

RESON 6046

SOFTWARE MANUAL

Version 2.00

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Extended to address features of version 2 software and corresponding installation.

Version 1.01 – Nomenclature change: Interface and Display Controller is now Data Visualization Utility and figure 1 was added.



Version 1.00 - Initial release

RESON strives to maintain up-to-date information and may, as necessary, review and revise this document. If the information contained herein is unclear, please contact your nearest RESON office for clarification.

Preface

The 6046 Software Manual is a reference document that provides information required to install and operate the 6046 Data Collection Software package.

Manual Overview

The organization of this manual is as follows:

Chapter 1, General Information: provides an introduction to the RESON 6046 Data Collection Software package.

Chapter 2, Installation: identifies typical installation steps and minimum hardware specifications.

Chapter 3, Program Operation: provides recommended operating procedures based upon a typical operational scenario.

Electronic File Version

This document is available from RESON Inc. in the Adobe Acrobat Portable Document Format (PDF).

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Reference Documentation

- [1] — *“RESON SeaBat™ 7k Data Format Interface Control Document for RESON 6046”*, Vol. I., RESON Inc., 2002-2003.
- [2] — *“RESON SeaBat™ 7k Data Format Interface Control Document for RESON 6046”*, Vol. III., RESON Inc., 2002-2003.

Chapter 1 - General Information

1.1 Introduction

This manual describes the RESON 6046 Data Collection software package. It is written for the first-time user as well as the experienced operator who wishes to use this document as a reference. This manual provides installation and program operation details.

The RESON 6046 software package has two separate components: the Payload Controller (PLC) and the Data Visualization Utility (DVU). These components are described in the following sections with the overall system layout depicted by Figure 1.

1.2 Payload Controller

The 6046 Payload Controller (PLC) resides on the sub-surface unit's on-board computer system. It is designed to run autonomously, using specific configuration files and system settings for the purpose of data collection and logging, and to provide remote control capability to its suite of integrated sensors.

In the most common AUV arrangement, the vehicle controller supervises the PLC. However, if an adequate TCP/IP communications link exists between the PLC and the DVU systems, the DVU may be used to control the PLC and to view the sensor data as it is collected.

1.2.1 Supported Sensors

The list of sensors supported by the PLC periodically changes. Check with your local RESON office if the sensors you require are not listed below.

The following sensors are supported:

- EdgeTech FSDW system consisting of the following subsystems
 - Sub-Bottom Profiler (SBP)
 - Low Frequency Side Scan Sonar (SSS LF) and
 - High Frequency Side Scan Sonar (SSS HF)
- Bluefin Vehicle Control computer or compatible

The present version of the EdgeTech FSDW module supports only coupled internal triggering mode where the SSS LF is the master subsystem. As a result, all three subsystems are currently required to be active for data to be collected from this system.

1.3 Data Visualization Utility Software

The 6046 Data Visualization Utility (DVU) software resides on a dedicated topside PC and allows control of the PLC software during pre- and post-deployment as well as maintenance and testing. The DVU may also be used to view (replay) data collected during preceding missions.

1.4 Reference Documentation

The data format and protocol used by the PLC to communicate with remote clients (such as the DVU or vehicle controller) are defined by references [1] and [2]. These documents are available from RESON upon request.

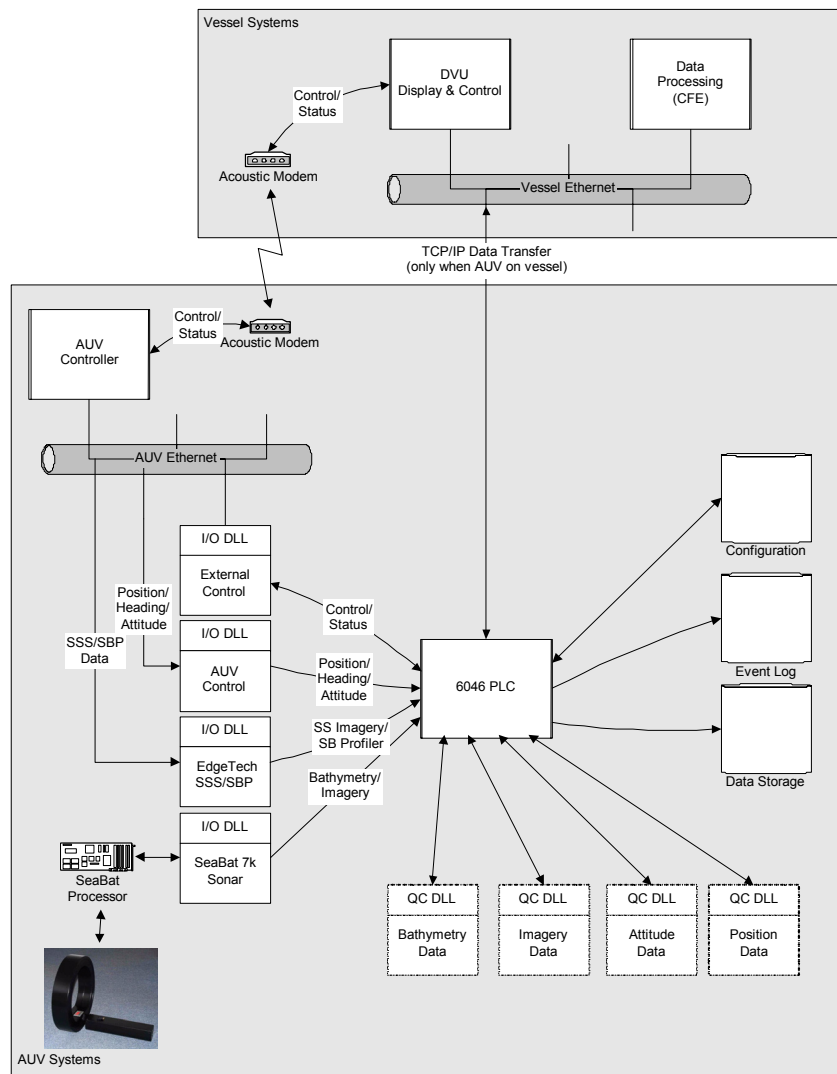


Figure 1: 6046 System Block Diagram



Chapter 2 - Installation

2.1 Introduction

The RESON 6046 Data Collection software, supporting documentation (including this manual), and various utilities are provided on the installation CD-ROM. The following sections describe the installation and setup process. A summary of this information is also available in the file, "Readme.htm," on the CD-ROM.

In the most common arrangement, the Payload Controller (PLC) is hosted on proprietary hardware supplied by RESON and located in the vehicle. Once configured, the PLC requires no further operator intervention.

The Data Visualization Utility (DVU) can be installed on any computer that meets the minimum hardware requirements and is configured to allow access to the vehicle's on-board computer via a TCP/IP-based network connection.

BEFORE YOU BEGIN

Because these programs access critical system resources, the user who installs and runs the RESON 6046 software must have administrative privileges for the computer on which the software resides. Lack of administrative privileges will result in incorrect installation and operation.

2.2 Minimum Hardware Requirements

2.2.1 The Data Visualization Utility

The recommended minimum hardware requirements for the DVU's host are:

Operating System: Windows 2000 Professional or Windows XP Professional.
Processor: 500 MHz
RAM: 256 MB
Display Capability: Minimum 1280 x 1024 screen resolution
Networking: Network Interface Card (supporting the TCP/IP protocol).

Correct network access between systems, using the TCP/IP network protocol suite, is a prerequisite for successfully attaching to the PLC.

2.2.2 The Payload Controller

The PLC host requirements depend, in part, on the sensor suite being configured, however the following are the typical minimum system requirements:

Operating System: Windows 2000 Professional or Windows XP Professional.

Processor: 500 MHz

RAM: 256 MB

Networking: Network Interface Card (supporting the TCP/IP protocol).

The PLC also requires a valid HASP security key (“dongle”) to run. Configured keys are only available from RESON in either the USB or Parallel Port configuration. (See Figure 2)



Figure 2: Hasp Security Keys

2.3 Installing the Software

The RESON 6046 Software CD-ROM contains installation programs for the following software components:

- HASP Driver.
- Adobe® Acrobat® Reader.
- 6046 Payload Controller (PLC) and Data Visualization Utility (DVU).
- VNC Remote Control and Viewer.

NOTE: While the software may run on Windows NT 4.0 Workstation, the installation program will only work with Windows 2000 Professional or Windows XP Professional. If you wish to install the RESON 6046 software on a different version of Windows, please contact RESON Customer Support for assistance.

2.3.1 HASP Security Key Installation

In order to run the PLC, the HASP security key and its drivers must be installed on the host PC. The HASP security key installation program is located on the installation CD-ROM, in the folder “HASP Driver”.

