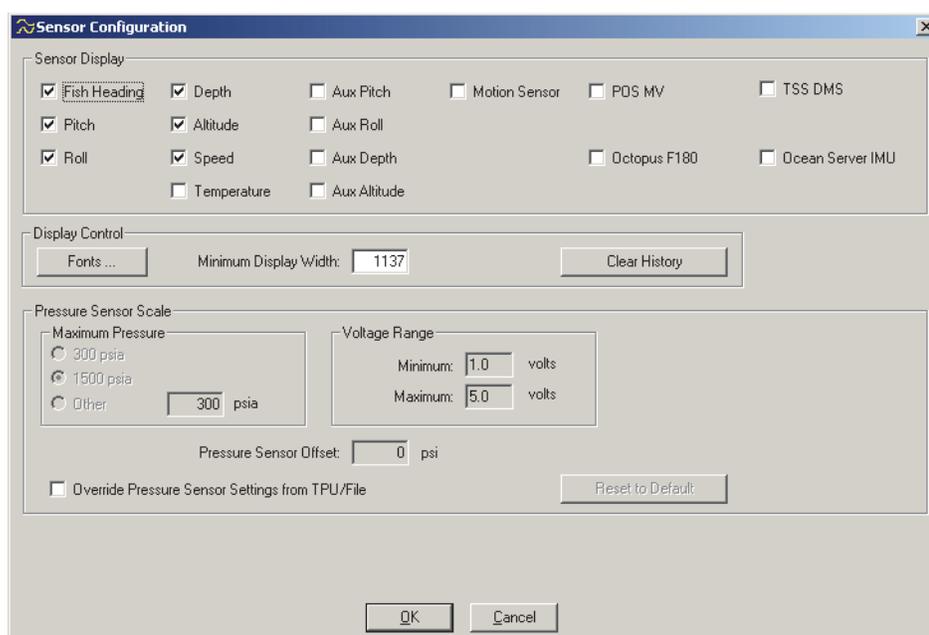
Figure 141: *The Sensor Configuration Dialog Box*

To select the sensors to monitor, select their corresponding check boxes in the **Sensor Display** area of the S*ensor Configuration* dialog box.

If a custom pressure sensor is installed in the towfish, select the **Override Pressure Sensor Settings from TPU/File** check box in the **Pressure Sensor Scale** area, select the **Other** option in the **Maximum Pressure** area, and then enter the maximum pressure in psia in the text box. The default voltage range is 0 to 5 volts. Similarly, if the pressure sensor's voltage range is different than this range, the correct values can be entered in the **Minimum** and **Maximum** text boxes in the **Voltage Range** area. To manually add an offset to the pressure sensor output, enter the offset in psi, plus or minus, in the **Pressure Sensor Offset** text box. All these settings can be made permanent with a modification to the startup.ini file. To reset the pressure settings to the default for the towfish, click **Reset to Default**.

To manually add an offset to the magnetic heading output, enter the offset in degrees, plus or minus, in the **Magnetic Heading Offset** text box in the **Magnetic Heading Offset** area. If you are unsure what the values should be, click **Reset to Default** to set them to the default for the current towfish type. To reset the magnetic heading offset to the default, click **Reset to Default**.

To adjust the width of the display, enter the width in pixels in the **Minimum Display Width** text box in the **Display Control** area. The wider the display, the more data history is shown, but it takes longer for the display to update. Reduce the width if it causes SonarPro to lag. To change the fonts that are used in the

Sensor window, click **Fonts** and make the font selection. To clear the display of all the data and restart, click **Clear History**. To reset the display width to the default, click **Reset to Default**.

Shown in Figure 142 is an example *Sensor Configuration* dialog box setup with the corresponding results in the Sensor window.

NOTE *The Sensor window is graphic intensive and should therefore be used sparingly during real-time operation. Leaving this window open for long periods may result in the system running in a data lag condition. The Sensor window should be used mostly in playback.*
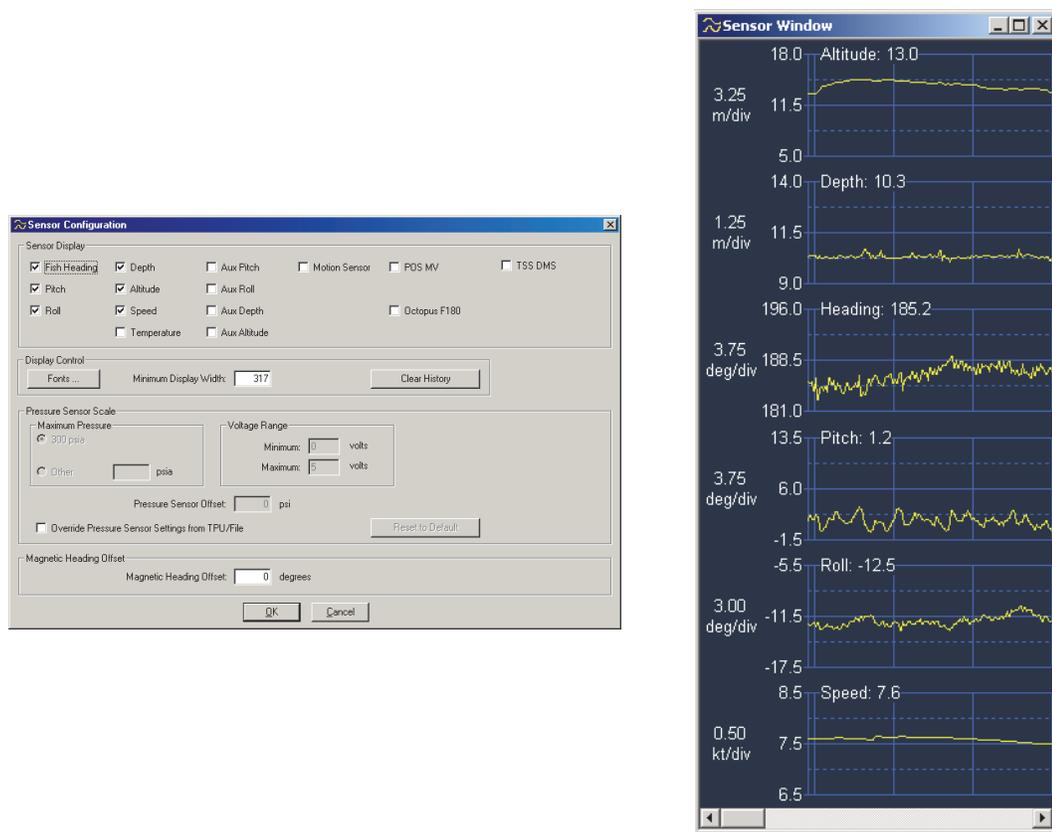
Figure 142: *Example of Sensor Configuration Dialog Box Setup with the Corresponding Results in the Sensor Window*

21.0 Setting up the User Preferences

Preferences

Click this button to set up the user preferences. The *SonarPro User Preferences* dialog box will open to the *General Preferences* tab as shown in Figure 143.

21.1 Setting up the General User Preferences

On the *General Preferences* tab you can set up the way SonarPro places and sizes the windows in the Main window. You can choose to manually set the position and sizes of the windows, or you can have SonarPro perform this function automatically. You can also select the units for SonarPro to use when displaying the towfish altitude and depth and when performing target mensuration. In addition, you can select the format to use when displaying latitude and longitude or use the WGS-84 or GRS-1980 (ETRS 89) UTM and select either English, Japanese, Chinese (Mainland) with simplified characters, or Chinese (Taiwan) with traditional characters for displayed text.
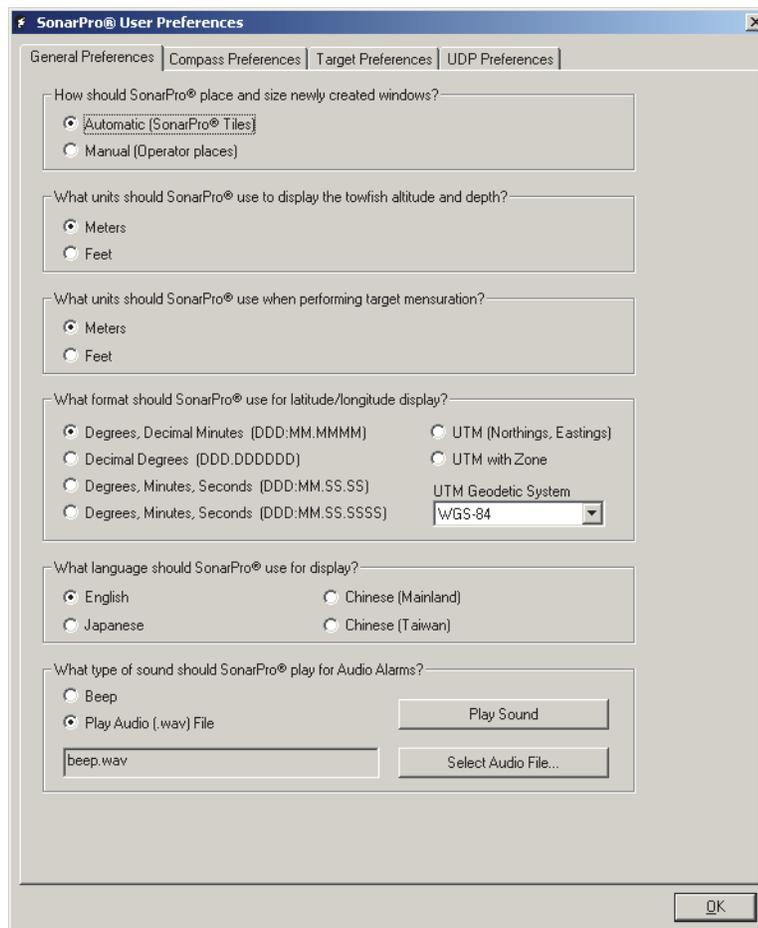
Figure 143: *The SonarPro User Preferences Dialog Box—General Preferences Tab*

SonarPro will beep when sounding an alarm. However, you can choose to have SonarPro play an audio (.wav) file instead. Click **Select Audio File** to choose the file. Click **Play Sound** to hear it.

21.2 Setting up the UDP Preferences

On the *UDP Preferences* tab you can select whether to output User Data Protocol (UDP) messages containing sonar and target information. When this option is selected, SonarPro will broadcast the UDP messages. You can also select whether to enable remote control of SonarPro with UDP messages from another program. This feature allows remote control of the data acquisition and recording functions and can set the values of some parameters. Additional information on these two options is provided in "SonarPro User Datagram Protocol Interface Specification," Rev 1.6, P/N 15300015 from KMS.
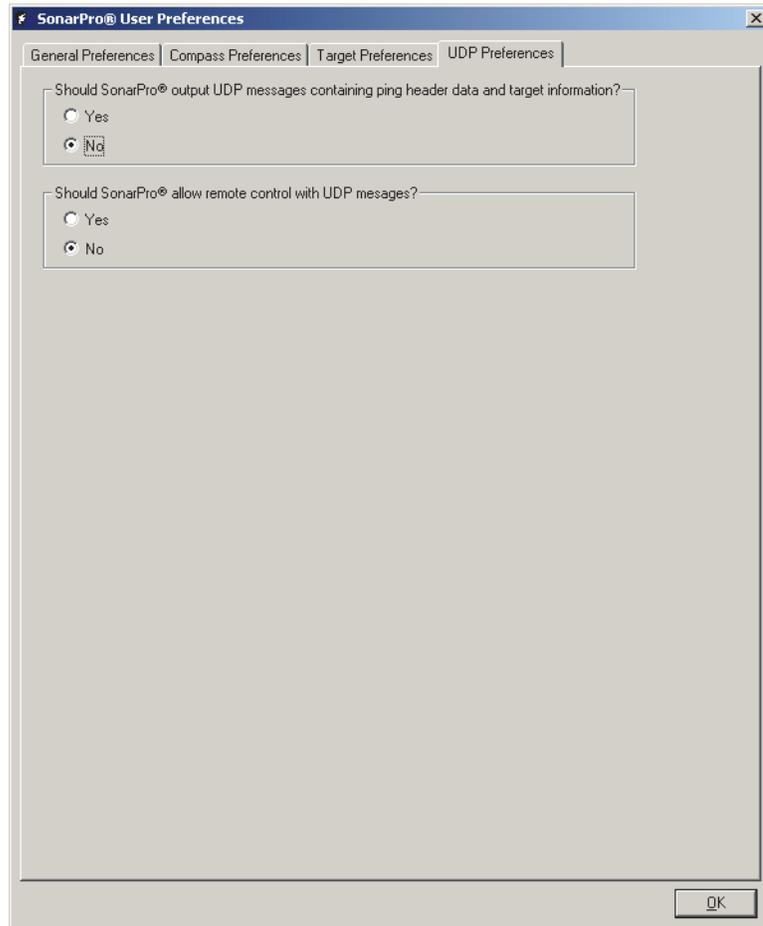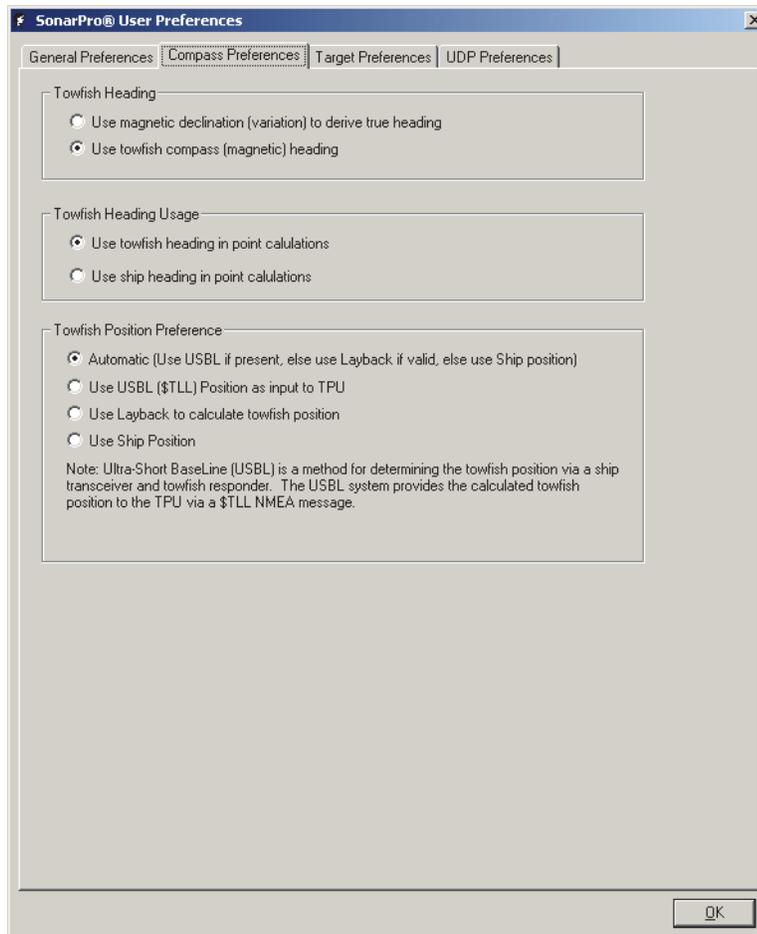

Figure 144: *The SonarPro User Preferences Dialog Box—UDP Preferences Tab*

21.3 Setting up the Compass Preferences

On the *Compass Preferences* tab shown in Figure 145 you can select whether to display within SonarPro the raw compass heading from the towfish, which includes a compass that provides a rough magnetic heading, or a deviation corrected towfish heading which derives true heading. You can also select the source used for positioning calculations within SonarPro, either the towfish heading or the ship heading.

In addition, you can choose to have SonarPro automatically select which positioning method to use or you can select a specific one. When choosing automatic, SonarPro will use the ultra short baseline (USBL) system, if installed, which uses a towfish mounted responder and a shipboard transceiver. If not installed or if not operating, layback will be automatically selected if valid layback parameters have been entered. If not, ship position will be automatically selected. When choosing a specific positioning method, first choose either the USBL or the layback option, depending on the system configuration.

Figure 145: *The SonarPro User Preferences Dialog Box—Compass Preferences Tab*

21.4 Setting up the Target Preferences

On the *Target Preferences* tab shown in Figure 146 you can set up the way SonarPro handles the targets when they are displayed in the Target window and how target information is handled and saved.