To execute an unattended installation of the driver:

- Click the “Start” button, then select “Run”
- Enter the fully-qualified path to the “cmdline” directory in the “HASP Driver” folder on the 6046 Software CD, then type the following: “hinstall.exe” -i -nomsg.
- Click “OK.”

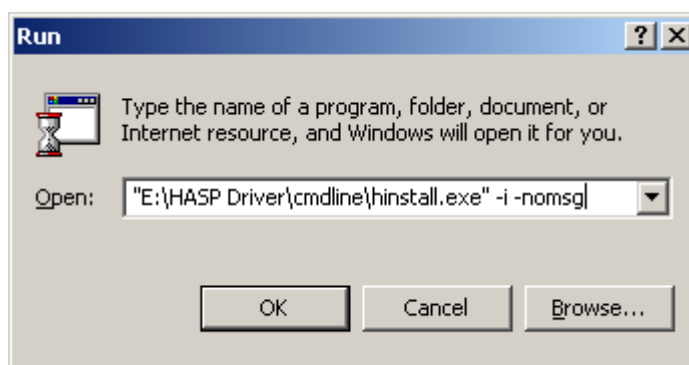


Figure 3: Sample Command Line Entry for HASP Installation

NOTE: For attended installation on Windows XP Professional or Windows 2000 Professional, the program “hdd32.exe” may be used. You may run the program from the command line, through Windows Explorer or a similar program.

2.3.2 Adobe Acrobat Reader

For your convenience, Adobe® Acrobat® Reader, version 5.00, has been provided on the installation CD-ROM. Acrobat® Reader is required to view the electronic version of this user manual. If you do not wish to view online documentation, then installation of the Acrobat® Reader is not required.

To begin installation of Acrobat® Reader, navigate to the “Adobe Acrobat Reader” folder on the CD and execute the program “rp500enu.exe”. Follow the instructions provided in the installation program.

NOTE: Additional information, support, and program updates for the Adobe® Acrobat® Reader, are available at <http://www.adobe.com>.

2.3.3 RESON 6046 Installation Process

The 6046 installation program should launch automatically when the CD is placed in the CD-ROM drive. If the program does not launch automatically, follow the steps below to launch the program manually:

1. Browse the CD-ROM by double-clicking the “My Computer” icon and selecting the CD-ROM drive from the resulting window.
2. Double-click “setup.exe”.

2.3.3.1 Installation Procedure

When the setup program begins, you will see the following screen while the InstallShield Wizard configures the program for installation.

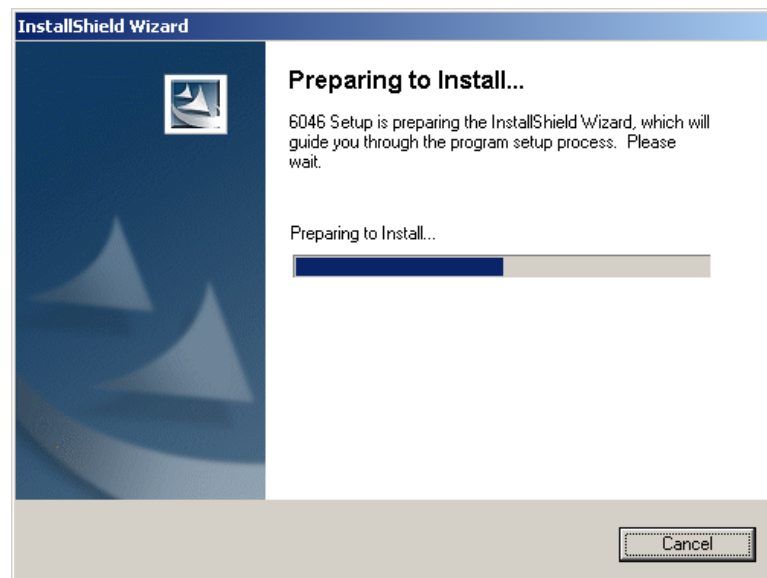


Figure 4: Installation Setup

When the preparation to install is completed, you will be presented with the following window. Click “Next” to continue with the installation process.

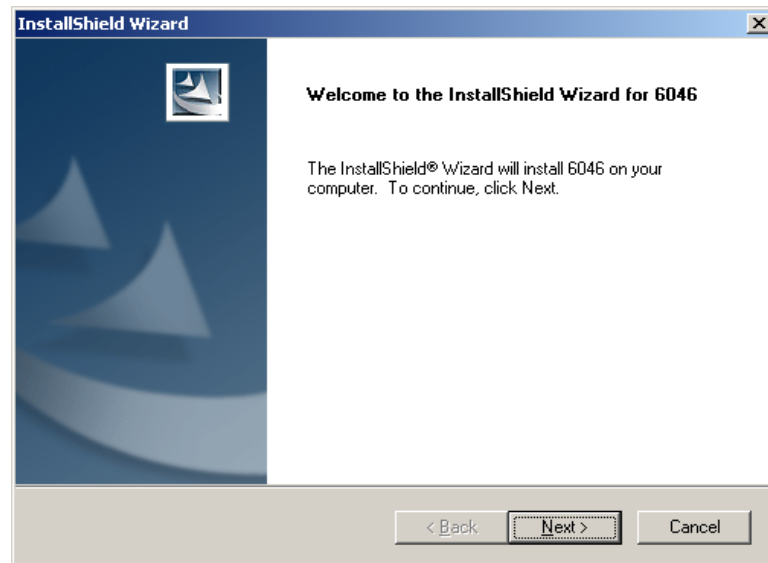


Figure 5: Welcome Dialog

The following license agreement page will be displayed. Read the agreement and indicate whether or not you accept the terms by clicking the “Yes” or “No” button. (Choosing “No” will cause the installation program to terminate.)

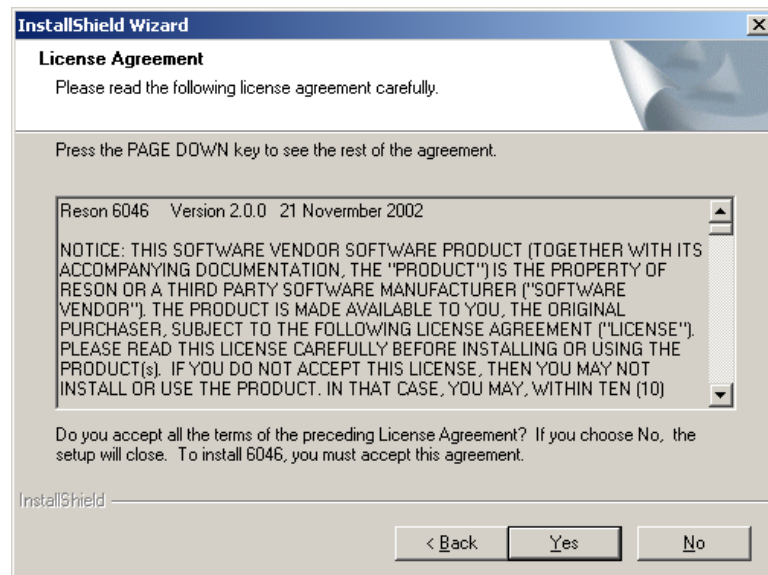


Figure 6: License Agreement Dialog

Enter the user name and company information for which this license applies. In addition, by selecting the appropriate radio button, you may install the program either for the current user only, or for all users on the host machine.

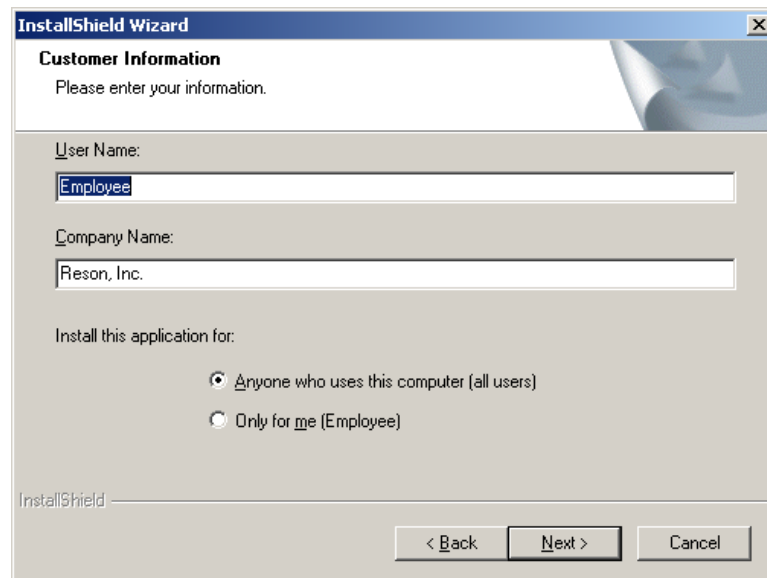


Figure 7: Customer Information Dialog

Choose the destination folder for the 6046 files. The default folder is “C:\Program Files\RESON\6046\”. This path may be changed by clicking the “Browse” button and selecting a new destination folder.

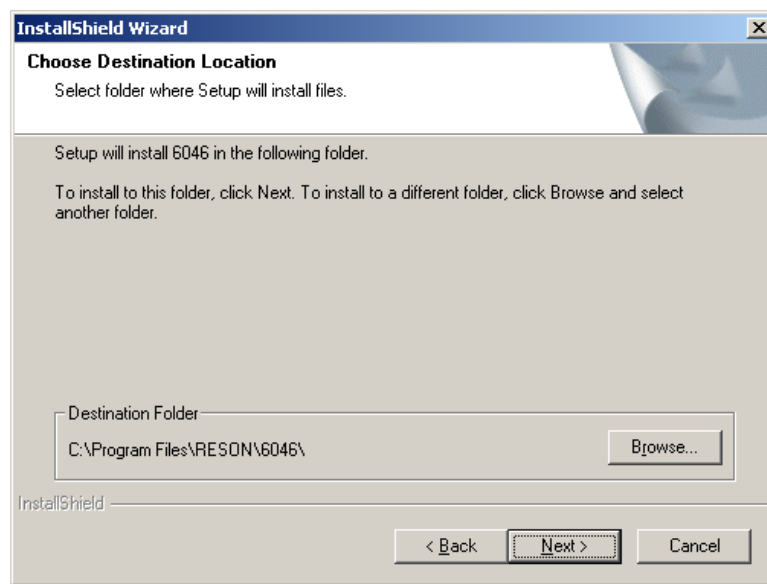


Figure 8: Choose Destination Location Dialog

Choose the components to install. The following modes apply:

- **Typical:** installs the 6046 Payload Controller (PLC), Data Visualization Utility (DVU) and documentation.
- **Compact:** installs only the 6046 Payload Controller.
- **Custom:** allows the selection of any or all of the components that are listed in the typical setup.

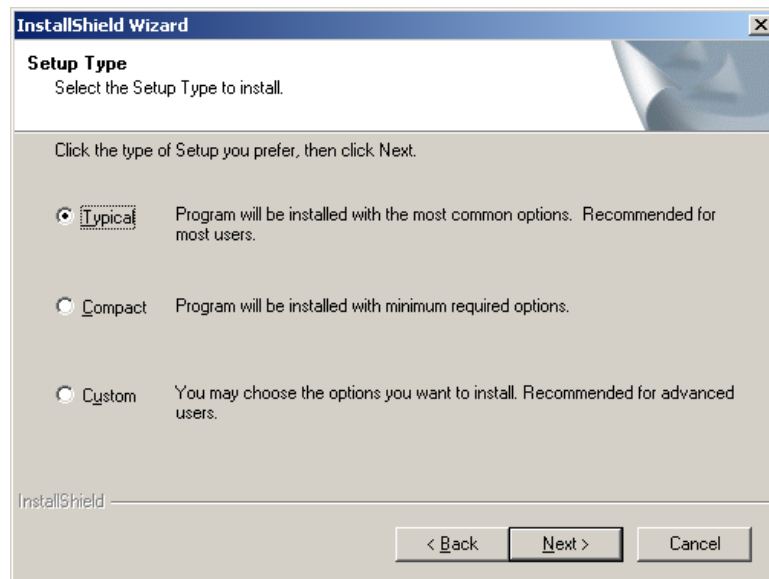


Figure 9: Setup Type Dialog

If you selected the “Custom” installation option, the Feature Selection screen will appear. Remove the check mark(s) from the box(es) beside the options which you do not wish to install, then click “Next”.

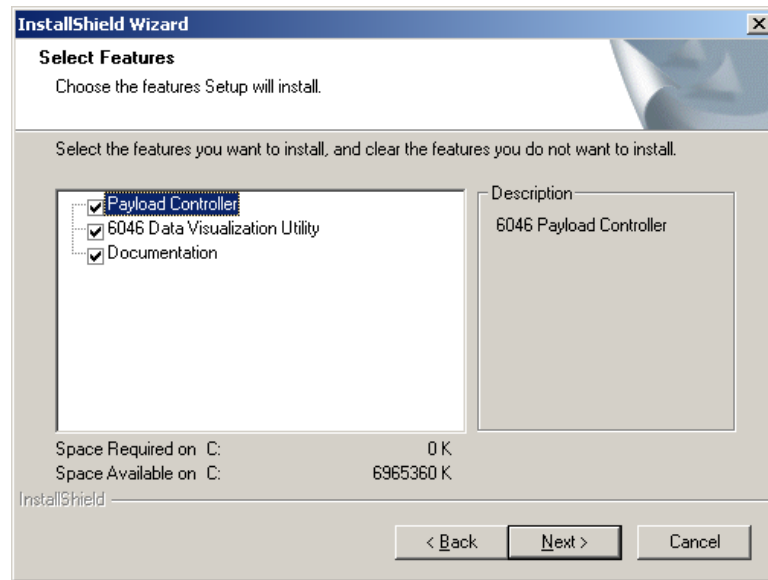


Figure 10: Feature Selection Dialog

Once all desired features have been selected, the following dialog box will appear, displaying the user information and the target folder to which the software will be installed. Verify that this information is correct, then choose “Next” to begin the installation process.

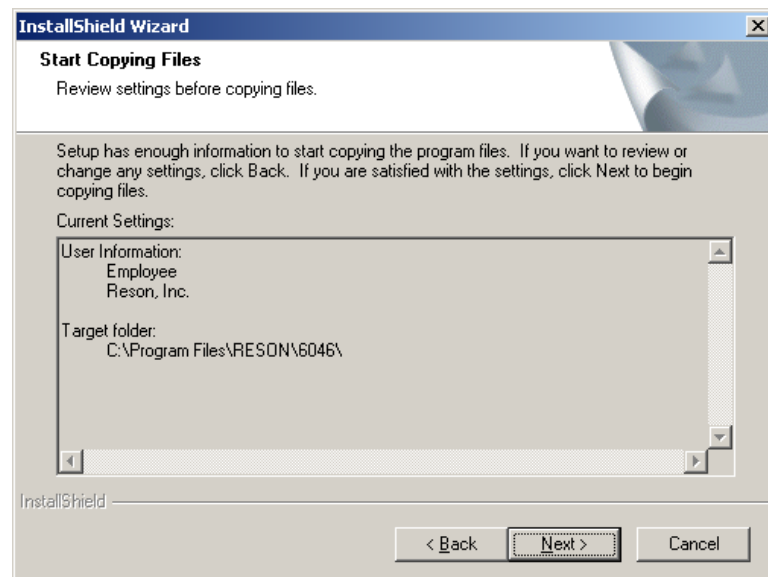


Figure 11: Review Settings

While the InstallShield Wizard copies files to your computer’s hard drive, the following “Setup Status” will appear and will display information as to progress.

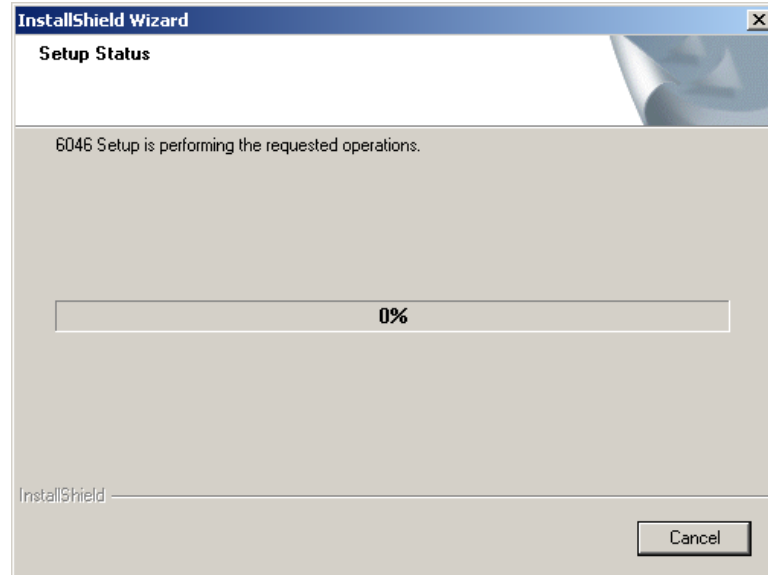


Figure 12: Setup Status

When the installation is complete, the “Setup Complete” window will appear. Click the “Finish” button to terminate the installer. The installation of the RESON 6046 software is now complete. See “Chapter 3 - Program Operation” for information on operating the system.

2.3.3.2 Payload Controller (PLC) Configuration

The 6046 installation program (described above) installs the PLC both as a console program and as an NT service in the standard RESON account (if available).