In the **Target Catalog** area of the *Target Preferences* tab, select the location for saving the target catalogs that are generated. This can be a new catalog or a previously generated catalog. The catalog must be located on a hard drive. If the Survey Wizard was used when starting the survey, the location was selected at that time. Click **Browse** to select or create the directory from the *Save* box.
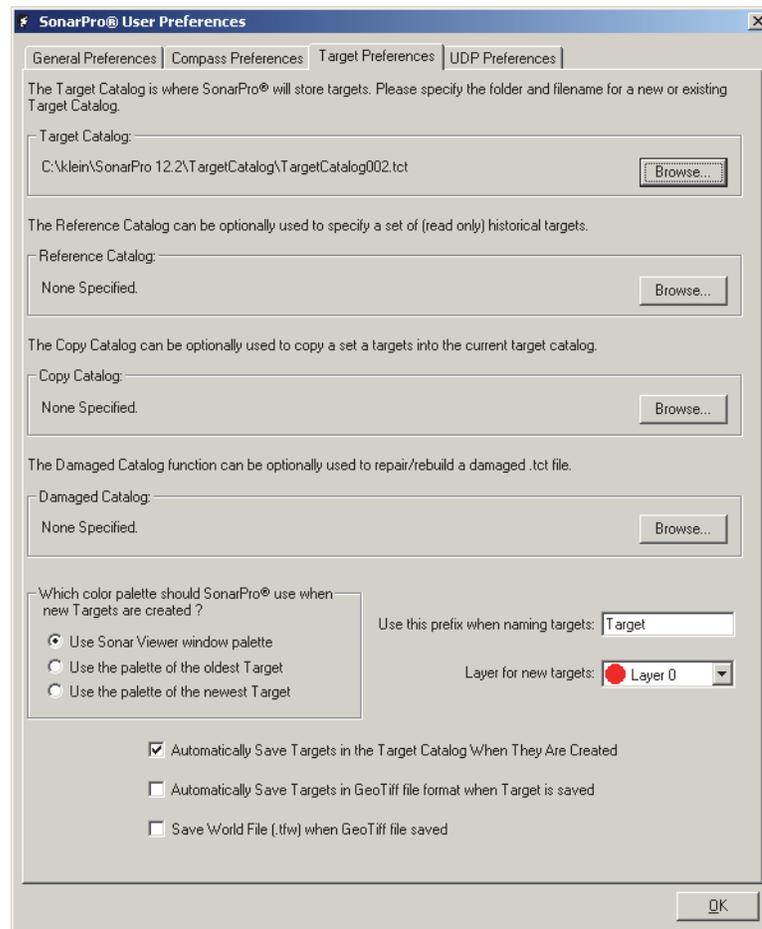
Figure 146: *The SonarPro User Preferences Dialog Box—Target Preferences Tab*

In the **Reference Catalog** area you can optionally browse for historical targets located on the computer hard drive. These targets can be used in the Navigation window as a reference if you are resurveying an area. If the Survey Wizard was used when starting the survey, the targets were selected at that time.

In the **Copy Catalog** area you can optionally browse for and copy a set of targets into the current target catalog.

In the Damaged Catalog area you can repair or rebuild a damaged target catalog.

In the **Which color palette should SonarPro use when new targets are created?** area, you can select the color palette to use for the target. When you create a target, SonarPro generates the target in a color palette. The default color palette is the same color palette as that used in the Sonar Viewer window. There may be instances when you may want the target in a different color palette to highlight different characteristics. You can choose to use the Sonar Viewer window palette or the palette of the oldest or newest target.

You can change the prefix for the target names by entering it in the **Use this prefix when naming targets** text box. If the Survey Wizard was used when starting the survey, the prefix was entered at that time.

Targets can be stored on 4 different layers. These layers are displayed as different colored targets in the Navigation window. This feature is useful if you have previously surveyed an area and want to compare the targets from this survey with the current survey. The most recent surveyed targets are placed on a separate layer for easy comparison. If the Survey Wizard was used when starting the survey, the layer was selected at that time.

You can save targets in the target catalog manually from the Target window, or you can have SonarPro automatically save targets when they are generated. To save them automatically, select the **Automatically Save Targets in the Target Catalog When They Are Created** check box. In addition, when saving targets, you can also select the **Automatically Save Targets in GeoTiff file format when Target is saved** check box to save the targets to GeoTiff files—one file for each target—with embedded georeferenced information. And you can select the **Save World File (.tfw) when GeoTiff file saved** to automatically save an associated World File (.tfw) with the GeoTiff file.

21.5 Arranging Windows

SonarPro Tile

Click this button to position the open windows in the Main window in a tile arrangement.

Cascade Window

Click this button to position the open windows in the Main window in a cascade arrangement.

22.0 Survey Routes

There are two types of survey routes: a survey grid and a survey route. A survey grid is a rectangular array of back-and-forth lines at equal spacing. A survey route is a more free form tool which is made up of lines with multiple waypoints. The lines can have different numbers of waypoints and be at different spacings. An example survey grid in the Navigation window is shown in Figure 147, and an example survey route is shown in Figure 151 on page 137.

Survey routes and survey grids can be turned on or off in the Navigation window by right-clicking in the window to open the *Navigation Properties* dialog box to the *General* tab and selecting or clearing the **Display Survey Route** check box.
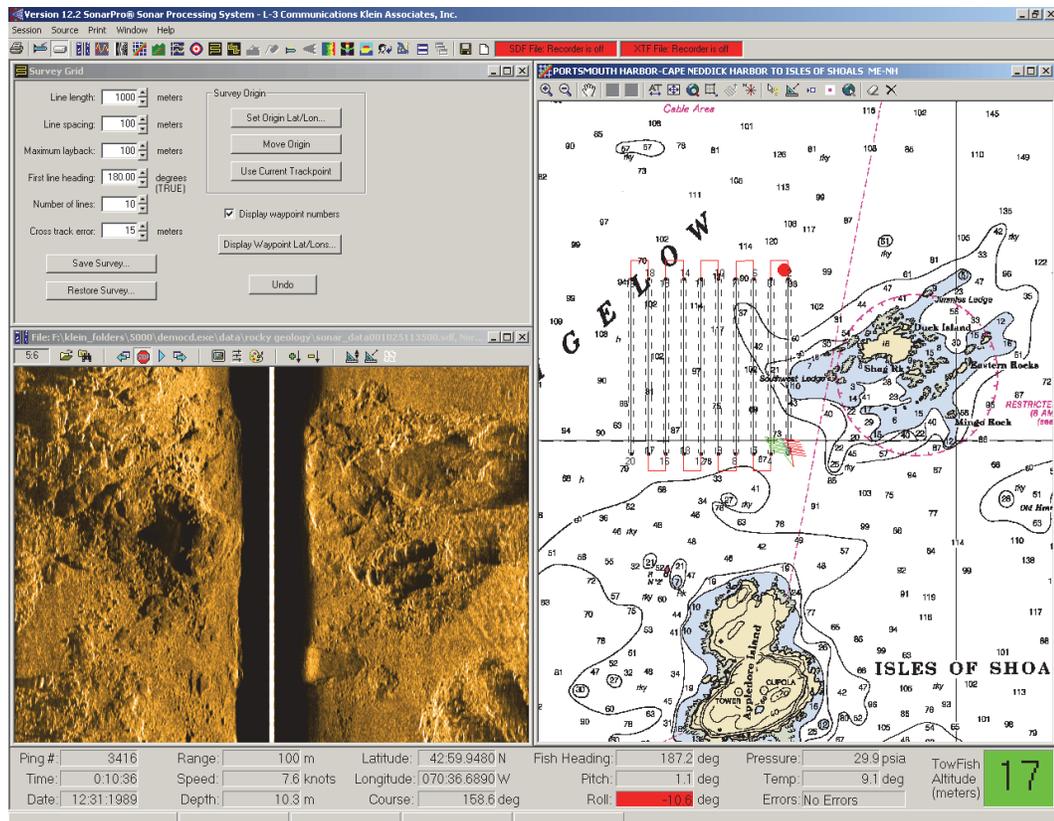
Figure 147: *Example Survey Grid in the Navigation Window*

22.1 Setting up a Survey Grid

☰ Survey Grid

Click this button, either on the Main tool bar or on the Navigation window tool bar, to set up and place a survey grid over a charted area in the Navigation Window. The *Survey Grid* dialog box will open as shown in Figure 148.
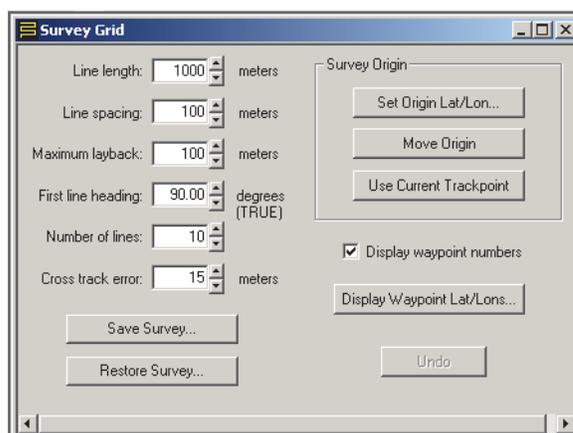
Figure 148: *The Survey Grid Dialog Box*

Use the following scroll boxes to set up the survey grid:

- **Line length**
- **Line spacing**
- **Maximum layback**
- **First line heading**
- **Number of lines**
- **Cross track error**

The cross track error is the course error margin that the ship needs to hold when running a line and is shown as dashed lines on the survey grid.

The following buttons in the *Survey Grid* dialog box are used to set up, save and restore the survey grid:

Save Survey. Click this button to save the survey grid.

Restore Survey. Click this button to restore the survey grid.

Set Origin Lat/Lon. Click this button to open the *Origin Location* dialog box which allows you to enter the latitude and longitude manually.

Use Current Trackpoint. Click this button to start the survey grid at the current navigation trackpoint location.

Move Origin. Click this button to quickly move the placed survey grid on the chart in the Navigation window. Click the button, and then move the cursor over the Navigation window. The cursor will change to a ⬚. Click in the window to move the grid to the new starting point.

Undo. Click this button to undo a moved survey origin.

Display Waypoint Lat/Lons. Click this button to open the Text window shown in Figure 149 with the waypoint information listed. This is the information that is saved when clicking **Save Survey** and can be printed and used as a reference at a later date if the survey needs to be repeated.

Figure 149: *Text Window with Waypoint Information Listed*

22.2 Setting up a Survey Route

Survey Route

Click this button, either on the Main tool bar or on the Navigation window tool bar, to set up and place a survey route over a charted area in the Navigation Window. The *Survey Route* dialog box will open as shown in Figure 150. The survey route is used to set up surveys where a survey grid is not the best pattern. A survey route is intended for rivers or coastlines where a free form survey is better as shown in Figure 151.

Use the following scroll boxes to set up the survey route:

- **First line heading**
- **Maximum layback**
- **Cross track error**

The cross track error is the course error margin that the ship needs to hold when running a line and is shown as dashed lines on the survey route.
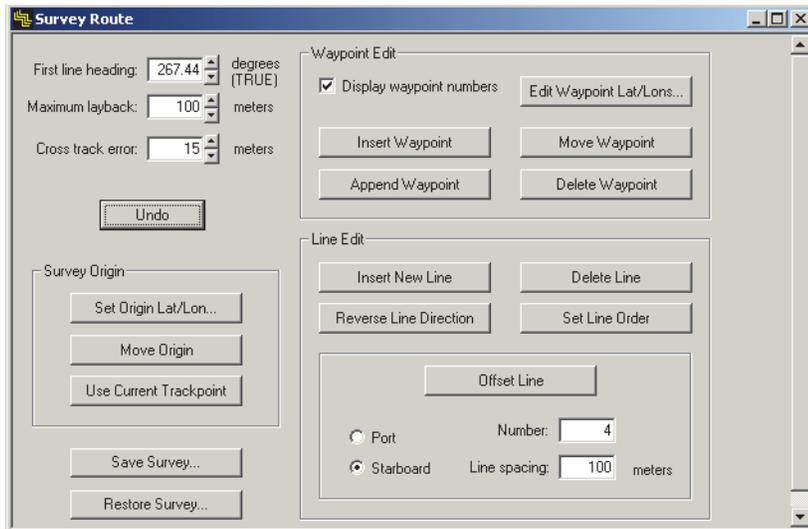
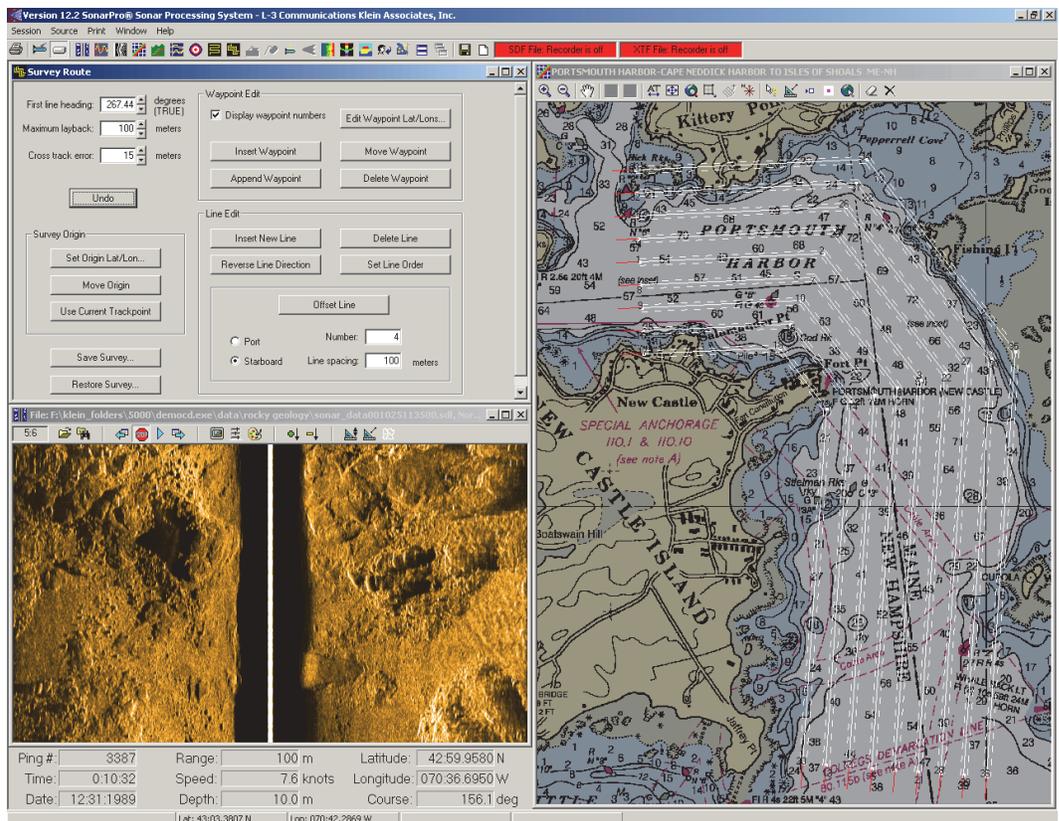**Figure 150:** *The Survey Route Dialog Box*

Figure 151: *Example Survey Route in the Navigation Window*

The following buttons in the *Survey Route* dialog box are used to set up, save and restore the survey route:

Save Survey. Click this button to save the survey route.

Restore Survey. Click this button to restore the survey route.

Set Origin Lat/Lon. Click this button to open the *Origin Location* dialog box which allows you to enter the latitude and longitude manually.

Use Current Trackpoint. Click this button to start the survey route at the current navigation trackpoint location.

Move Origin. Click this button to quickly move the placed survey route on the chart in the Navigation window. Click the button, and then move the cursor over the Navigation window. The cursor will change to a ⬉. Click in the window to move the route to the new starting point.

Undo. Click this button to undo an operation.

Edit Waypoint Lat/Lons. Click this button to open the Text window shown in Figure 149 on page 136 with the waypoint information listed. This is the information that is saved when clicking **Save Survey** and can be printed and used as a reference at a later date if the survey needs to be repeated. You can edit this file in the Text window if you want, and when you save the file, the changes will be reflected in the Navigation window when you click **Restore Survey** and open the file from the *Open* dialog box.

Insert New Line. Click this button to insert a line. Click the button, and then click in the Navigation window to insert the first waypoint, which is the beginning of the line. Click again in the window to insert the second waypoint, which is the end of the line. Continue clicking to add additional lines. When you are finished, click **End Line Insertion**, which was previously the **Insert New Line** button. You can also end the line insertion by clicking any other button or by right-clicking in the Navigation window.

Insert Waypoint. Click this button to insert a waypoint into an existing line. Click the button, and then click in the line where you want to insert the waypoint. The waypoint is inserted. The line will turn red when it is directly under the pointer. If you hold the mouse button down when inserting the waypoint, you can drag the newly inserted waypoint to a different location. You can continue to click in the Navigation window to insert additional waypoints, on the same or on a different line.

Append Waypoint. Click this button to append a waypoint to the end of a line. Click the button, and then click the line near the end that you want to append the waypoint to. Click again in the Navigation window where you want to insert the new waypoint. Continue clicking to append additional waypoints. When you are finished, click **End Append**, which was previously the **Append**

Waypoint button. You can also end the waypoint insertion by clicking any other button or by right-clicking in the Navigation window.

Move Waypoint.   Click this button to move an existing waypoint to a new location. Click the button, and then click and drag the waypoint to the new location. The waypoint turns red when it is directly under the pointer. The survey route is updated immediately. You can continue to select and move other waypoints.

Delete Waypoint. Click this button to delete a waypoint. Click the button, and then click the waypoint you want to delete. You can continue to delete additional waypoints. If a line will have less than two points after deletion, the entire line is deleted. A warning message appears first, however, asking for your confirmation. To restore a deleted waypoint, click **Undo**.

Delete Line. Click this button to delete an entire line. Click the button, and then click the line you want to delete. You can continue to delete additional lines. To restore a deleted line, click **Undo**.

Reverse Line Direction. Although the cross-track error lines are not shown for routes, the lines are ordered and have a direction as shown by the waypoint numbers. Click this button to reverse the ordering of the waypoint numbers for a line. Click the button, and then click the line whose direction you want to reverse.

Set Line Order. Click this button to set the line order for the entire survey. Click the button, and then click the lines in the order desired. The order is updated immediately as each line is clicked. You can stop at any time by clicking **End Line Order**, which was previously the **Set Line Order** button. When the next to the last line is selected, the last line is ordered automatically.