If the NT service is successfully installed in the standard RESON account, the PLC will be registered with the system’s Service Control Manager (SCM) and will appear as “6046” with a description of “RESON 6046 Payload Controller” in the SCM’s list of services. If it does not appear in the list of services, check for problems (for example, verify that you are logged on with administrative privileges, and that the RESON account exists and is properly configured).

The service will be installed with a startup type of “Manual,” however, an administrator may change this to “Automatic*” if desired.

**Automatic startup means the operating system will start the service after the boot process has completed and without operator intervention. If the service is left at “Manual,” an operator with sufficient privilege must start the program from the SCM’s control panel.*

The PLC service may be installed or removed by an administrator using the command line switches “6046 -i” and “6046 -r” respectively. Using the “-i” software switch allows the service to be setup in cases where the standard RESON account is not being used.

When installing the service in this manner, it is important to use the SCM’s control panel to change the “Log on” account to a local system account that has administrator privileges. This can be done by using the “Properties” setup page of the SCM (See Figure 13).

Note: The “Local System account” does not offer sufficient privilege to allow the PLC to run correctly.

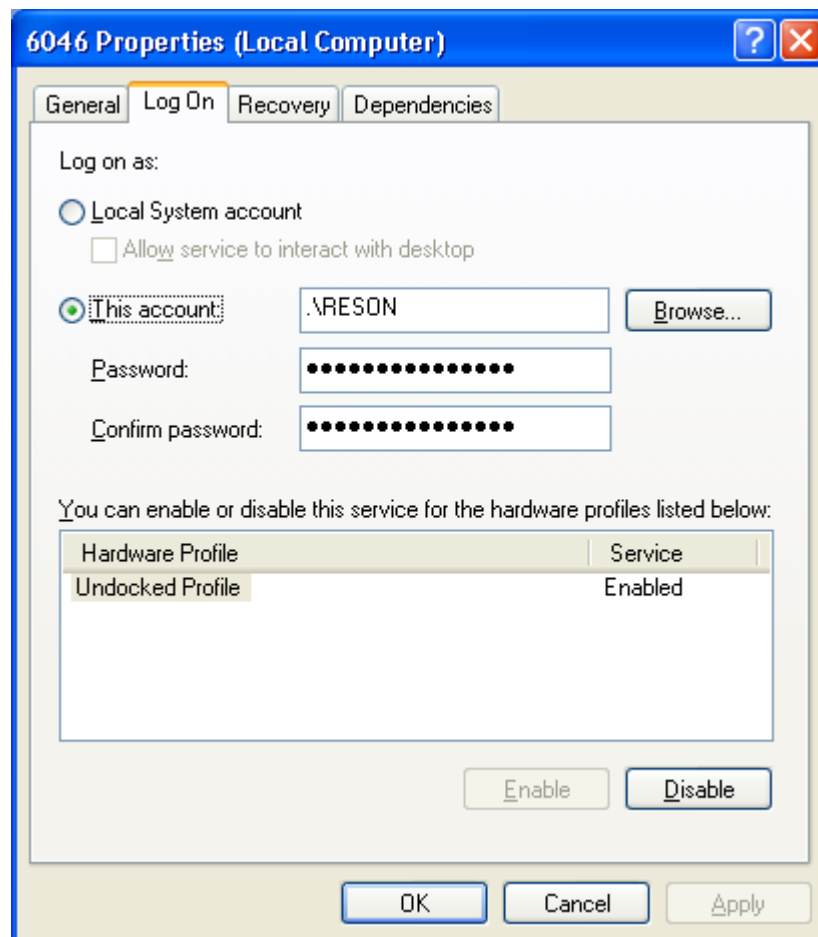


Figure 13: SCM Log On Properties Dialog Box

NOTE:

1. To run the PLC in console mode, specify the command line “6046 –c” at run time. For convenience, during installation shortcuts on the desktop and start menu will be created for this purpose.
2. Only one instance of the PLC is permitted to run at a given time. Therefore care should be taken to ensure the PLC service is inactive when attempting to run the program in console mode; otherwise the console program will abruptly terminate, and an entry will be placed in the Survey Event Log indicating the cause.

2.3.3.2.1 Registry Configuration

During normal installation, the following default PLC registry entries will be created. Depending upon the sensor suite, these registry entries may need to be changed.

The core registry key is “HKEY_USERS\DEFAULT\Software\RESON\6046”. Attributes under this key generally govern the behavior of the PLC itself.

NOTE: Shut down the PLC before changing these settings. Changes will only take effect after the PLC has been re-started.

Table 1: Default PLC Registry Settings

Key	Type	Default	Description
ActivateOnStart	REG_DWORD	0	Stay passive (0) or go active (1) upon sensor startup. Likely disabled for AUV applications.
AutoHealthCheckEnable	REG_DWORD	0	Enable (1) or disable (0) periodic health checking.
AutoHealthCheckPeriod	REG_DWORD	30000	Automatic sensor health-check period in milliseconds, if enabled.
DataPath	REG_SZ	“c:\DataStore6046\”	The default folder for logged 7k data files. This folder will be created by the installation program but may be redirected as necessary. Folder must be valid.
MaxFileSizeInMBytes	REG_DWORD	200	Maximum approximate file size in Mbytes of a 7k data file before the next file in a sequence is generated. File names will be time based.
RecordOverlap	REG_DWORD	100	The number of 7k records that are duplicated in successively logged data files – used to assist post processing.

Key	Type	Default	Description
RemoteControlPort	REG_DWORD	6046	The TCP/IP port number for which the PLC will listen for connecting clients. If this entry is not present, 6046 is assumed.
RoutingEnable	REG_DWORD	0	Enables (1) or disables (0) routing of valid 7k records that are non-PLC commands to the specified sensor.
RoutingIndex	REG_DWORD	0	PLC relative index to which 7k messages will be routed (see also RoutingEnable and 6046.sav file).
SessionId	REG_DWORD	0	7k file header session field – see reference [1].
TimeSyncMode	REG_DWORD	0	Stand alone (0) or slaved (1) time synchronization mode.
UserName	REG_SZ	"RESON 6046 User"	User name that appears in 7k data file header headers – see reference [1].
UserNotes	REG_SZ	"RESON 6046 Payload Controller"	User notes that appear in the 7k file header – see reference [1].

Tables 2 to 7 below describe the default registry settings for subordinate sensor modules currently supported by the PLC.

Table 2: PLC sub-key BlueFin Defaults

Key	Type	Default	Description
Address	REG_SZ	"127.0.0.1"	This non-empty field is currently needed but ignored by the PLC.
Port	REG_DWORD	3100	UDP port over which broadcast Vehicle Control messages will be received.

Table 3: PLC sub-key EdgeTechFSDW Defaults

Key	Type	Default	Description
Address	REG_SZ	192.9.0.101	IP address of where EdgeTech's sonar.exe server program resides.
AutoShutdown	REG_DWORD	0	Enables (1) or disables (0) automatic shutdown of the EdgeTech system when the PLC shuts down all subsystems. Requires v8.1 or higher of EdgeTech sonar.exe program.
Command	REG_DWORD	1700	TCP/IP command port that the EdgeTech server is configured to listen for connecting clients.
Data	REG_DWORD	1701	TCP/IP data port that the EdgeTech server is configured to listen for connecting clients.

Table 4: PLC sub-key EdgeTechFSDW\SBP Defaults

Key	Type	Default	Description
Default	REG_SZ	"SubBottom Profiler"	None.
SubsystemId	REG_DWORD	0	Subsystem identifier for the Sub-Bottom Profiler. Must match the EdgeTech sonar.ini file.

Table 5: PLC sub-key EdgeTechFSDW\SSSHF Defaults

Key	Type	Default	Description
Default	REG_SZ	"Side Scan Sonar (High Frequency) "	None.
SubsystemId	REG_DWORD	21	Subsystem identifier for the high-frequency Side Scan sonar. Must match the EdgeTech sonar.ini file.

Table 6: PLC sub-key EdgeTechFSDW\SSSLF Defaults

Key	Type	Default	Description
Default	REG_SZ	"Side Scan Sonar (Low Frequency) "	None.
SubsystemId	REG_DWORD	20	Subsystem identifier for the low frequency Side Scan sonar. Must match the EdgeTech sonar.ini file.

Table 7: PLC sub-key RESON7kSonar Defaults

Key	Type	Default	Description
AutoShutdown	REG_DWORD	0	Not currently used – to be determined.
CollectionMode	REG_DWORD	0	Not currently used – to be determined.

2.3.4 VNC Remote Control and Viewer

VNC for the Windows platform is provided out of courtesy for those customers requiring remote control of the operating system on which the PLC runs. This program and its reference material may be downloaded from the following site <http://www.uk.research.att.com/vnc>.

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Chapter 3 - Program Operation

3.1 Introduction

The RESON 6046 software package has two components: the Payload Controller (PLC) and the Data Visualization Utility (DVU). The PLC software resides in the vehicle's on-board computer and runs autonomously based on mission-specific configuration files. The DVU resides in a dedicated topside PC and requires operator intervention.

3.2 Data Visualization Utility Operation

The 6046 DVU application may be used to view real-time data as it is being collected, control certain essential PLC application functions, and to replay data collected by the PLC during previous missions.

3.2.1 Getting Started

Three configuration steps are required to view data in real-time in the DVU:

1. Connect to the remote host (PLC) using the Setup Tab and specifying the appropriate IP address and port.
2. Select the display data to be viewed using the Displays Tab, which subscribes to the PLC for specific messages. Use the "Available Sensors" list box to select any, or all, installed sensors.
3. Activate the applicable waterfall display window by using the Waterfall Displays feature.

3.2.2 Program Features

The following text and figures describe each application function and should be followed in the sequence presented.

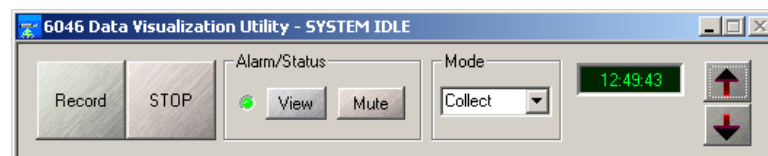


Figure 14: Main Application Window, Collapsed View

3.2.3 Play/Record/Stop Function

These buttons control data logging and playback. In the “Collect” mode, the “Record” and “Stop” buttons are visible. If the mode is changed to “Playback”, the “Record” button will disappear, with the “Play” button taking its place.

3.2.4 Alarms

The “Alarm/Status” function allows the operator to view alarm, warning and status information message received from the PLC.

If there is no alarm or warning condition, the LED to the left of the “View” button will be green. If the PLC reports an alarm condition, the LED to the left of the “View” button will flash red, and a siren will sound. In a warning condition, the LED will be yellow.



Figure 15: Alarm / Status Button

- **View:** You may click the “View” button at any time to see a list of messages.
- **Mute:** You may click the “Mute” button to silence the alarm. (This will NOT disable or correct the alarm condition. It is only a sound control.)

3.2.4.1 Alarm/Status/Info Display

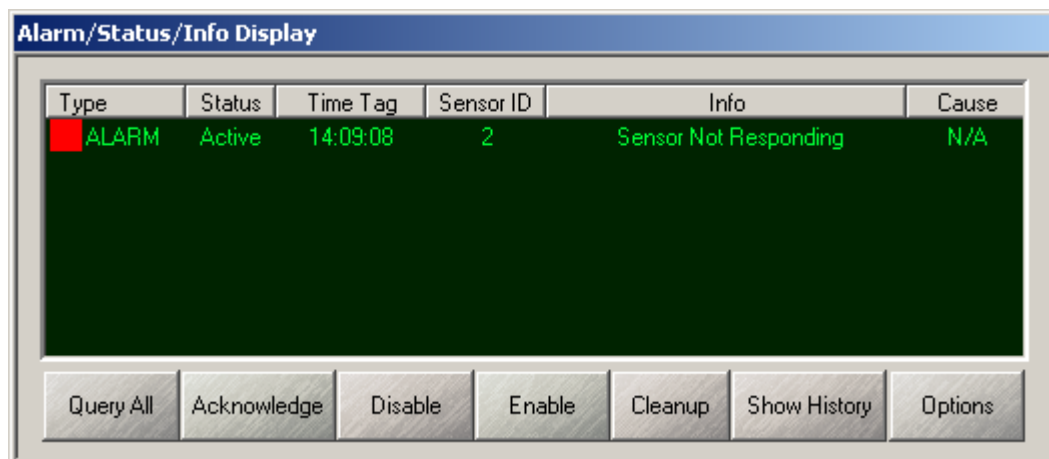


Figure 16: Alarm/Status/Info Display

The messages in the “Alarm/Status/Info Display” are presented in reverse chronological order. The following information is displayed in the window:

- **Type:** Identifies the message as “Alarm”, “Warning” or “Status”
- **Status:** Indicates whether the message is “OK”, “Acknowledged”, “Active” or “Disabled.”
- **Time Tag:** Shows the time the message was received.
- **Sensor ID:** Shows the sonar sensor related to the message (if applicable).
- **Info:** Information as to the subject of the message.
- **Cause:** Indicates the cause of the alarm, if that information is available.

The buttons along the bottom of the window allow the operator to interact with the messages as follows:

- **Query All:** Request updated information from the PLC.
- **Acknowledge:** Indicates that the operator is aware of the alarm, but does not want it turned off. (Changes status to “Acknowledged.”)
- **Disable:** Disables the alarm for the duration of that DVU session. (Changes status to “Disabled.”)
- **Enable:** Removes the “Disabled” condition from an alarm.
- **Cleanup:** Clears the screen (but does not delete history) of Status messages and Acknowledged or Disabled alarms. Active alarms will remain visible.
- **Show History:** Displays all previous messages.
- **Options:** Allows the operator to set the system monitoring options.
 - **Query All Messages On Connect:** Query the status of the PLC upon connect.
 - **Perform Auto Health Check:** Automatically query the status of the PLC at a specified time interval.
 - **Auto Health Check Interval:** Determine the number of seconds between automatic health checks.

NOTE: The “Acknowledge,” “Enable,” and “Disable” functions **only** affect the DVU functions. Changing the status of an alarm condition in the DVU will not have an impact on the status of the PLC itself.

3.2.5 Mode

The “Mode” feature is a pull-down menu from which the operator may chose to run the DVU in either “Collection” mode or “Playback” mode. The “Collection”

Program Operation

mode is used to view real-time data that is being collected by the PLC. “Playback” mode is used to view data collected during previous missions.

The interface changes slightly when “Playback” is selected. The playback time display window will appear beneath the system time. If the DVU window is maximized, an additional “Playback Tab” will appear in the lower half of the window.

Note: Selecting Playback causes any open waterfall display to immediately show the data being played back. Data collection, however, is not interrupted.

3.2.6 Time Display Windows

The top window displays the system time of the topside host computer. The bottom window displays file playback time when in the Playback Mode. The Playback Time window is hidden when the system is in the “Collection” mode.

3.2.7 Shrink/Expand Buttons

This feature allows the size of the main application window to be reduced to save screen space. Click the “Up” arrow to collapse the window, and the “Down” arrow to expand the window.

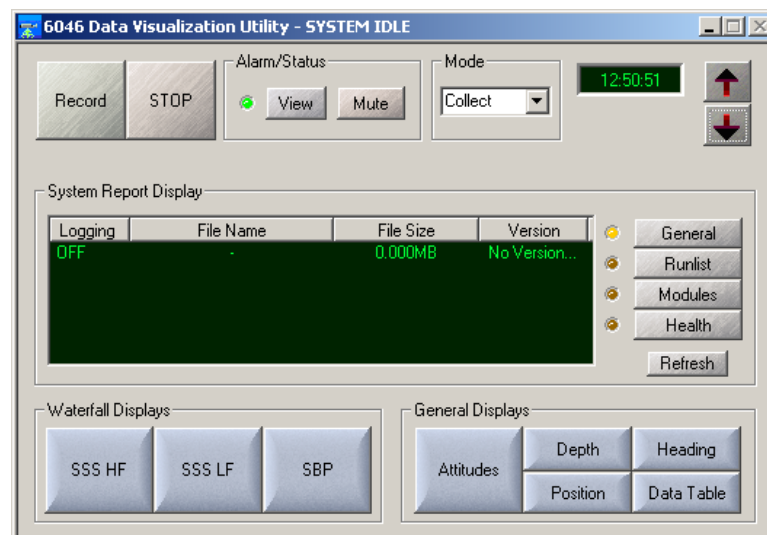


Figure 17: Main Application Window, Partially Expanded

3.2.8 System Report Display

This window shows the status of currently enabled program features. Click the applicable button to display the status of that function.



- **General:** This is the default at startup. It displays the version, status, filename and size of the destination file during logging.
- **Runlist:** Displays the PLC-mapped sensor suite on the vehicle, including name, index, port and subsystem id's.
- **Modules:** Displays the currently available sensor modules on the system including version and ID Number.
- **Health:** Indicates the status of each sensor module along with the Sensor ID number.
- **Refresh:** Updates the fields in the System Report Display.

Note: When the system is in the “Collect” mode, the File Name column shows the destination/source file path and file size in the vehicle’s computer. Use the Refresh button to update this information, as it will **not** update automatically unless the “Sync Interval” is selected on the “Setup” tab. See 3.2.10 “Setup Tab”.

3.2.9 Displays

Each display button calls up a new window to display a different kind of data. There are three waterfall displays, as well as five general displays. All display buttons are “toggles.” Click once to show the desired window, then click again to hide the window.