Offset Line. Click this button to generate lines that are parallel to a selected line. Enter the number of parallel lines in the **Number** text box, enter the line spacing in meters in the **Line spacing** text box, and select the **Port** or the **Starboard** option to place the lines to the port or starboard of the selected line. After entering this information, click the button and then the line.

When creating a survey route, it is easiest to first insert a master line in the Navigation window and then generate parallel lines using the **Offset Line** function. For example, if you were surveying a river, insert the first line, the master line, down the middle of the river, and then insert the required number of offset lines on the port and starboard sides of the master line. If working along the coast, place the master line along the coast and then generate the required number of lines on the seaward side of the master line.

KLEIN
MARINE SYSTEMS, INC.

23.0 Layback

Layback

Click this button to enter the cable layback parameters. The *Layback* dialog box will open shown in Figure 152.
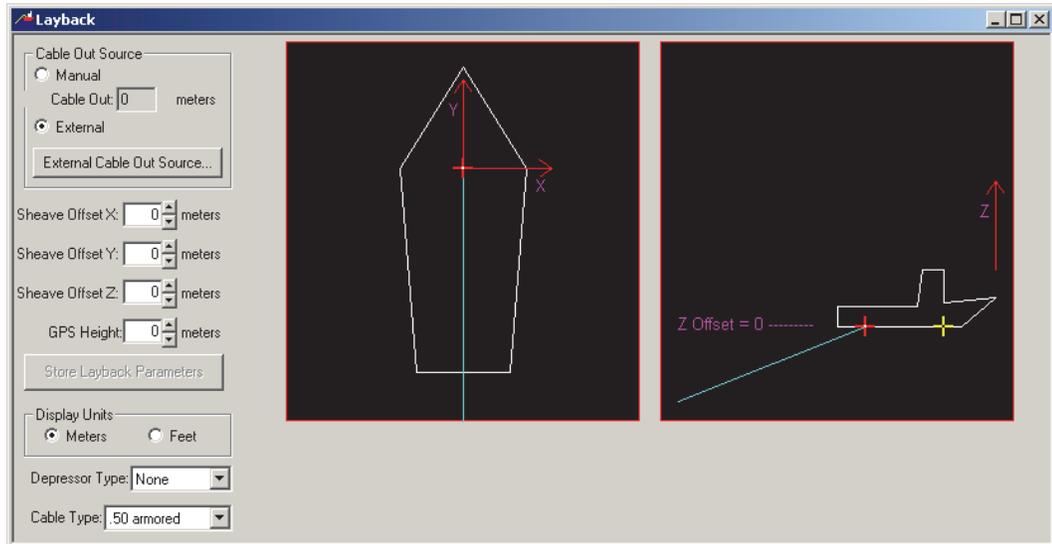
Figure 152: *The Layback Dialog Box*

Navigation position information is obtained by the location of the GPS antenna. The parameters in the *Layback* dialog box are used to increase the accuracy of the towfish and target positions that are calculated by SonarPro. These parameters become part of the sonar data record and are stored during data collection. The layback calculation is always active on the target and towfish positions. The more accurate the information entered here is, the more accurate the positioning information will be.

23.1 Entering the Layback Parameters

The layback parameters are entered in the *Layback* dialog box as follows:

Cable Out Source. Select the **Manual** option if you want to manually enter the length of cable out; select the **External** option to obtain the length from a winch status input. If you select the **Manual** option, enter the length of cable out in the **Cable Out** scroll box in the units shown. This scroll box is available only if you selected this option.

Display Units. Select the **Meters** option to enter and display the layback parameters in meters; select the **Feet** option to enter and display the parameters in feet.

Sheave Offset X. Enter the distance the sheave is from the GPS antenna on the X axis. Enter a positive number if it is to starboard of the antenna; enter a negative number if it is to port of the antenna.

Sheave Offset Y. Enter the distance the sheave is from the GPS antenna on the Y axis. Enter a positive number if it is forward of the antenna; enter a negative number if it is aft of the antenna.

Sheave Offset Z. Enter the distance the sheave is from the GPS antenna on the Z axis. Enter a positive number if it is above the antenna; enter a negative number if it is below of the antenna.

GPS Height. Enter the distance above the water the GPS antenna is located.

Store Layback Parameters. Click this button to transmit the layback parameters to the TPU for the position correction calculations. Changed parameters will not take effect until this button is clicked.

Depressor Type. Select the type of depressor being towed with the towfish from the drop-down list box. If a depressor is not being used, select *None*.

Cable Type. Select the cable type being used from the drop-down list box.

For convenience a **Cable out** scroll box is included on the tool bar of the Sonar Viewer window when running in real time as shown in Figure 4 on page 7. Enter the amount of cable out, and then click **Apply** next to the scroll box. You *must* click **Apply** for the new value to be used.

23.2 Choosing or Setting up an External Cable Out Source

SonarPro accepts winch status input on an RS-232 serial port from the following cable read-out devices.

- 3PS Inc. SD41
- BJ Design T count Counter System
- Brooke Ocean Technology Metering Sheave
- Delph format from Coastal0
- TOTOCO Cable Counter
- Dynapar Cable Counter
- NEMA 0183 format template
- AGO EWC-41A Cable Counter

The winch status is generally input to COM2 of the computer running SonarPro. The **External Cable Out Source** button is available when the **External** option is selected. Clicking this button opens the *Cable Out* dialog box shown in Figure 153.

KLEIN
MARINE SYSTEMS, INC.
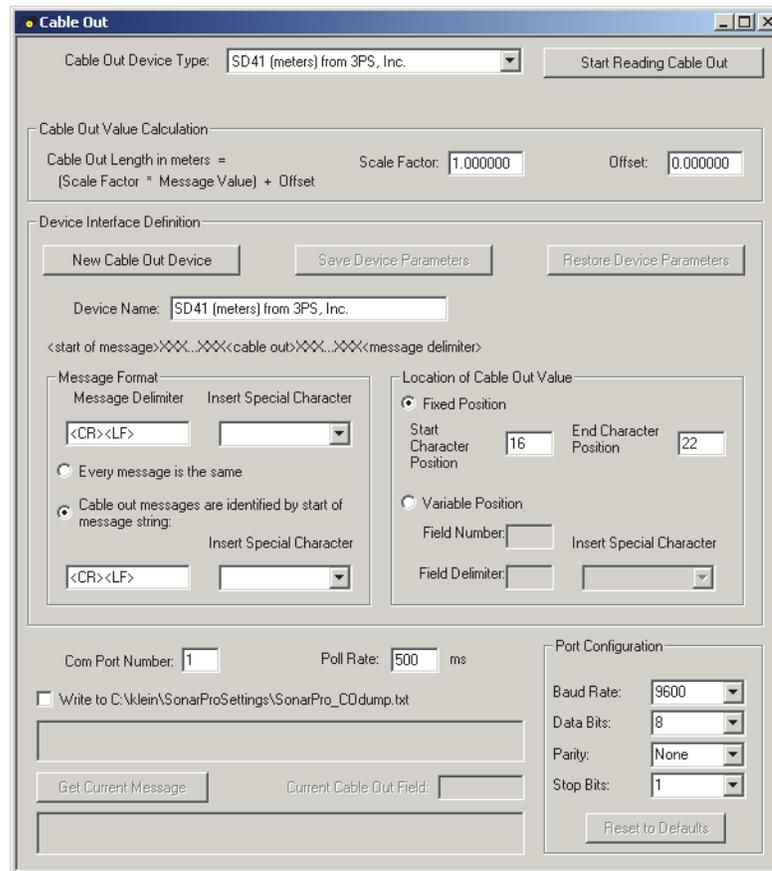
Figure 153: *The Cable Out Dialog Box*

The *Cable Out* dialog box allows you to select the specific cable counter to use and to set up any new cable counters. To use a cable counter that is already on the list, select it from the **Cable Out Device Type** drop-down list box, and then click **Start Reading Cable Out**. The cable out value will be displayed in the **Cable out** display on the tool bar of the Sonar Viewer window when running in real time.

To set up a new cable counter, click **New Cable Out Device** in the **Device Interface Definition** area. Here you specify the new device name, which COM port the computer will use to receive the data, the message format, the location of the cable out value in the data string, and whether you want the data stored in a log file. A template is provided for devices that uses a NMEA format message.

SonarPro requires that the cable out value from the device be in meters. You make this adjustment in the **Cable Out Value Calculation** area by entering a value in the **Scale Factor** text box. For example if the device outputs a value in feet, you would enter the conversion factor .304800. To zero the value, for example, when the cable is all the way in and you have a reading of 4 meters, you could enter into the **Offset** text box a correction of -4.

Enter how often to poll the device in the **Poll Rate** text box and configure the port using the drop-down list boxes in the **Port Configuration** area.

To save the new device, click **Save Device Parameters**. The new device will be added to the **Cable Out Device Type** drop-down list box.

To save the cable out device settings to a file, choose *Save Devices, to File* from the *Session* menu. To read the cable out device settings from a file, choose *Open Devices File* from the *Session* menu.

24.0 Towfish Depth

⊨ **Towfish Depth**

Click this button to enter the depth output parameters. The *Depth Output* dialog box will open as shown in Figure 154.
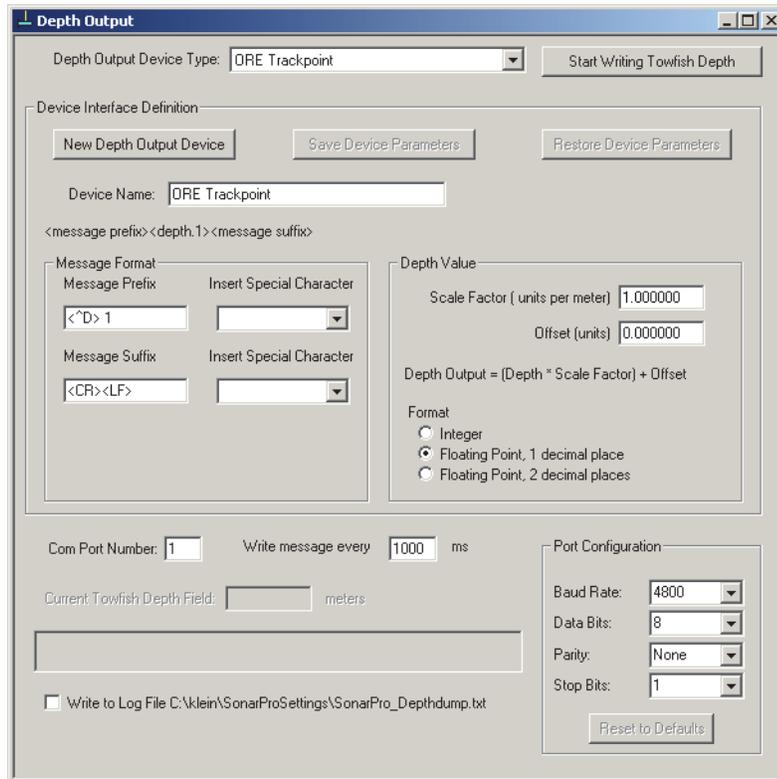
Figure 154: *The Depth Output Dialog Box*

The current towfish depth can be output to a hardware device using an RS-232 serial port. Two predefined data formats are available: the ORE Trackpoint format, and a standard NMEA DPT message format. Custom messages can also be defined using the **Depth Output** dialog box.

To use an existing format, select it from the **Depth Output Device Type** drop-down list box. Enter the COM port to which the device is connected in the **Com Port Number** text box, and then click **Start Writing Towfish Depth** to output the depth data. The data being transmitted are also displayed at the bottom of the window. To help troubleshoot problems, the data can also be written to a file by selecting the **Write to Log File** check box. To stop the output of data, click **Stop Writing Towfish Depth**, which was previously the **Start Writing Towfish Depth** button.

To define a new device interface, click **New Depth Output Device**. Enter a name for the device in the **Device Name** text box. Messages are split into three parts: a prefix, the actual depth value and a suffix. The prefix and suffix are any characters that come before and after the depth value, respectively. Enter the message prefix and suffix in the **Message Prefix** and **Message Suffix** text boxes. Use the **Insert Special Character** drop-down list boxes to insert special character codes such as carriage return, line feed and spaces.

NOTE *The ORE and NMEA messages contain codes that are not in this list. These codes cannot be used in custom messages. There may be messages that do not fit into this format. You can contact Klein Marine Systems, Inc. to request that we add new predefined formats.*

For the depth value, enter the scale factor to convert from meters to the units required by the message in the **Scale Factor** text box. Enter an offset in the same units, if any, in the **Offset** text box. If the message value is in meters, the scale factor equals one. If the message value is in feet, the scale factor should be set to the number of feet per meter, or 3.281, and so on. Then select the format option as follows:

- **Integer** for no decimal places
- **Floating Point, 1 decimal point** for one decimal place.
- **Floating Point, 2 decimal places** for two decimal places.

Enter how often to output the data in the **Write message every** text box and configure the port using the drop-down list boxes in the **Port Configuration** area.

To save the new device, click **Save Device Parameters**. The new device will be added to the **Depth Output Device Type** drop-down list box.

To save the depth output device settings to a file, choose *Save Devices, to File* from the *Session* menu. To read the depth output device settings from a file, choose *Open Devices File* from the *Session* menu.

25.0 Printing with SonarPro

SonarPro provides two methods for printing a hard copy of the data. One method allows you to use the utility program SnagIt to obtain a screen capture and save it as a .bmp, .pcx, .tif, .jpg, .gif, or .png file. You can then import the image into any image editing program or image catalog program and print a high resolution image to a printer. The supplied Snagit Studio is a limited editing, print and catalog utility. Choose *SnagIt Capture* from the *Print* menu to start SnagIt.

The second method uses the *EPC Model 1086 Printer Properties* dialog box shown in Figure 155. To open this dialog box, choose *EPC 1086* from the *Print* menu. The dialog box opens to the *Control* tab.
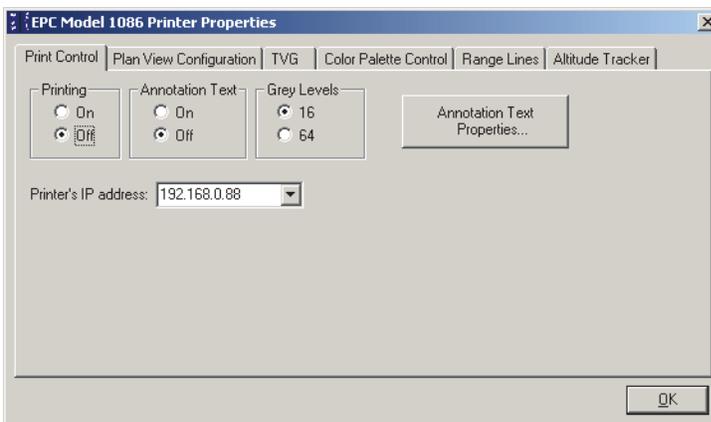
Figure 155: *The EPC Model 1086 Printer Properties Dialog Box*

On the *Control* tab enter the printer's IP address in the **Printer's IP address** drop-down list box. The IP address 192.168.0.88 is the default and should be used to avoid any address conflicts with other SonarPro default addresses. Select additional print options as follows:

Printing. Select **On** to turn the printer on; select **Off** to turn the printer off.

Annotation text. Select **On** to print the annotated text; select **Off** to not print the text.

Grey Levels. Select the **16** or the **64** option to choose the levels of gray.

Click **Annotation Text Properties** to open the *Annotation Text Properties* dialog box shown in Figure 156. In this dialog box, select the data to be printed, and then click the appropriate arrow button to place it in the **Selected Fields** window. The information in this area will be printed. Select additional print options as follows:

Text Size. Select the text size.

Text Background. Select the text background. The **Overlay** option prints text over the data; the **Window** option prints the text in a white window.
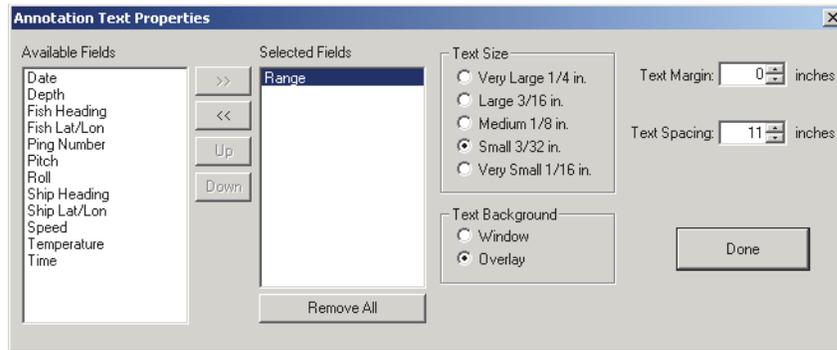
Figure 156: *The Annotation Text Properties Dialog Box*

Text Margin. Select the text margin from this drop-down list box.

Text Spacing. Select the spacing between lines of text from this drop-down list box.

Done. Click this button when you are finished with the setup.

The *Plan View Configuration*, *TVG*, *Color Palette Control*, *Range Lines,* and *Altitude Tracker* tabs all work as described in "Running SonarPro in Playback" on page 22, with the exception that the color information is given a gray scale equivalent for printing on the gray scale EPC 1086 printer.

26.0 Operating SonarPro With Dual Displays

For a dazzling sonar display presentation, SonarPro can be used with two displays. This allows you to run the sonar on one display and do navigation and target management on the other, or run the port sonar data on the left display and the starboard sonar data on the right display.

26.1 Recommendations When Using Dual Displays

Below are some recommendations if you plan to use two displays.

- If you change from a single to dual displays, or vice versa, on the fly, you must close and restart SonarPro.

- If you change the display resolution, color depth, refresh frequency, or desktop area, you must restart SonarPro.

- SonarPro should be run with the small fonts selected in the Windows display settings.

- If you plug a second display into a booted computer, you must reboot the computer before the second display will be detected by that computer.

26.2 Setting up the Displays and Switching between Them

When using dual displays, they can be set up horizontally or vertically using the functions in the Windows display settings. With two displays active, either vertically or horizontally, the Sonar Viewer window occupies one display—the bottom display for a vertical arrangement and the left display for a horizontal arrangement—and all the other windows occupy the other display. If multiple Sonar Viewer windows are open, they will all occupy the same display. You can rearrange the open windows, however, any way you want and in either of the two displays.

To enable instant swapping of the displays, SonarPro provides a Rapid Window Switch (RWS) button in the Status bar of the Main window as shown in Figure 157. This button is only visible when two displays are connected and the Main window in each display fills the entire display area. Click RWS to move the Sonar Viewer window to the other display and all the open windows in that display to the one originally occupied by the Sonar Viewer window. If more than one Sonar Viewer window is open, they will all move together.

Figure 157: *The RWS Button in the Status Bar*

An example of a windows vertical arrangement for two displays is shown in Figure 158, where the Sonar Viewer window in the bottom display and the Target window is in the top display. The top display also includes the *Control Towfish Wing* dialog box. For information on this dialog box, refer to "Operating the Series 5000 MK IIB Towfish Wing" on page 150. Clicking RWS will instantly swap the displays.

NOTE *The Main window Title bar and tool bar remain in the top display when a vertical arrangement is set up and begins in the left display when a horizontal arrangement is set up.*
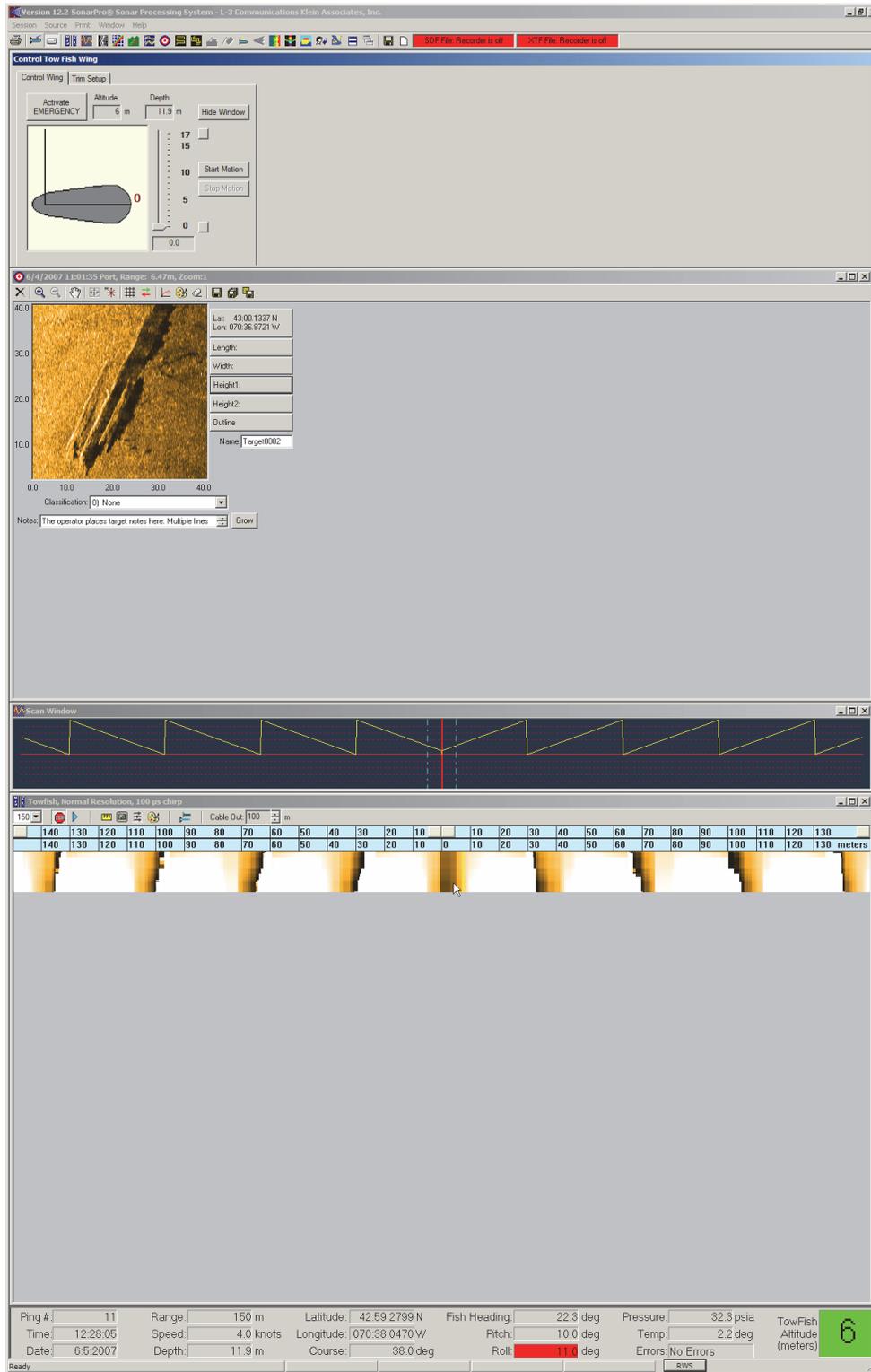
Figure 158: *Dual Displays with Open Control Towfish Wing Dialog Box and Target Window (Top) and Sonar Viewer, Information and Scan Windows (Bottom)*

27.0 Raw Channel Data

You can monitor the raw data output from the towfish by choosing *Raw Data* from the *Window* menu to open the Raw Channel Data window as shown in Figure 159.

NOTE *For the Series UUV-3500, only raw bathymetry data can be displayed if selected; sonar data channels are not displayed. No data are displayed for the Series 3000 and 3900. All sonar data channels are displayed for the Series 5000 V2 and in some Series 5000.*
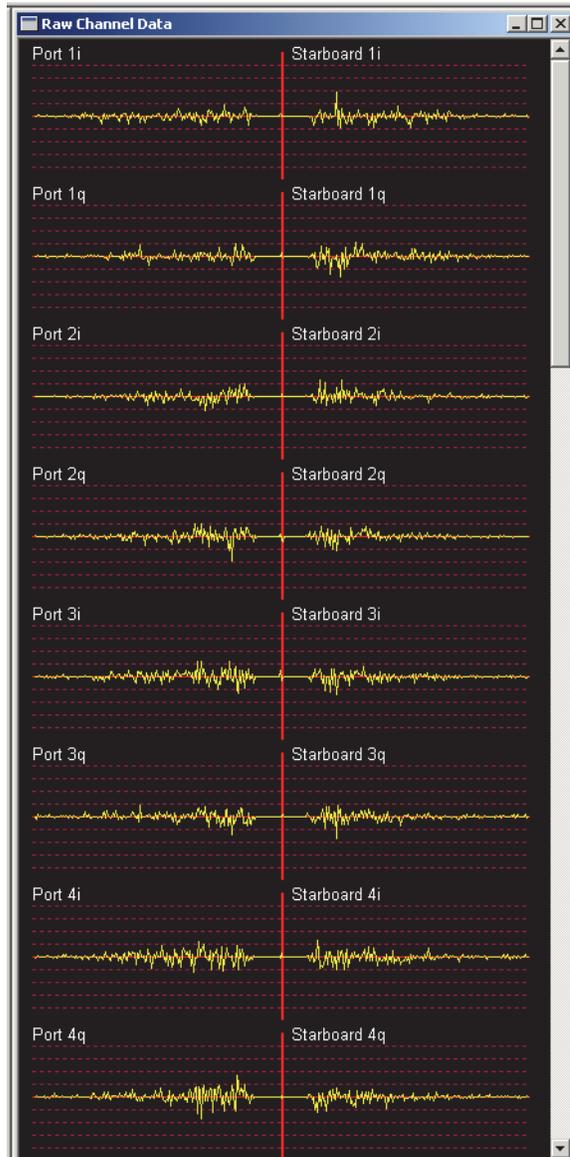
Figure 159: *The Raw Channel Data Window*

28.0 Operating the Series 5000 MK IIB Towfish Wing

◀ Show/Hide Wing Control

Click this button to show or hide the *Control Towfish Wing* dialog box where you can operate the Series 5000 MK IIB towfish wing. You can also open this dialog box by choosing *Show/Hide Wing Control* from the *Window* menu. The *Control Towfish Wing* dialog box is shown opened to the *Control Wing* tab in Figure 160. A wing graphic on the tab indicates the current angle of the wing.
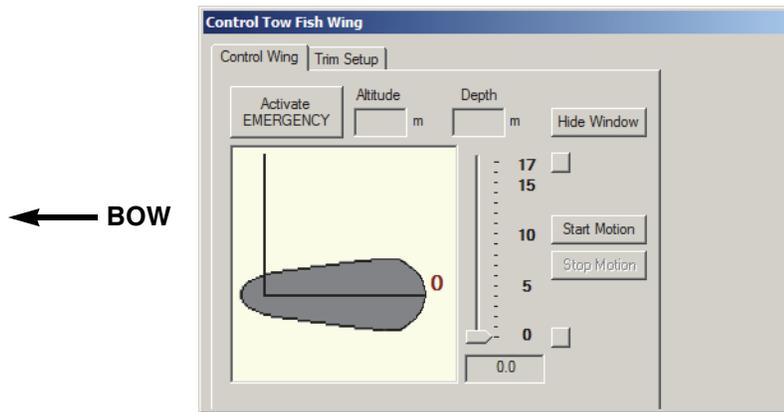
Figure 160: *The Control Towfish Wing Dialog Box—Control Wing Tab*

The wing is activated by an actuator which raises or lowers the aft section of the wing, pivoting on the forward section. This changes the wing angle relative to the horizontal and hence the depressive or downward force on the towfish when it is being towed. In addition to adjusting the wing angle, an emergency feature is included which when activated, immediately lowers the wing to within three degrees of its horizontal position. The emergency activation can be initiated from SonarPro or by sending a command to a COM port of the computer running SonarPro. The COM port is selected in SonarPro, and the command is sent from an interface board when a switch, which is connected to the board, is closed. The interface board is provided.

NOTE *To be able to operate the wing, the **Control Wing** check box and the **Connect as Master** option in the TPU Connection dialog box must be selected. (See "Selecting the Connection Type" on page 6.)*

To hide the *Control Towfish Wing* dialog box, click **Hide Window** in the dialog box, choose *Hide Wing Control* from the *Window* menu or click the **Show/Hide Wing Control** button. The same applies to show the hidden dialog box.

28.1 Selecting the Emergency Activation COM Port

You can select any available COM port on the computer running SonarPro for the emergency activation connection. The computer must also be connected as a master or a slave. To select the COM port, click the *Trim Setup* tab in the *Control Towfish Wing* dialog box. The *Trim Setup* tab shown in Figure 161 opens. Select the COM port from the **Emergency Switch Port** drop-down list box, and then restart the computer. Connect the interface board to the COM port and to a switch.
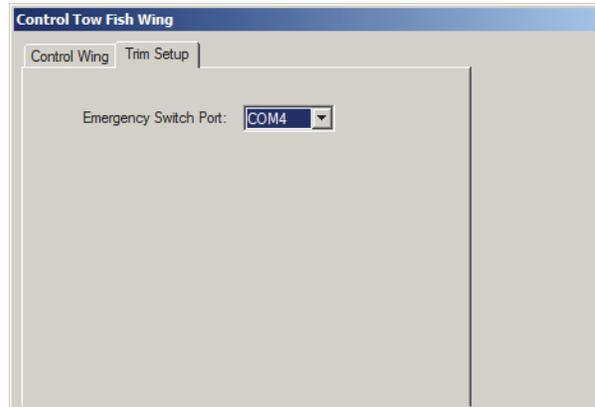
Figure 161: *The Control Towfish Wing Dialog Box—Trim Setup Tab*

28.2 Initiating Emergency Activation

To initiate emergency activation of the wing, click **Activate EMERGENCY** on the *Control Wing* tab of the *Control Towfish Wing* dialog box or activate the switch closure to the interface board. The emergency condition is indicated by a red border around the wing graphic as shown in Figure 162, and the wing moves to its horizontal, zero-degree position as shown in Figure 163. The interface board must be connected to the selected COM port for the emergency activation to function. (See "Selecting the Emergency Activation COM Port" above.)

To terminate the emergency, open the switch closure to the interface board or click **Clear Emergency**.

NOTE *You must terminate the emergency using the same device that was used to initiate it, the switch or the **Clear Emergency** button.*

KLEIN
MARINE SYSTEMS, INC.

28.3 Setting the Wing Angle

The wing angle is set from the *Control Wing* tab of the *Control Towfish Wing* dialog box. To set the angle of the wing, first choose the angle by dragging the slider up or down to position it at the desired angle, from 0 to 17 degrees. The angle is displayed in degrees in one-degree increments in the display below the slider as shown in Figure 162. Then click **Start**

Figure 162: *Choosing the Wing Angle*

Motion. The wing moves to the desired angle as indicated both by the wing graphic and the display in the graphic as shown in Figure 163. Movement of the wing can be stopped at any time by clicking **Stop Motion**.

To immediately move the wing to its horizontal position in just one operation, click the button to the right of "0" on the slider; to immediately move the wing to its maximum angle, click the button to the right of "17." Again, movement of the wing can be stopped at any time by clicking **Stop Motion**.

Figure 163: *Wing Angle Set*

If maneuvering of the mouse or pointing device is awkward or difficult, you can use an alternate method of setting the wing angle. To set the angle of the wing using this method, use the up or the down arrow key on the keyboard to move the slider. Each click of an arrow key moves the slider one degree. Then click Enter. The wing moves to the desired angle. Movement of the wing can be stopped at any time by clicking Enter again.

28.4 Depth and Altitude Displays

For convenience depth and altitude are displayed on the *Control Wing* tab of the *Control Towfish Setup* dialog box. The displayed information is the same as that displayed in the Information window as shown in Figure 16 on page 15.

29.0 Operating the Series 5900 K-Wing IV Depressor

The Series 5900 Sonar System K-wing IV depressor is operated from the *Towfish Trim Control* dialog box which is shown in Figure 164. To open the *Towfish Trim Control* dialog box, select *Wing Control* from *Window* menu.

Figure 164: *The Towfish Trim Control Dialog Box*

The depressor is used to trim the towfish and adjust its depth. It includes two operator activated control surfaces, one on the port and one on the starboard side of the depressor. Similar to ailerons on an aircraft, they enable trimming of the towfish roll, depression and lift. Programmable step rate driven linear actuators are mechanically linked to the surfaces to control their positions. The position status of each control surface is measured with an analog position sensor and combined with the uplink sonar data.

29.1 Trimming the Towfish Roll

To trim the towfish roll, click the right or left arrow button as necessary. The roll trim is adjusted one step for each click over a range of -4 to 4 in 1-step increments. The **Roll Trim Set** display will indicate the roll trim setting, and the **Roll Trim Current** display will indicate the actual roll trim position as shown in Figure 165. The **Towfish Down/Towfish Up** display graphically illustrates the roll trim position. A positive roll trim is starboard down; a negative roll trim is starboard up.

Figure 165: *Trimming the Towfish Roll*

29.2 Trimming the Towfish Lift

To trim the towfish lift, click the **Fish Up** or **Fish Down** button as necessary. The lift trim is adjusted one step for each click over a range of -4 to 4 in 1-step increments. The **Lift Set** display will indicate the lift trim setting, and the **Lift Current** display will indicate the actual lift trim position as shown in Figure 166. The **Towfish Down/Towfish Up** display graphically illustrates the lift trim position. A positive lift trim increases lift/decreases depressive force; a negative lift trim decreases lift/increases depressive force.
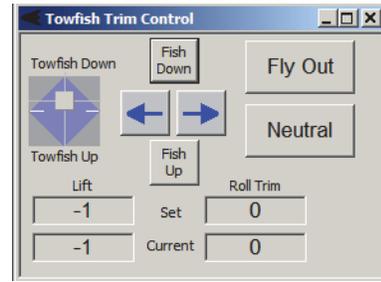
Figure 166: *Trimming the Towfish Lift*

29.3 Trimming the Towfish Roll and Lift Trim Simultaneously

You can trim the towfish roll and lift trim simultaneously by clicking the right or left arrow and the **Fish Up** or **Fish Down** button as necessary. The **Towfish Down/Towfish Up** display graphically illustrates the roll and trim position.

29.4 Setting Towfish Trim to Neutral

To set the towfish trim to neutral, click **Neutral**.
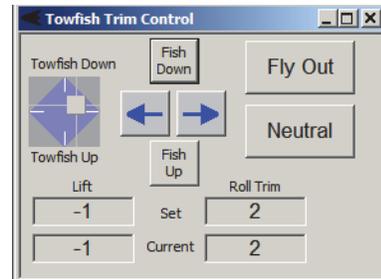
Figure 167: *Trimming the Towfish Roll and Lift Trim Simultaneously*

29.5 Setting a Strong Upward Trim

To set a strong upward trim for the towfish, click **Fly Out**. This control can be used to quickly force the towfish up as fast as possible, such as when a collision is imminent. The towfish nose can pitch up in this mode.