3.2.9.1 Waterfall Displays

There are three different kinds of waterfall displays: High-Frequency (SSS HF), Low-Frequency (SSS LF) and Sub-Bottom Profiler (SBP). All three windows, or any combination thereof, can be opened at once.

Each waterfall display can be moved on the desktop by clicking anywhere in the display and dragging it to a new location.

- **Image** – allows the operator to set brightness and contrast.
- **Palette** – offers a choice of colors.
- **Scaling** – offers a choice of “Mean”, “Peak” or “RMS” scaling. (This menu item is not available in the Sub-Bottom Profiler Display).

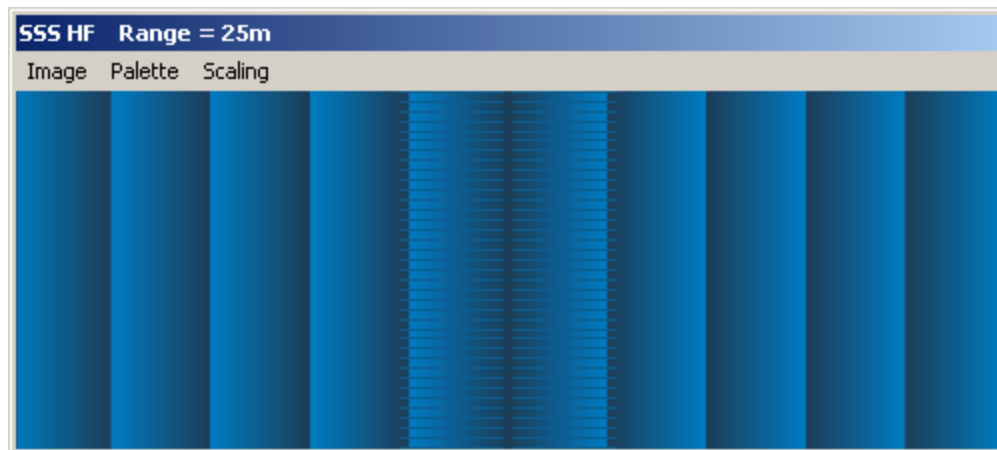


Figure 18: Waterfall Display

3.2.9.2 General Displays

There are five “General Displays:” “Attitudes,” “Depth,” “Position,” “Heading,” and “Data Table”. Each of these is updated by information collected from the PLC.

Each display can be moved on the desktop by clicking anywhere in the display and dragging it to a new location.

3.2.9.2.1 Attitude Time Series Display



Figure 19: Attitude Time Series Display

The “Attitude Time Series” display appears as a horizontal line that scrolls from right to left. Select check boxes to add items to the graph. Lines will appear in colors corresponding to those beside the items.

This window may be re-sized by floating the mouse cursor over the edge of the dialog box until it becomes a two-pointed arrow, then dragging the box to the desired size.

In addition, the bar between the “Series 1” and “Series 2” windows may be moved up or down to accommodate a larger or smaller display in either.

3.2.9.2.2 Depth Timeseries Display



Figure 20: Depth Time Series Display

The “Depth Timeseries” display indicates the vehicle depth as relayed by the PLC. This window may also be resized by floating the mouse cursor over the edge of the dialog box until it becomes a two-pointed arrow, then dragging the box to be the appropriate size.

3.2.9.2.3 Position Display

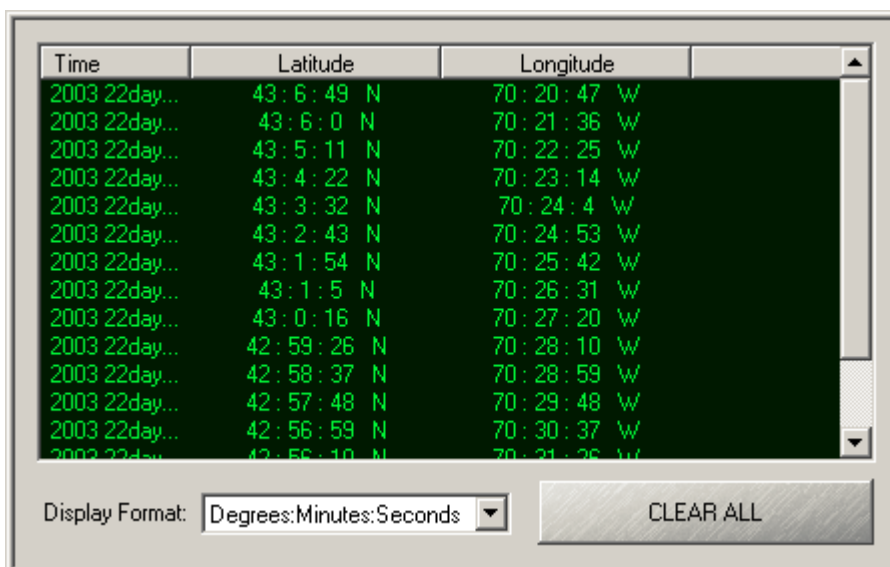


Figure 21: Position Display

The “Position” display shows the time, latitude, and longitude reported by the PLC. The “Display Format” dropdown menu allows the user to select the format in which information is displayed.

3.2.9.2.4 Heading Display

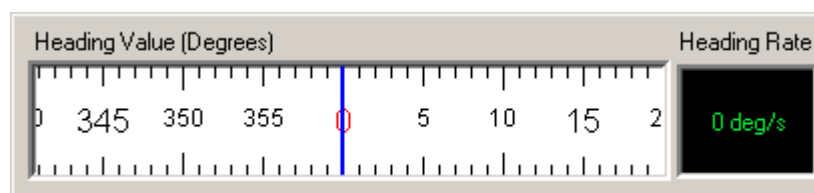


Figure 22: Heading Display

The “Heading” display indicates the “Heading” value reported by the PLC.

3.2.9.2.5 Data Table Display

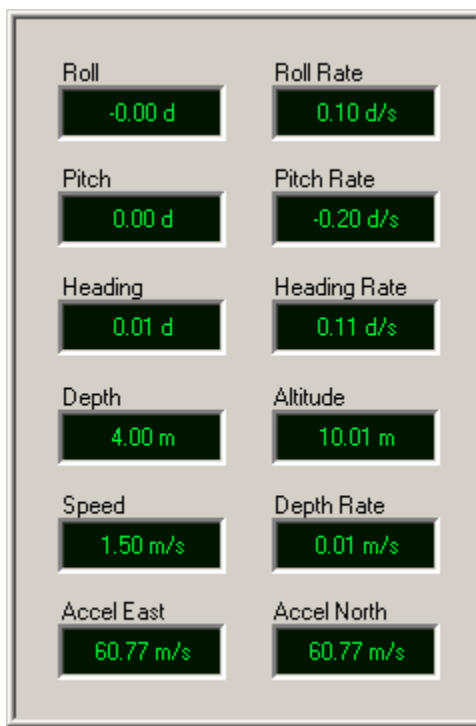


Figure 23: Data Table Display

The “Data Table” display shows all values in a simple alpha-numeric format.

3.2.10 Setup Tab

Configuration of the 6046 program starts with this tab.