30.0 Notes on Time Usage

30.1 TPU Time in SonarPro

When using SonarPro, a date and time is displayed in the Information window. This time is also in the header in the .sdf data that comes from the TPU. The time is set when SonarPro is started on the master computer.

When the system is successfully booted, SonarPro can be started from the master computer. The master computer controls the range, pulse length, etc. of the sonar, and only one master computer can be running at a time with one sonar. Any other computers connected to the Ethernet Hub and running SonarPro, would be considered slaves. The slave computers running SonarPro have no control of the sonar or the TPU.

When SonarPro starts on the master computer, a message is sent to the TPU to set the TPU clock. The TPU in turn looks at the GPS navigation input on COM2. If it sees an RMC sentence on COM2 in the GPS message, the TPU clock is set to the GPS time which is Zulu time. If an RMC message is not seen on COM2, the TPU sets its clock to the master computer's clock.

The TPU clock is set whenever SonarPro is started from the master computer. Thereafter it keeps its own time, either GPS or master computer time. Therefore if the navigation input is not present when SonarPro is started on the master computer, and the navigation input is connected after SonarPro is started, the TPU will not follow GPS time. SonarPro will have to be restarted, or a new state will have to be initialized to sync the TPU to the GPS time with the RMC sentence present.

If another operating system other than SonarPro is used, it most likely will not set the TPU clock. SonarPro should be started before the other operating system to sync the TPU to GPS time if desired. Once the TPU has been synced, SonarPro can be shut off and the TPU will continue to keep time with its own clock. Another solution would be to set the master computer to GPS (Zulu) time.

In the header information for .sds files, there are two times. The first time is that described above, and again, it is set when SonarPro is started. The second time or fix time hour, minutes and seconds is the time read from the GPS input on COM2 if a sentence with time is input. This time is not viewable in SonarPro.

30.2 Data File Time

When data are stored on a computer running SonarPro, the date and time of the data files are that of the computer being used to store the data. However, the date and time displayed when playing back these files is that originally recorded by SonarPro from the TPU. It is recommended to set all computers used to record data files to the local date and time or to Zulu date and time.

KLEIN
MARINE SYSTEMS, INC.

A.1 SonarPro Setup for Windows 7

This appendix section provides SonarPro setup instructions on the Windows 7 operating system for the following items:

- Configuring the LAN. (Use for a Linux based TPU.)

- Turning off the Windows Firewall. (Use for a Linux based TPU.)

- Creating the klein user.

- Installing Internet Information Services.

- Configuring the FTP.

- Setting up the User Account Control. (Use for a Linux based TPU.)

A.1.1 Configuring the LAN in Windows 7

To configure the LAN in Windows 7:

1. On the desktop choose *Start/Control Panel*.

   The Control Panel window opens.

2. Select *Small Icons* in the *View by* scroll box.
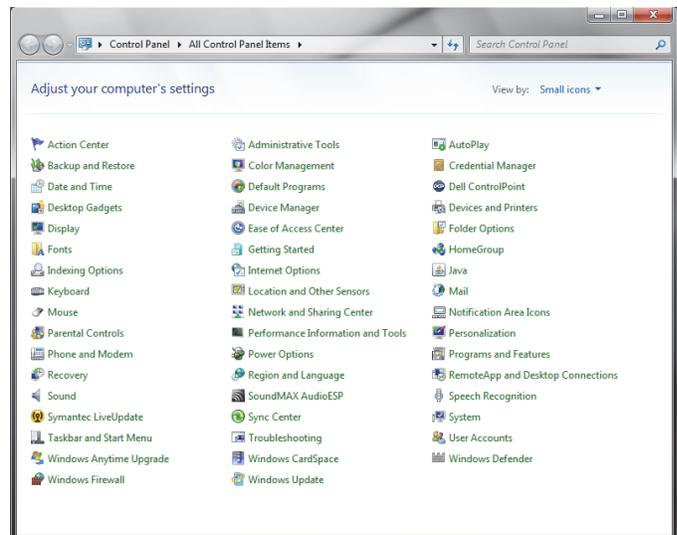
3. Choose *Network and Sharing Center*.

The Network and Sharing Center window opens.
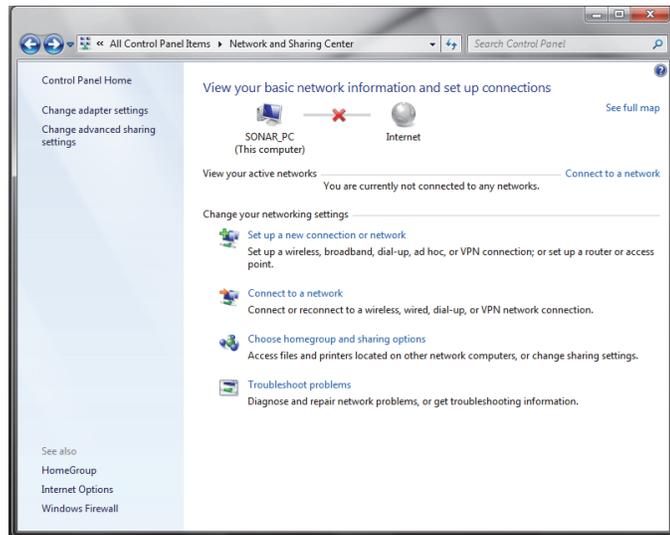
4. Select *Change adapter settings* in the left panel of the Network and Sharing Center window.

The Network and Internet window opens.
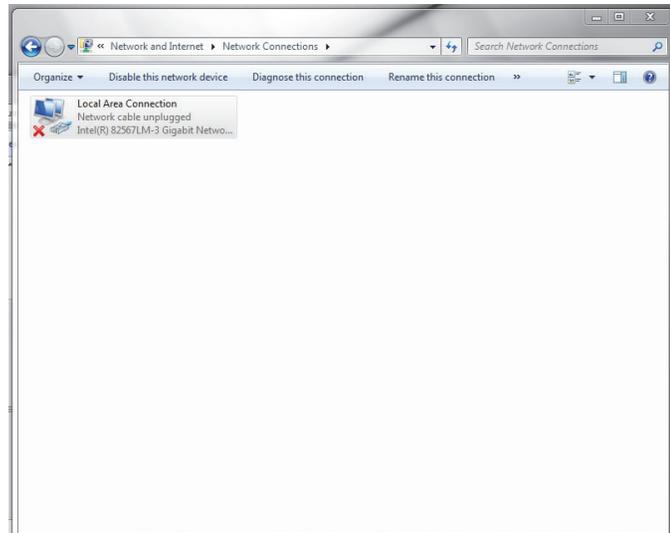
5. Right-click *Local Area Connection*, and then choose *Properties*.

The *Local Area Connection Properties* dialog box opens.
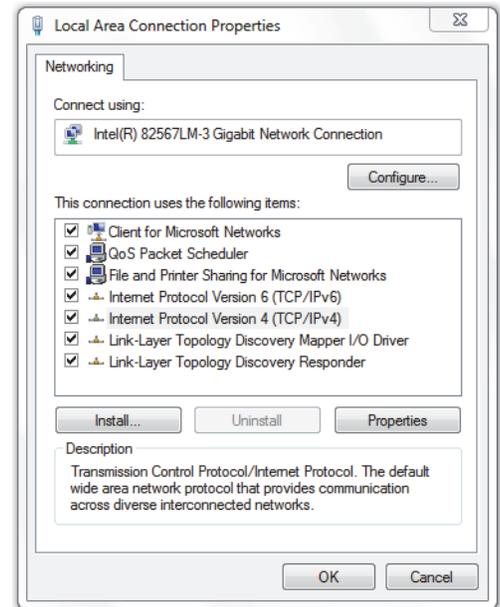
6. Select *Internet Protocol Version 4 (TCP/IPv4)*, and then click **Properties**.

The *Internet Protocol Version 4 (TCP/IPv4) Properties* dialog box opens.

7. Enter the IP address for your computer in the **IP address** text box and the subnet mask in the **Subnet Mask** text box.
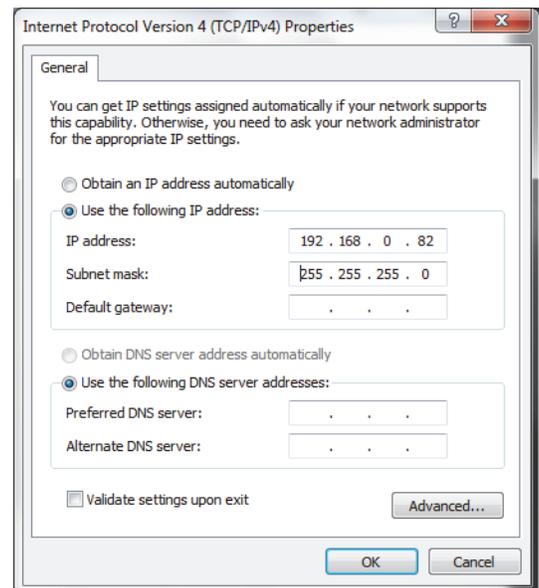
NOTE *The address 192.168.0.82 shown is the standard address from which the TPU downloads its operating software. This address should be used unless otherwise required.*

8. Click **OK**.

9. Close all the dialog boxes and windows.

KLEIN
MARINE SYSTEMS, INC.

A.1.2   Turning off the Windows 7 Firewall

If the Windows Firewall is turned on, access to the TPU software FTP site will be blocked. Therefore the firewall should be turned off.

To turn off the Windows 7 Firewall:

1. On the desktop choose *Start/Control Panel*.

    The Control Panel window opens.

2. Select *Small Icons* in the *View by* scroll box.
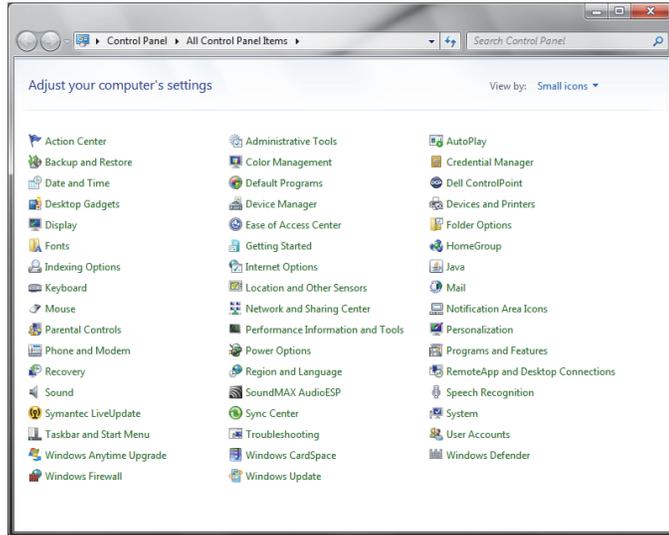
3. Choose *Windows Firewall*.

    The *Windows Firewall* dialog box opens.

4. Select *Turn Windows Firewall on or off* in the left panel.

    The *Customize Settings* dialog box opens.

5. Select both **Turn off Windows Firewall** options, and then click **OK**.
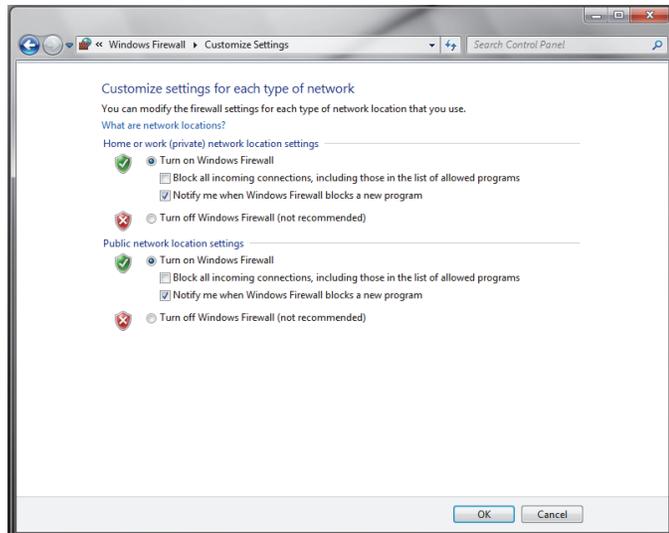
6. Close the Windows Firewall window, and then the Control Panel window.

A.1.3 Creating the Klein User in Windows 7

NOTE *Do not create the klein user for the Klein SplashProof-2, UUV-3500 and HydroScan products.*

To create the klein user in Windows 7:

1. On the desktop choose *Start*, right-click *Computer*, and then choose *Manage*.

   The Computer Management window opens.
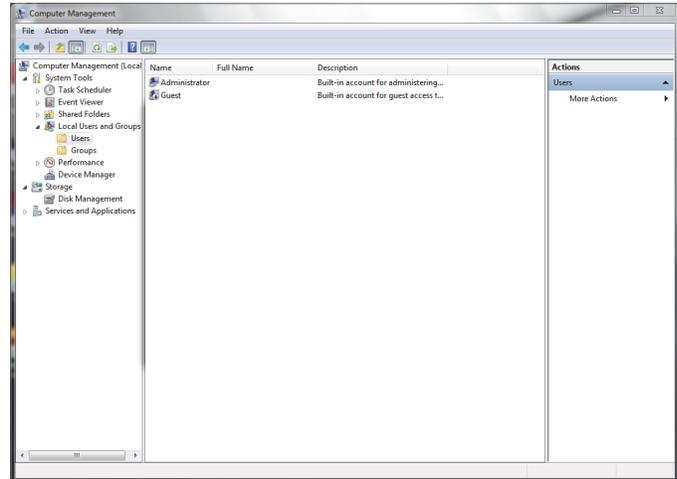
2. Expand *Local Users and Groups*.

3. Right-click *Users*, and then choose *New User*.

   The *New User* dialog box opens.

4. Enter "klein" in the **User name**, **Full name**, **Description, Password**, and **Confirm password** text boxes.

5. Select the **User cannot change password** and **Password never expires** check boxes.

6. Click **Create** and then **Close**.
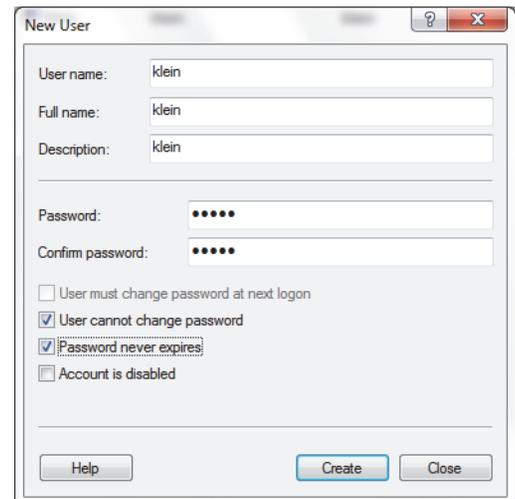
7. Verify that the klein user was created by selecting *Users* in the left pane of the Computer Management window and looking at the center pane. The klein user should be listed.

8. Close the Computer Management window.

KLEIN
MARINE SYSTEMS, INC.

A.1.4   Installing Internet Information Services

NOTE *Do not install Internet Information Services for the Klein SplashProof-2, UUV-3500 and HydroScan products.*

When the TPU is turned on, it downloads its operating software from the host computer by way of the file transfer protocol (FTP). Therefore the host computer must be configured to run an FTP server to make this transfer possible. Windows 7 uses the program Internet Information Services for this purpose which must be separately installed by the user.

To install Internet Information Services:

1. On the desktop choose *Start/Control Panel*.

   The Control Panel window opens.

2. Select *Small Icons* in the *View by* scroll box
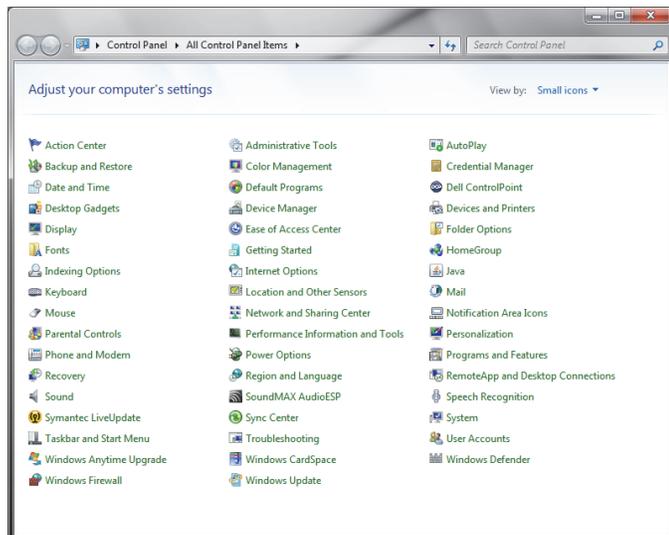
3. Choose *Programs and Features*.

   The Programs and Features window opens.

4. Select *Turn Windows features on or off*.

   The *Windows Features* dialog box opens.

5. Expand *Internet Information Services*, and then *FTP Server*.
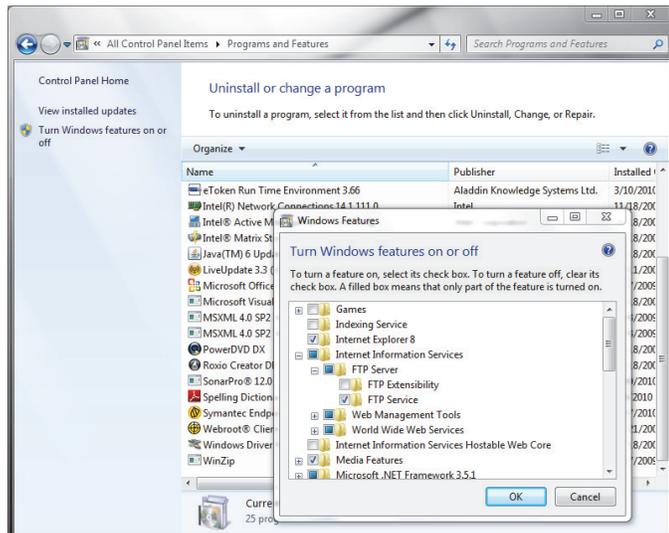
6. Select the *FTP Service*, *Web Management Tools* and *Worldwide Web Services* check boxes, and then click **OK**.

   Internet Information Services will be installed.

7. Close the Programs and Features window, and then the Control Panel window.

A.1.5   Configuring the FTP in Windows 7

NOTE *Do not configure the FTP for the Klein SplashProof-2, UUV-3500 and HydroScan products.*

To configure the FTP in Windows 7:

1. On the desktop choose *Start/Control Panel*.

   The Control Panel window opens.

2. Select *Small Icons* in the *View by* scroll box
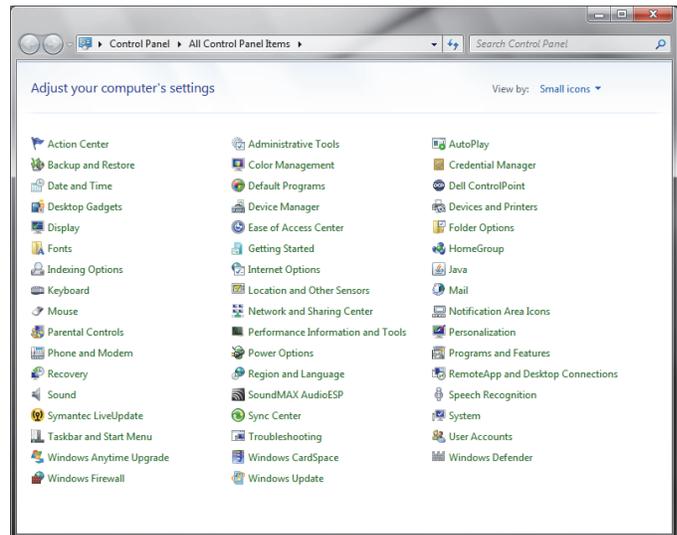
3. Choose *Administrative Tools*.

   The Administrative Tools window opens.

4. Double-click *Internet Information Services (IIS) Manager*.

   The Internet Information Services (IIS) Manager window opens.
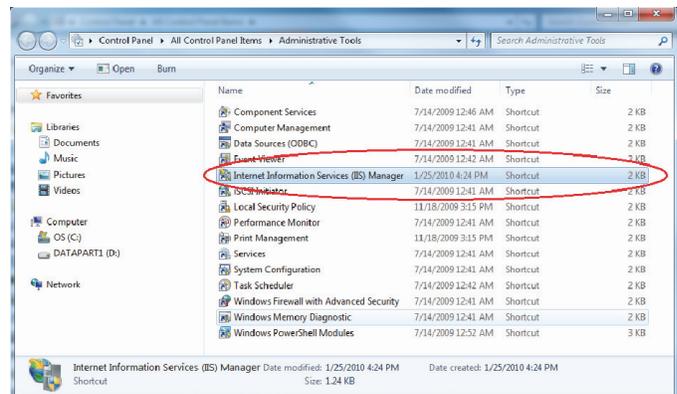
KLEIN
MARINE SYSTEMS, INC.

5. In the left pane of the Internet Information Services (IIS) Manager window, right-click the name of the computer, and then choose *Add FTP Site*.

The *Site Information* dialog box opens.

6. In the **FTP site name** text box, enter "vxboot."

7. In the **Physical path** text box, enter "C:," and then click **Next**.

The *Binding and SSL Settings* dialog box opens.

8. Select the IP address of the network adapter that connects to the TPU from the **IP Address** drop-down list box.

NOTE *The address 192.168.0.82 shown is the standard address from which the TPU downloads its operating software. This address should be used unless otherwise required. It should be the same address as that used for Step 7 on page A-3.*

9. Enter "21" in the **Port Address** text box.

10. Select the **Start FTP site automatically** check box.

11. Select the **Allow SSL** check box.

12. Click **Next**.

The *Authentication and Authorization Information* dialog box opens.

13. Select the **Basic** check box.

14. Select *Specified users* from the **Allow access to** drop-down list box, and then enter "klein" in the text box below.

15. Select the **Read** check box, and then click **Finish**.

16. In the left pane of the Internet Information Services (IIS) Manager window, expand *Sites* and click *vxboot*.

17. In the center pane, click the **FTP Authorization** icon.

18. In the right pane, click *Basic Settings*.

The *Edit Site* dialog box opens.
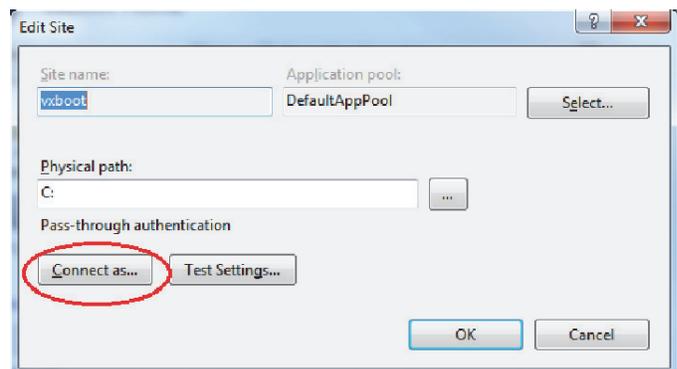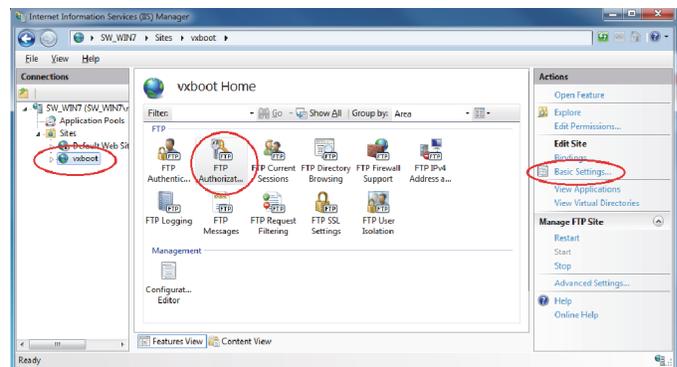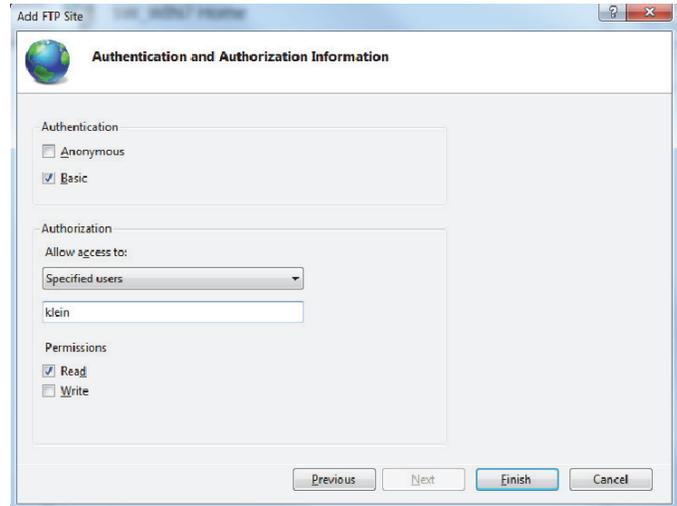
19. Click **Connect as**.

The *Connect As* dialog box opens.

Select the **Specific user** option.
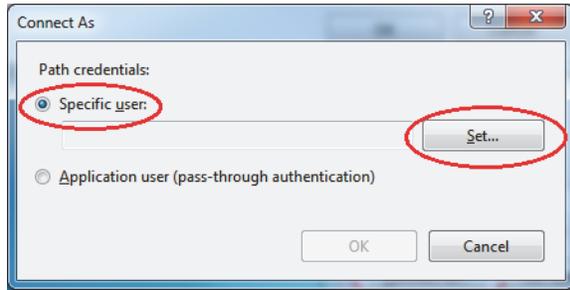
20. Click **Set**.

The *Set Credentials* dialog box opens.

21. Enter "klein" in the **User name** text box.

22. Enter the password "klein" into both the **Password** and **Confirm** text boxes.

23. Click **OK** to close the dialog box.
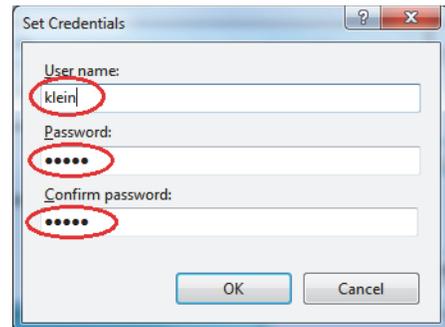
A.1.6 Setting up the User Account Control

Windows 7 has a set of features called User Account Control (UAC) which attempt to protect the user from malicious programs by seeking confirmation before running programs that may change programs or data on the computer. User Account Control can affect SonarPro. On a computer with UAC enabled, Windows displays the User Account Control window when SonarPro is started.
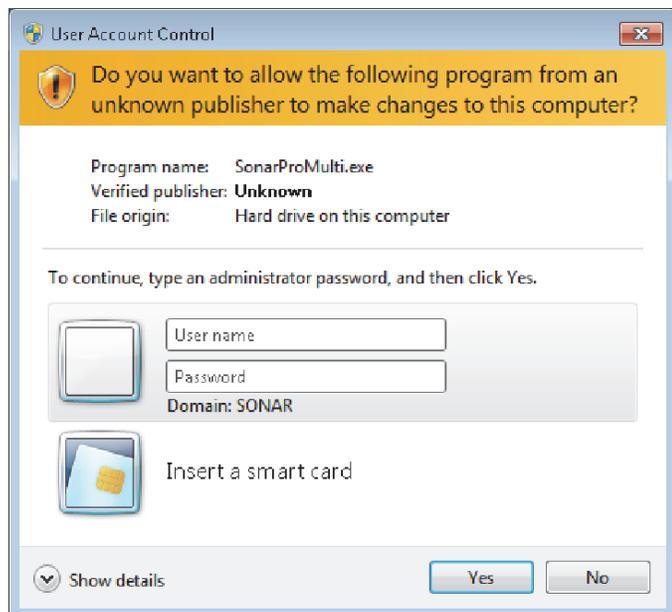
Clicking **Yes** will start SonarPro normally. However, to avoid this step there are two options:

- Disable UAC.
- Start SonarPro without interference from UAC.

NOTE *You must be logged into Windows 7 as Administrator to make any changes that affect UAC.*

To disable UAC:

1. On the desktop choose *Start/Control Panel*.

    The Control Panel window opens.

2. Select *Small Icons* in the *View by* scroll box
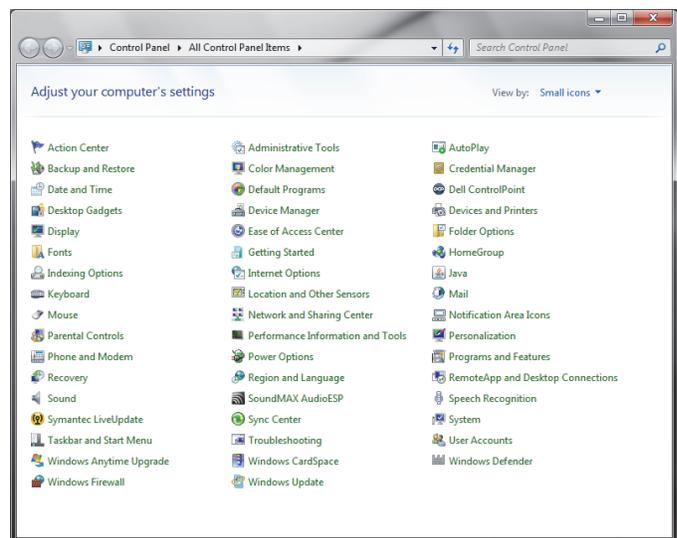
3. Choose *User Accounts*.

    The User Accounts window opens.

KLEIN
MARINE SYSTEMS, INC.
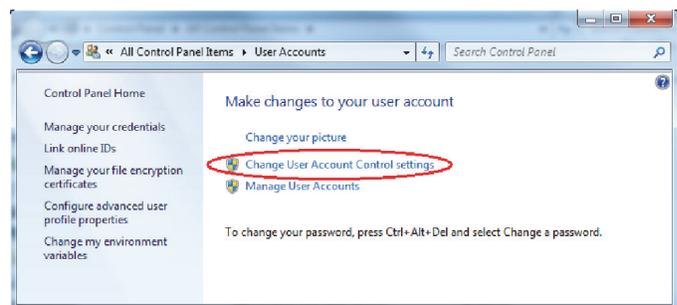
4. Click *Change User Account Control settings*.

   The *User Account Control Settings* dialog box opens.

5. Move the slider to the lowest position to **Never Notify**, and then click **OK**.

6. Click **Yes** in the confirmation dialog box that appears.
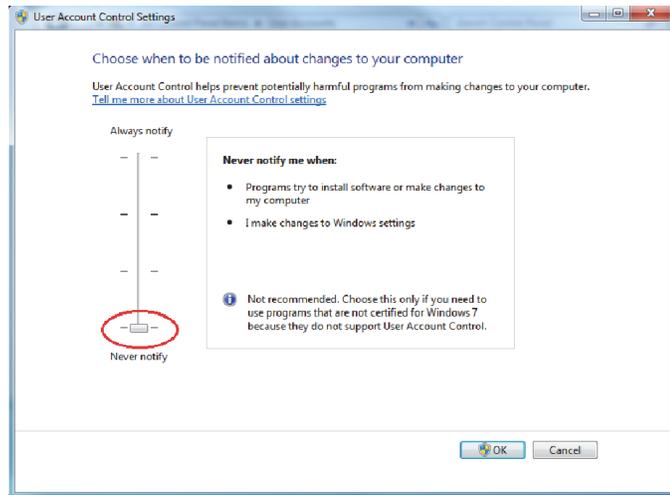
Optionally, to start SonarPro without interference from UAC:

1. Click *Start*.

   The *Start* menu opens.
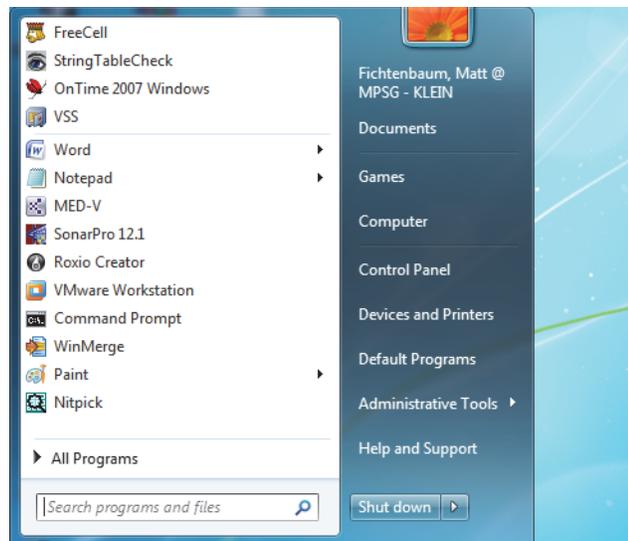
NOTE *You must be running Windows 7 Professional or Windows 7 Ultimate to configure your computer to run SonarPro without interference from UAC.*

---

2. In the *Search Programs and Files* text box, enter secpol.msc.
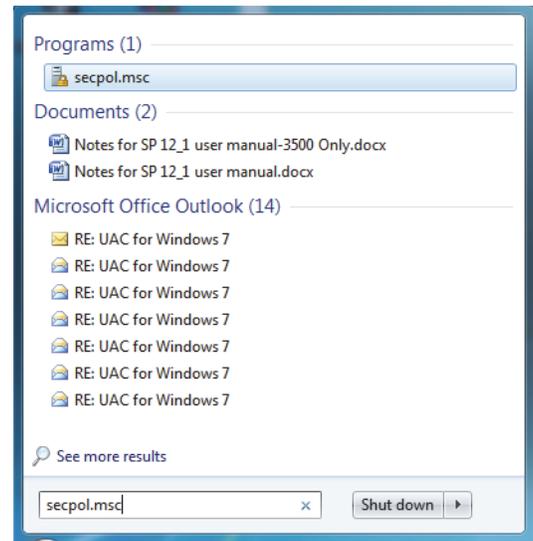
3. Press the Enter key.