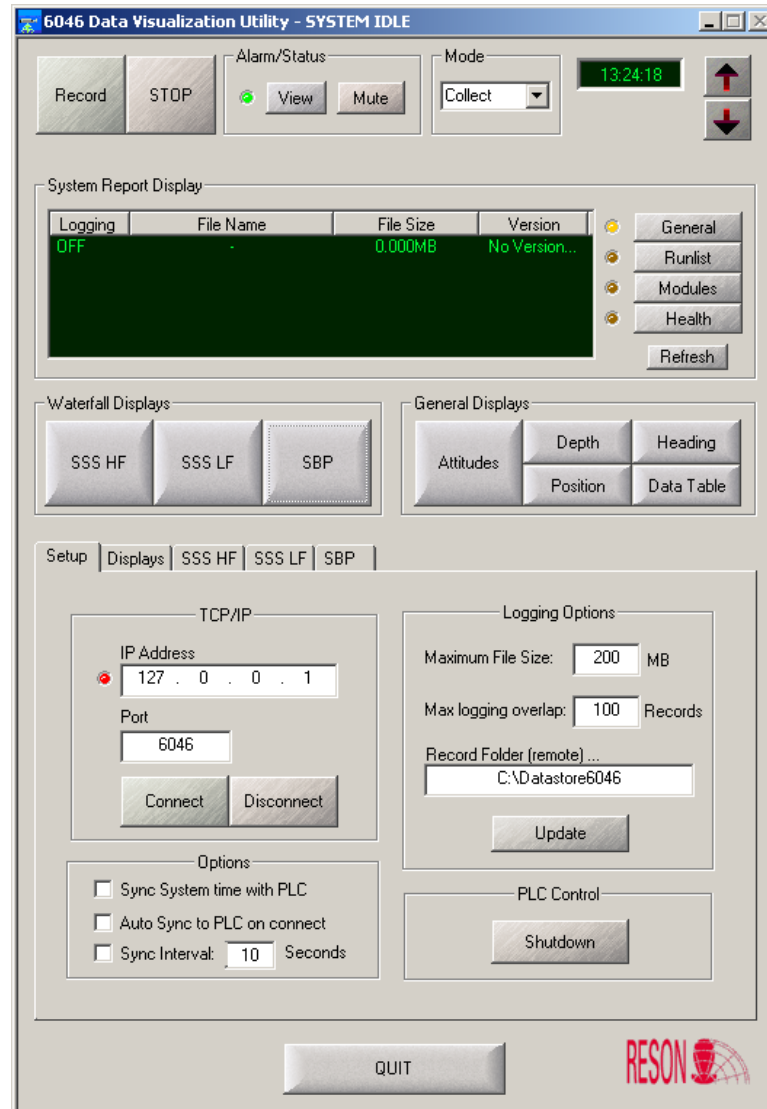


Figure 24: Main Application Window, Expanded

3.2.10.1 TCP/IP

- IP Address: Enter the address of the host computer on which the Payload Controller resides.
- Port: Enter a connection port number (the default port is 6046).
- Click the “Connect” button to start the connection.
- Click the “Disconnect” button to break the connection.

Note: Network access between PCs using the TCP/IP network protocol suite is a prerequisite for successful connection to the PLC. When the connection is made, the IP Address LED will change to Green. If the connection fails, the LED will flash Red (on/off) twice and return to Red.

3.2.10.2 Options

- **Sync System time with PLC:** Synchronizes the system time of the DVU host computer with that of the PLC host computer.
- **Auto Sync to PLC on connect:** Check this box to automatically refresh the system information that appears in the DVU when you connect to the PLC.
- **Sync Interval:** Check this box to automatically refresh the “System Report Display” window at a specified interval (default = 10 seconds).

Note: The Sync Interval Value may only be modified if the “Sync Interval” check box is unchecked. The minimum value is 10 seconds.

3.2.10.3 Logging Options

A maximum file size of approximately 200MB has been chosen as the default for logged data. When the logged data file exceeds this size, a new file is created and the original is saved. To assist with post-processing, an overlap is maintained between files.

- **Maximum File Size:** Specify the maximum size for a single log file. When the file reaches this limit, an additional log file will be created.
- **Max Logging Overlap:** Specify the amount of data (number of records) you wish to have overlapped in subsequent log files.
- **Record Folder (remote):** Specify the file location in which to store the log file.

Click the “Update” button to accept changes. These changes will take effect once the PLC has been shut down and restarted.

3.2.10.4 PLC Control

The “Shutdown” button allows the operator to shut down the PLC. When this button is selected, the operator is prompted to shut down the PLC host computer’s operating system as well.

- Answering NO shuts down the PLC and leaves the PLC host computer running.
- Answering YES shuts down the PLC and then the PLC host computer.

3.2.11 Displays Tab

The Displays tab allows the operator to select what data should be displayed, as well as any scaling that is needed.

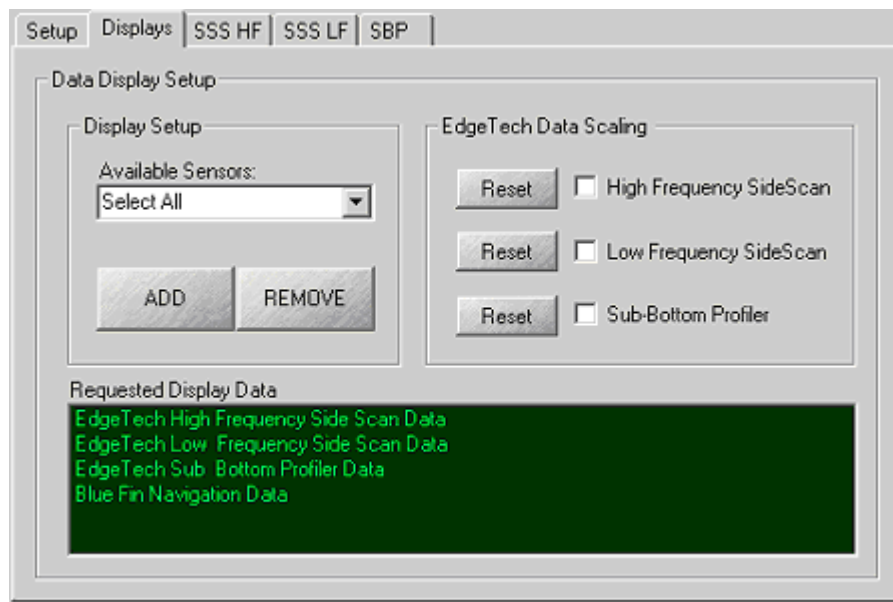


Figure 25: Displays Tab

3.2.11.1 Display Setup

The Available Sensors drop-down list allows the operator to select individual sensors for data display. To add additional sensors, select an option from the available sensors list and click the “Add” button.

As each sensor is added, it appears in the “Requested Display Data” window. When a sensor is added, its data will be seen in the corresponding waterfall display. (See “3.2.9.1 Waterfall Displays” for information on how to show and hide waterfall displays.)

3.2.12 EdgeTech Data Scaling

The “EdgeTech Data Scaling” section allows for the use of proprietary scaling of sensor data for EdgeTech equipment. This scaling will have a noticeable effect on the applicable waterfall display.

NOTE: The data collected by the Payload Controller does not have scaling applied; this is a visualization process only.

3.2.13 SSS HF and SSS LF Tabs

The High Frequency Side Scan (SSS HF), Low Frequency Side Scan (SSS LF), and Sub-Bottom Profiler (SBP) tabs have been provided to allow control of the EdgeTech subsystems.

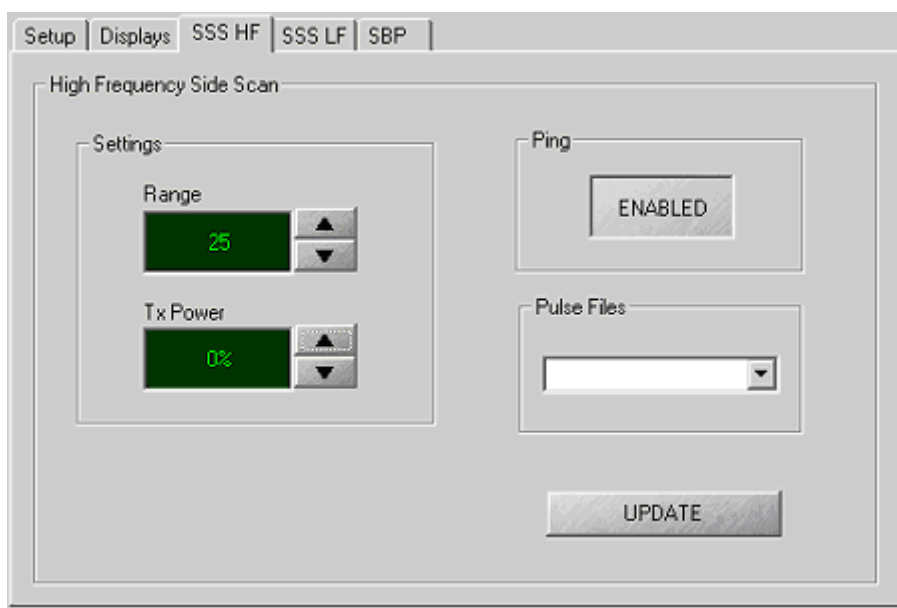


Figure 26: HF Side Scan Tab

- **Settings**
 - **Range:** Sets range scale for the selected side scan unit.
 - **Tx Power:** The arrows change the transmit power for the selected side scan unit from 0% to 100% in 1% steps. (Depressing the “Ctrl” key changes this rate in 10% steps.)
- **Ping:** Click this button to enable or disable pinging of the subsystem.
- **Pulse Files:** Select the appropriate EdgeTech pulse file.
- **Update:** Click UPDATE to enter any changes.

3.2.14 SBP Tab

The Sub-Bottom Profiler (SBP) tab functions in a similar fashion to the “SSS HF” and “SSS LF” tabs.