The Local Security Policy window opens.
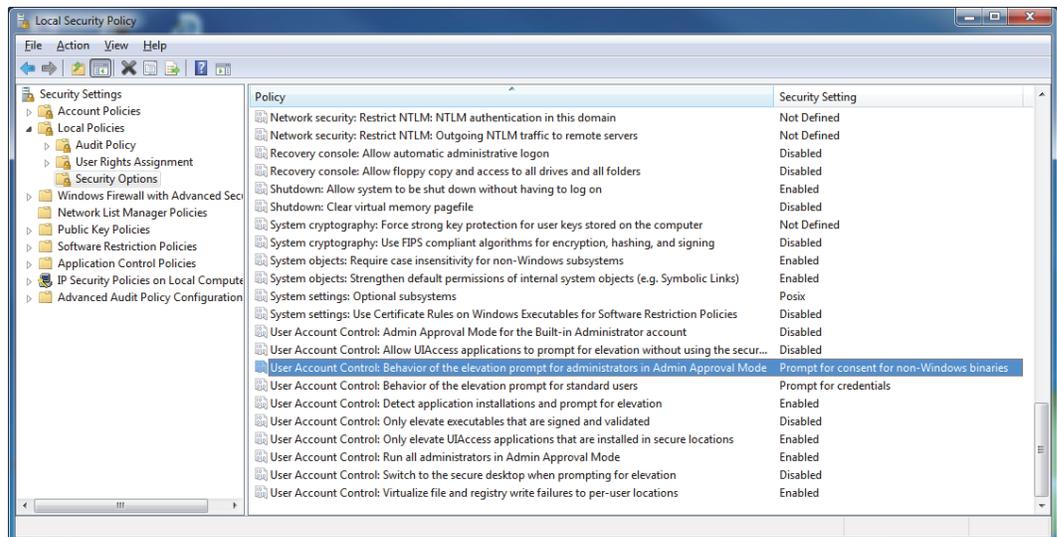
4. Expand *Local Policies* in the left pane of the Local Security Policy window, and then select *Security Options*.

5. Right-click *User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode* in the right pane, and then select *Properties*.

The *User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode* dialog box opens to the *Local Security Setting* tab.

6. Select *Elevate without prompting* in the drop-down list box, and then click **OK**.

7. Close the Local Security Policy window.
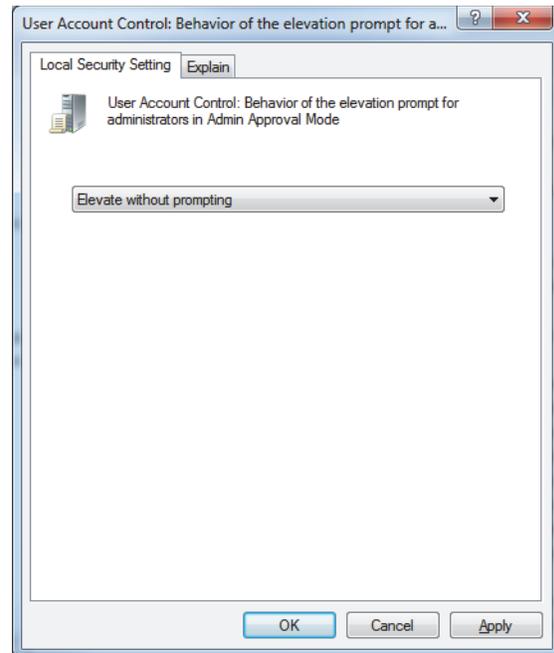
A.1.7   Installing the Tera Term Serial Communications Software

After installing SonarPro 14.0, you are asked if you want to install the Tera Term serial communications software. This software emulates different types of computer terminals and supports serial port and other types of connections. To manage the TPU configuration and monitor sonar performance, Tera Term must be installed.

To install the Tera Term serial communications software:

1. After the installation of SonarPro 14.0 is complete, the *InstallShield Wizard Complete* dialog box opens.

2. Select the **Install Tera Term Serial Communications (COM) Software** check box.
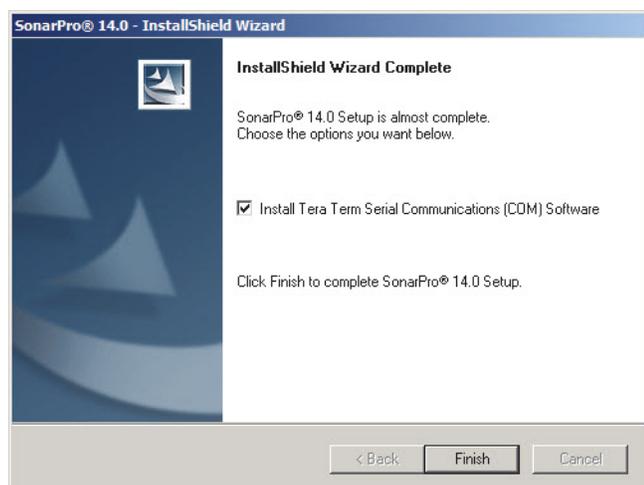
3. Click **Finish**.

The *Tera Term Setup* dialog box opens to the *Welcome to the Tera Term Setup Wizard* page.

4. Click **Next**.

The *License Agreement* page opens. Select the **I accept the agreement** option, and then click **Next**.
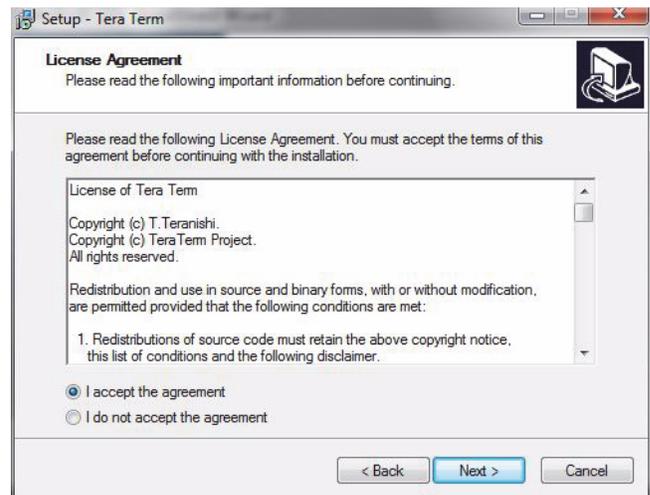
5. Click **Next**.

The *Select Destination Location* page opens.
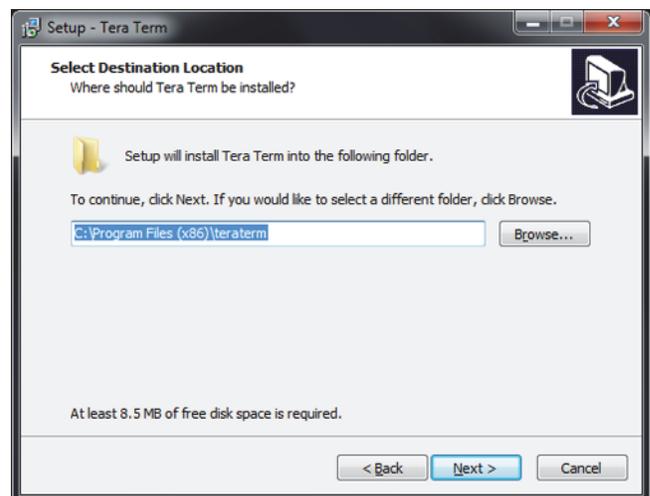
6. Click **Next** to select the default destination.

The *Select Destination Location* page opens.
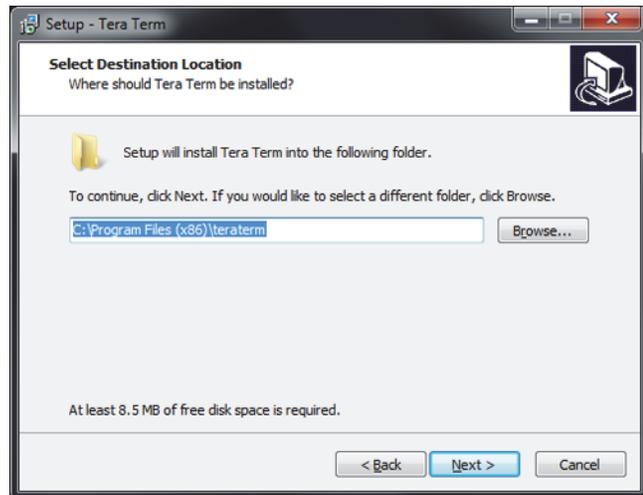
7. Click **Next**.

The *Select Components* page opens.
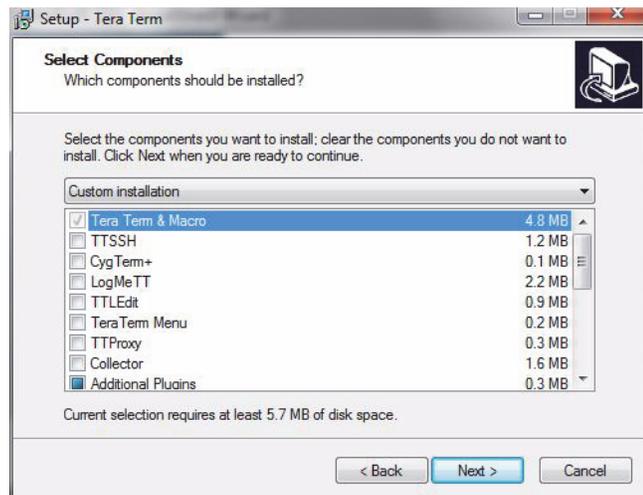
8. In addition to the **Tera Term & Macro** check box, which is selected by default, select the **TTXResizeMenu** and **TTXttyrec** check boxes. Clear all the other check boxes.
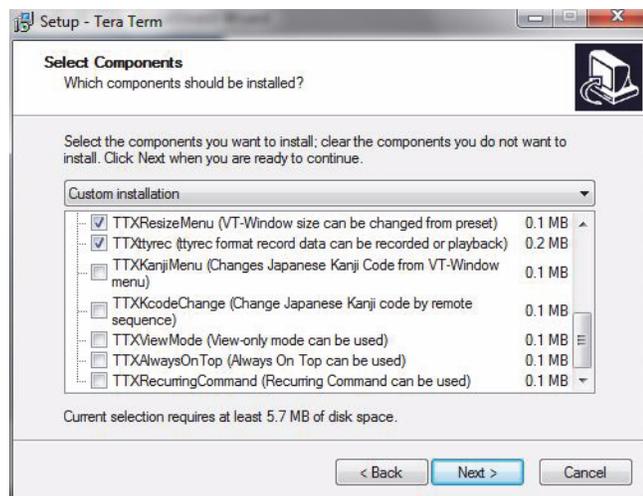
9. Click **Next**.

   The *Select Language* page opens.

10. Click **Next**.

    The *Select Start Menu Folder* page opens.
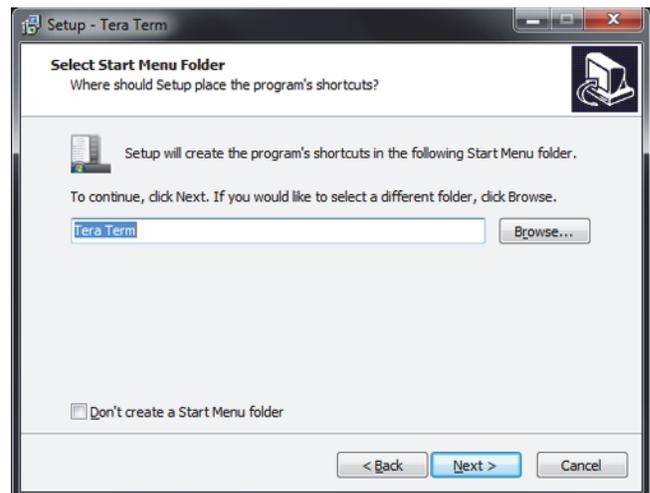
11. Click **Next**.

    The *Select Additional Tasks* page opens.

KLEIN
MARINE SYSTEMS, INC.
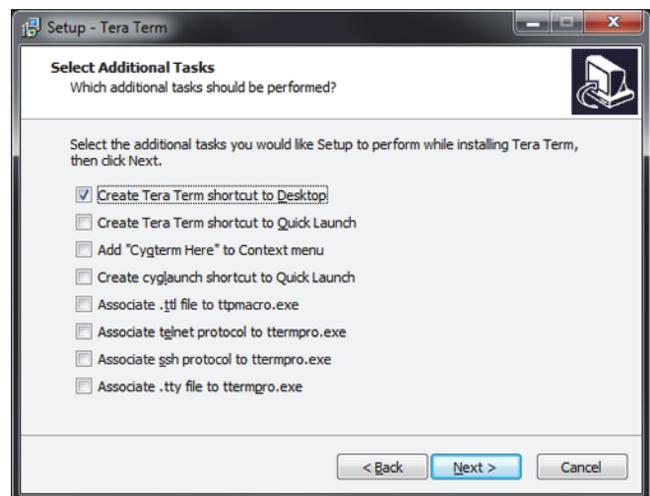
12. Click **Next**.

The *Ready to Install* page opens.
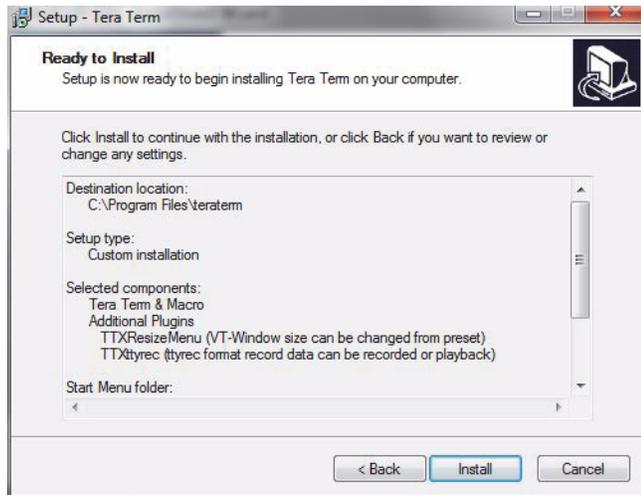
13. Review the installation setup for correctness, and then click **Install**.

14. Tera Term is installed, and then the *Completing the Tera Term Setup Wizard* page opens.

15. Click **Finish**.
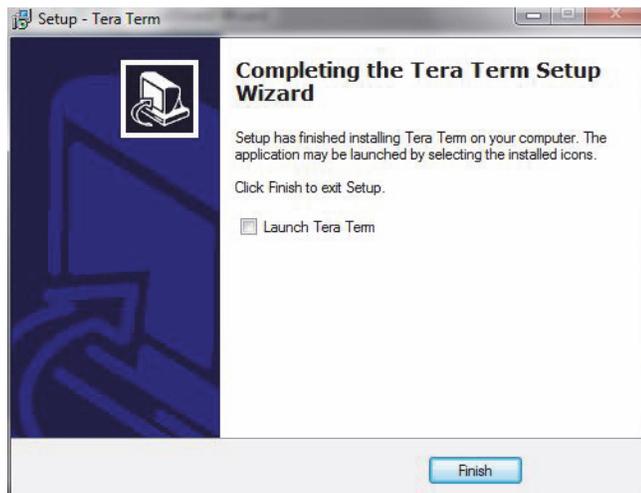
A.2   SonarPro Setup for Windows XP

This appendix section provides SonarPro setup instructions on the Windows XP operating system for the following items:

- Configuring the LAN.

- Turning off the Windows Firewall.

- Creating the klein user.

- Configuring the FTP.

A.2.1   Configuring the LAN in Windows XP

To configure the LAN in Windows XP:

1. On the desktop choose *Start/Control Panel*.
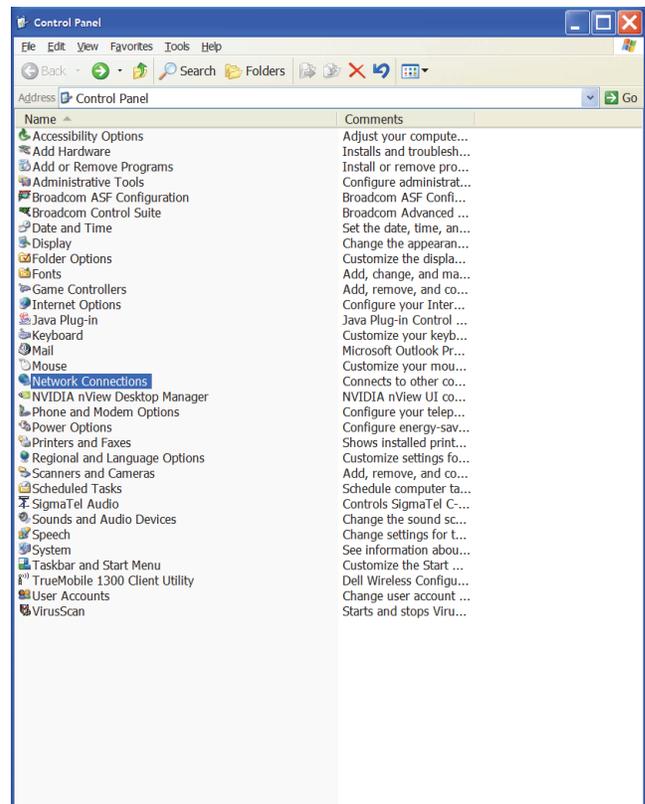
2. Right-click *Network Connections*.

The *Network Connection* dialog box opens.

3. Right-click *Local Area Connection*.

The *Local Area Connection* dialog box opens.

4. Select *Internet Protocol (TCP/IP)*, and then click **Properties**.
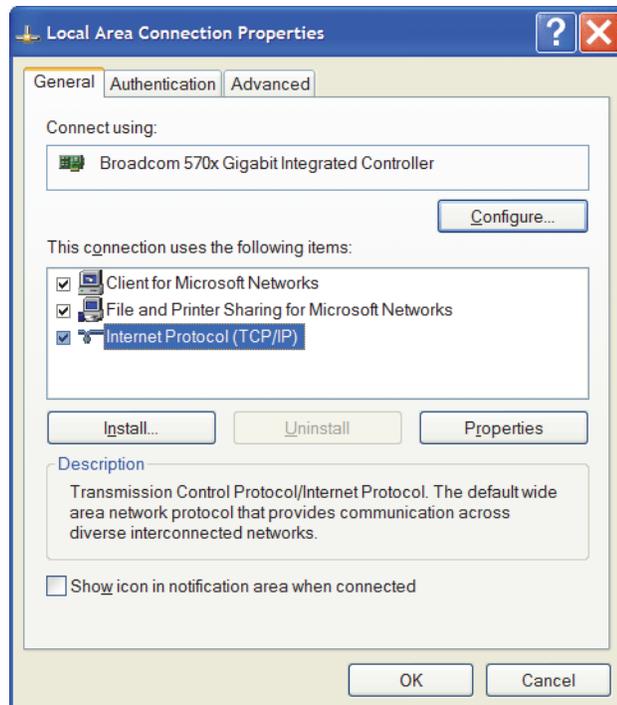
NOTE *The address 192.168.0.82 shown is the standard address from which the TPU downloads its operating software. This address should be used unless otherwise required.*

---

5. Enter the IP address and the subnet mask for your computer, and then click **OK.**
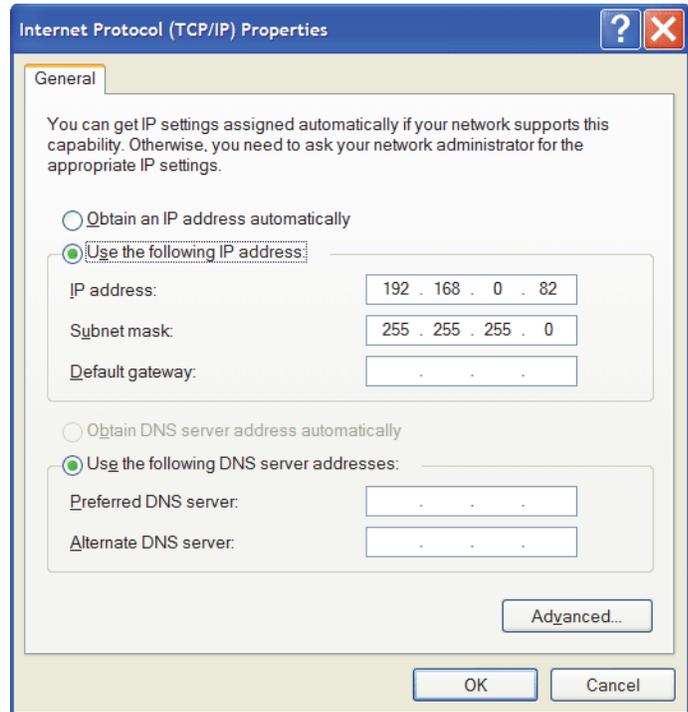
A.2.2 Turning off the Windows XP Firewall

With the addition of XP Service Pack 2, Microsoft has added a firewall. This firewall prevents the system from downloading the vxWorks program and will cause the system to not boot up properly and usually produce an error message. If you are using XP with Service Pack 2, you must turn off the Windows firewall.

To turn off the Windows XP firewall:

1. On the desktop choose *Start/Control Panel*.
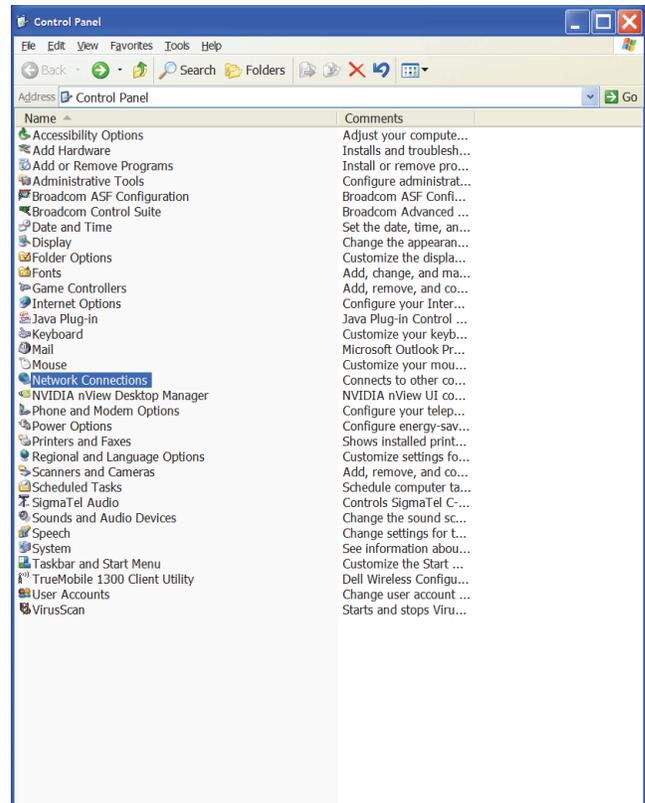
2. Right-click *Network Connections*.

The *Network Connection* dialog box opens.

3. Right-click *Local Area Connection*, and then choose *Properties*.

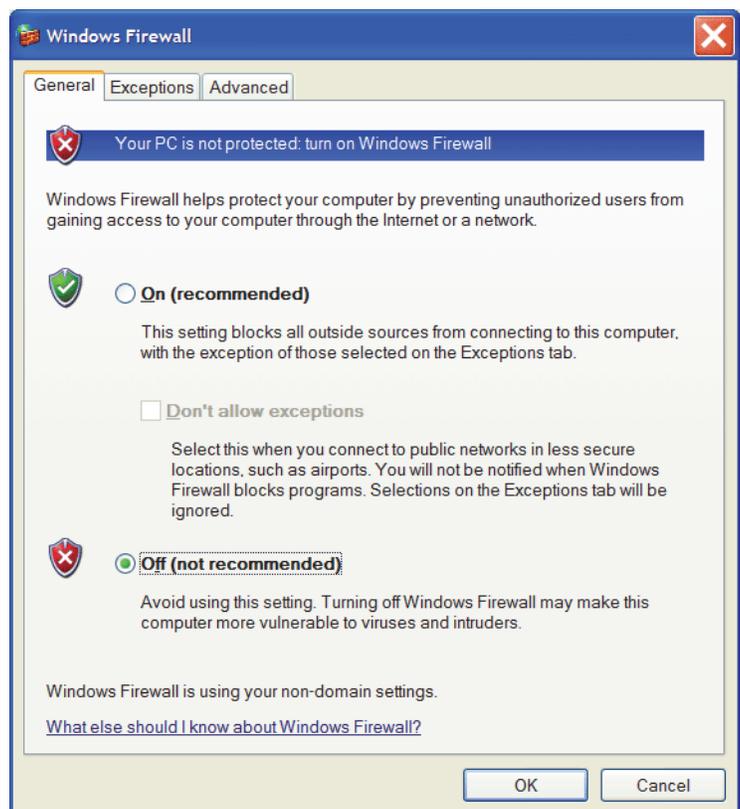The *Local Area Connection* dialog box opens.

4. Select *Internet Protocol (TCP/IP)*, and then click **Properties**.
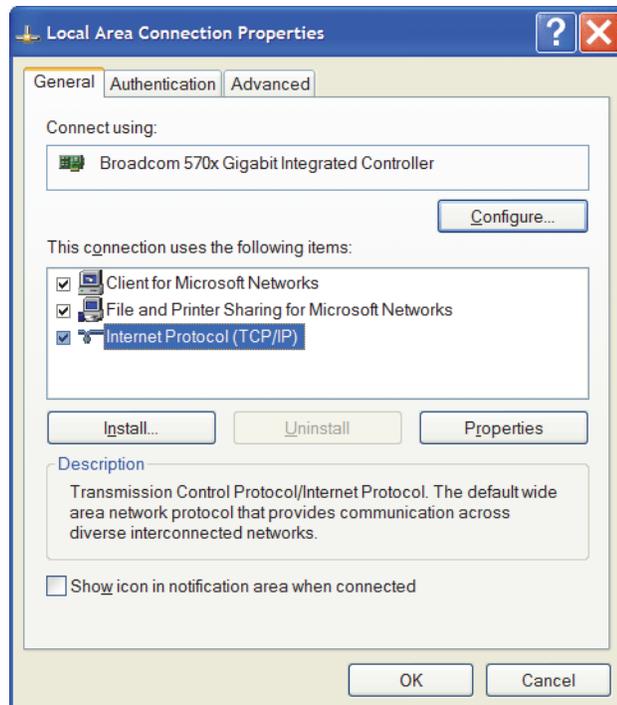
5. Select the *Advanced* tab.
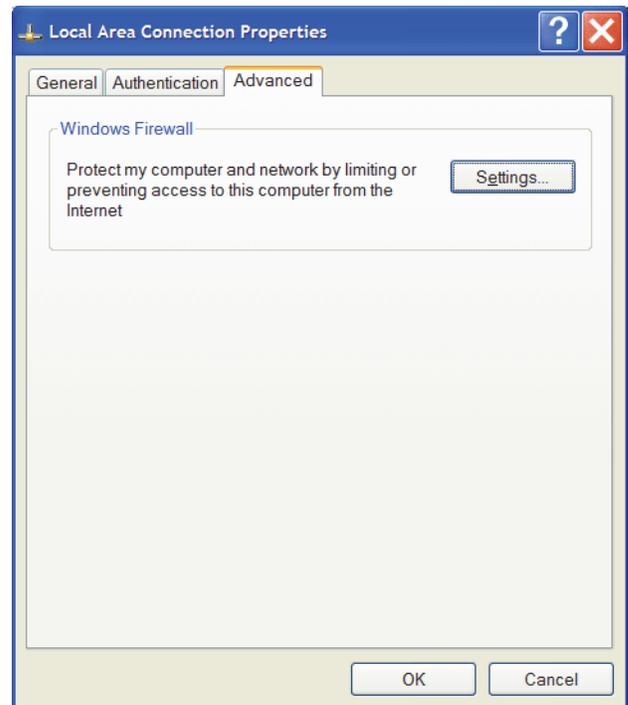
6. Click **Settings**, select the **Off** option, and then click **OK**.

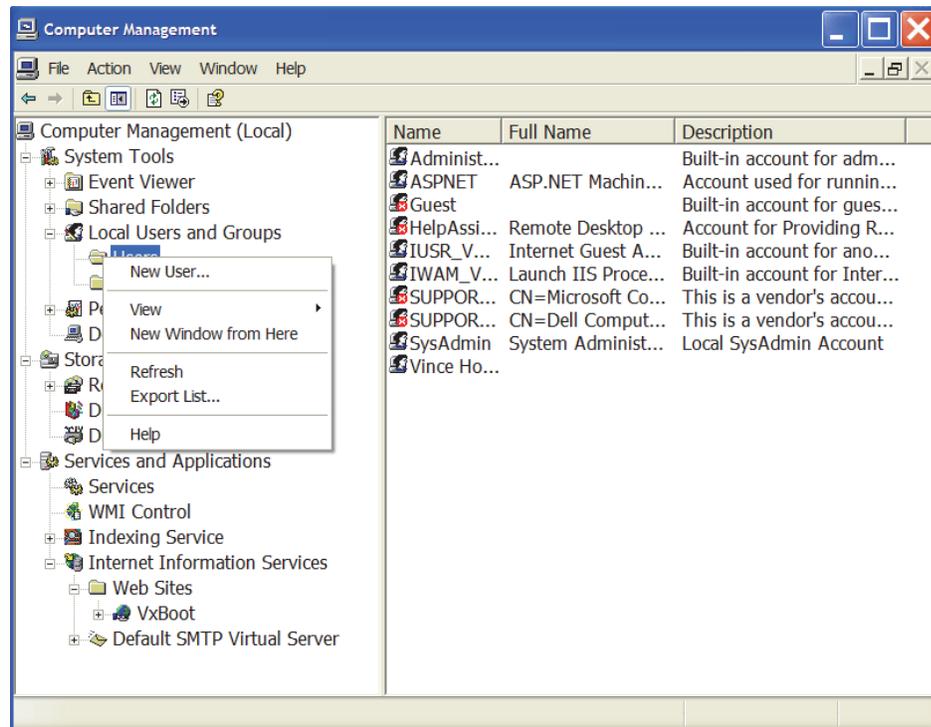**7.** Verify that your vxWorks file is located in the klein directory.

A.2.3 Creating the Klein User in Windows XP

NOTE *Do not create the klein user for the Klein SplashProof-2, UUV-3500 and HydroScan products.*

To create the klein user in Windows XP:

1. On the desktop choose *Start/Control Panel/Administrative Tools/Computer Management*.

2. Select *Local Users and Group*s.

3. Right-click *Users*, and then choose *New User*.

   The *New User* dialog box opens.

4. Enter klein in all the text boxes and set up the check boxes as shown.

A.2.4   Configuring the FTP in Windows XP

NOTE *Do not configure the FTP for the Klein SplashProof-2, UUV-3500 and HydroScan products.*

To configure the FTP in Windows XP:

1. On the desktop choose *Start/Control Panel/Administrative Tools/Computer Management*.

NOTE *If the Internet Information Services item is not in the Computer Management (Local) menu below, it will need to be installed. Locate your Windows XP Professional CD, select Install Optional Windows Components, and then select Internet Information Service (IIS) and add it to the list of other checked components. Select Details and make sure File Transfer Protocol (FTP) Service is checked.*

KLEIN
MARINE SYSTEMS, INC.
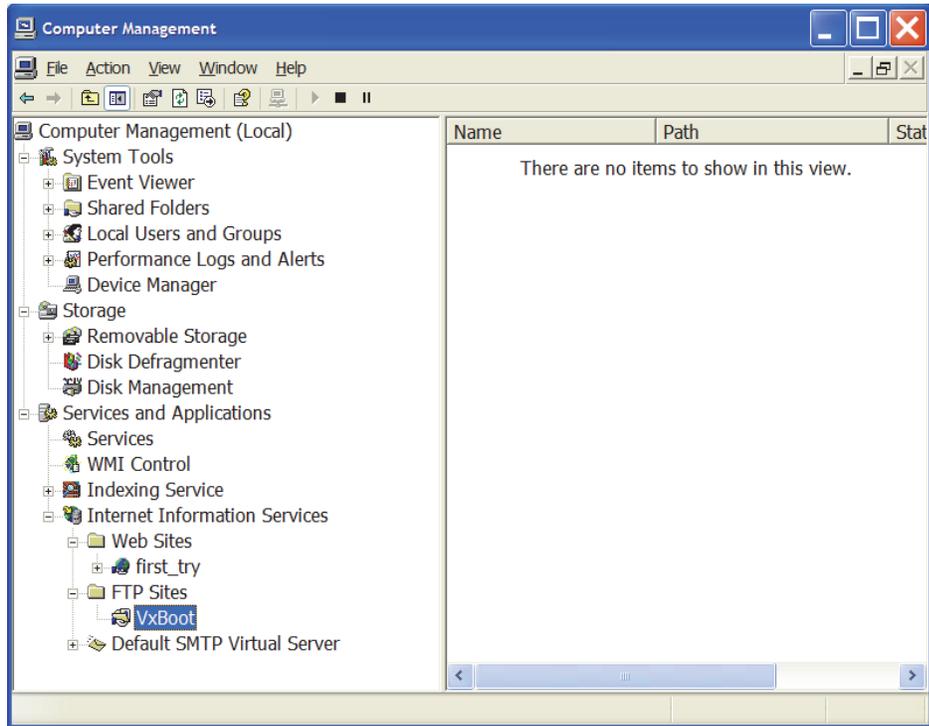
2. Select *Internet Information Services*.
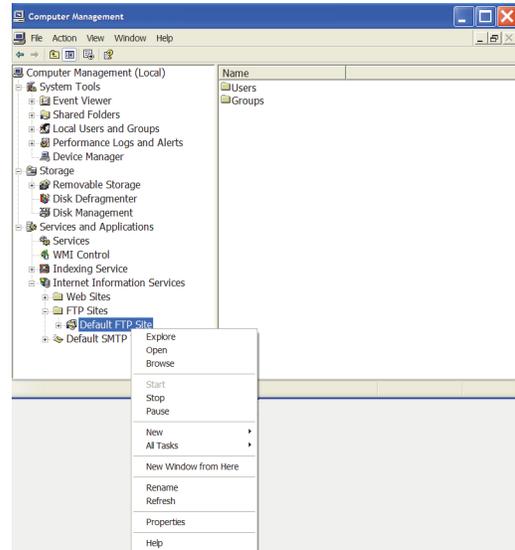
3. Right-click *Default FTP Site,* and then choose *Properties*.

The *Default FTP Site Properties* dialog box will open to the *FTP Site* tab.

4. Enter the parameters as shown.

NOTE *The address 192.168.0.82 shown is the standard address from which the TPU downloads its operating software. This address should be used unless otherwise required. It should be the same address as that used for Step 5 on page A-21.*

5. Click the *Home Directory* tab.

6. Set up the dialog box as shown, including entering C:\ in the **Local Path** text box.

KLEIN
MARINE SYSTEMS, INC.