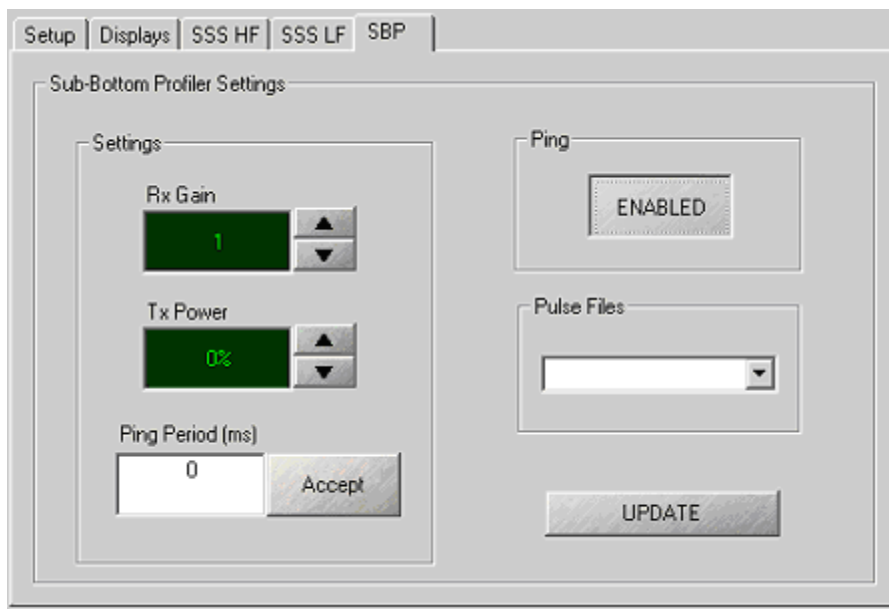


Figure 27: Sub-Bottom Profiler Tab

- **Settings**
 - **Rx Gain:** The arrows change the receiver gain values for the Sub-Bottom Profiler. Each time the arrow is clicked, the previous setting is doubled to a maximum of 2048. (i.e. 1, 2, 4, 8, 16... 2048)
 - **Tx Power:** The arrows change the transmit power for the Sub-Bottom Profiler from 0% to 100% in 1% steps. (Depressing the “Ctrl” key changes this rate in 10% steps.)
- **Ping Period:** Set the number of milliseconds that should elapse between pings.
- **Ping:** Click this button to enable or disable pinging of the subsystem.
- **Pulse Files:** Select the appropriate EdgeTech pulse file.
- **Update:** Click UPDATE to enter any changes.

NOTE: In the case of all Side Scan tabs (“SSS HF,” “SSS LF,” and “SBP”), newly entered commands are not sent to the PLC until the UPDATE button has been pressed. This avoids unnecessary network traffic when bandwidth is limited, especially when using an acoustic modem in the AUV context.

3.2.15 Playback Tab

The “Playback” tab is visible only if the “Playback” mode has been selected in the “Mode” list box.

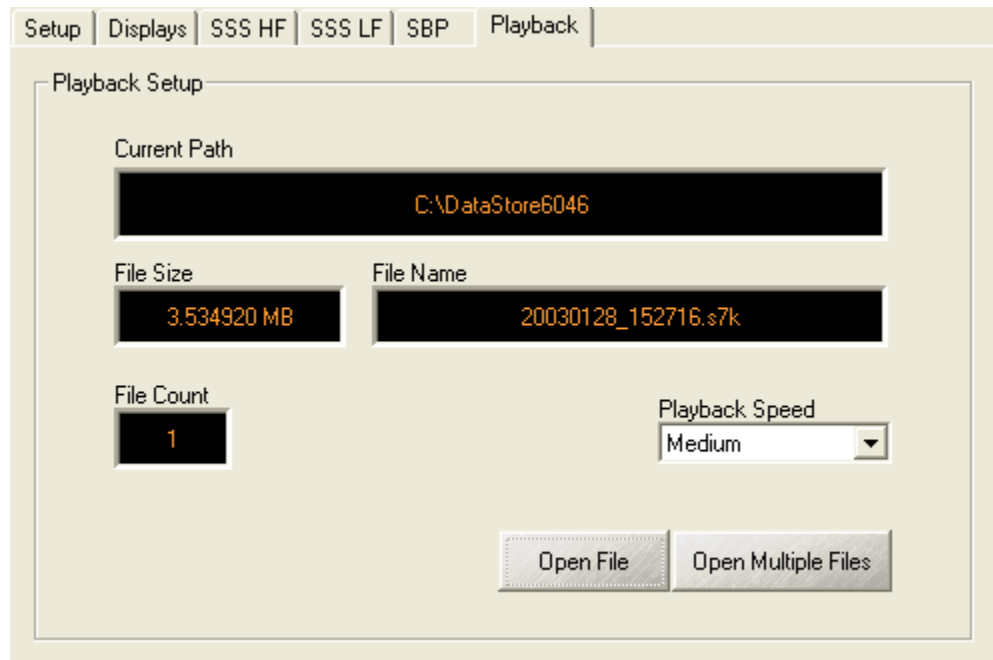


Figure 28: Playback Tab

- **Current Path:** Displays the path of the selected playback file.
- **File Size:** Displays the size of the selected playback file.
- **File Name:** Displays the name of the selected playback file.
- **File Count:** Indicates how many files are in the grouping.
- **PlayBack Speed:** Select the scrolling speed for the playback waterfall displays:
 - Fastest
 - Fast
 - Medium
 - Slow
 - Slowest
- **Open File:** Click this button and browse to select a file for playback.
- **Open Folder:** Click this button and browse to select multiple files for playback.

3.3 Payload Controller Operation

3.3.1 Overview

The Payload Controller (PLC) software is designed to control and collect data from multiple sensors in a manned or unmanned environment. Each sensor, or set of related sensors, is coordinated by a given module and is responsible for the control and acquisition of data from its associated sensor(s). A variety of communications types and protocols are available for use with different sensors.

The PLC coordinates the acquisition of data from each sensor and is responsible for time tagging and logging the acquired data.

Remote control of the PLC is achieved via a dedicated network interface through which one or more clients may communicate (the DVU and vehicle control computers are examples of such a client).

3.3.2 Program Execution

The PLC may be run either in console mode or as an NT service.

- In console mode, the PLC needs to be executed with a “-c” software switch applied to the command line thus “6046 -c”. A desktop shortcut is typically used for this purpose.
- When installed as an NT service, the PLC may be started by the operating system after the boot process has completed.

NOTE: Copying the 6046 console mode shortcut to the user’s startup folder will start the PLC after the user has logged on, thus emulating the behavior of an NT service. In this case, when operating in an unmanned environment, the user account should be configured to log on automatically.

Whether running as a service or console program, the PLC must run in the context of an account with administrator privilege to ensure necessary resources are accessible during operation.

See 2.3.3.2 Payload Controller (PLC) for more information with regards to setting the PLC up as a NT service.

3.3.3 Sensor Startup and Configuration

The PLC uses a text file (6046.sav) to determine what sensors should be loaded into the run-list and to subsequently start them in the specified order. Sensors

are scheduled according to their delay field, once the PLC has completed its initialization sequence.

Table 8 describes the respective columns of the 6046.sav file, as follows:

Table 8: Columns of the 6046.sav file

Column	Description
Media type	Not currently used.
Module identifier	0 – EdgeTech FSDW system (EdgeTechFSDW.dll) 1 – RESON 7k sonar system (RESON7kSonar.dll) 2 – Bluefin Vehicle Control computer (BlueFinVC.dll)
Port	Not currently used.
Subsystem Identifier	Module dependent optional parameter — used to distinguish between subsystems of a given system (e.g., the EdgeTech FSDW).
Startup delay	Duration in seconds (beginning with zero) that a sensor will be delayed before its startup procedure is attempted once the PLC has been initialized. The duration is relative to the completion of the previous sensor's startup procedure. A negative value indicates the sensor is disabled and therefore won't be loaded into the PLC's run-list.

The RUNLIST_SIZE parameter at the beginning of the file specifies the number of sensor entries to be loaded. Sensor entries beyond this are ignored.

Running the PLC may require the startup delay for each sensor to be configured separately. This startup delay may not be necessary where the boot period of the RESON system is delayed relative to the dependent sensor suite so that the sensors are guaranteed to be available during the first attempt at connection. Figure 29 shows an example of a normal “6046.sav” file.

```

RUNLIST_SIZE=4
0  0  0  0  0
0  0  0  20  0
0  0  0  21  0
0  2  0  0  0
0  1  0  0  0

```

Figure 29: Sample 6046.sav file

3.3.4 Survey Event Log

The PLC maintains a Survey Event Log (6046.log) that details significant system or sensor events such as alarms or fail conditions.

This file is maintained for post-mission review, and each entry is time-stamped to assist in this process. If the 6046.log file exists when the PLC starts, the data will be appended to the existing file. If the 6046.log file does not exist, the PLC will create a new one.

3.3.5 Logging File Format

Data files automatically logged by the PLC use the following naming convention:

“YYYYMMDD_HHMMSS.s7k”

Here, “YYYYMMDD” represents the UTC Date, and “HHMMSS” represents the UTC System Time. Logged data is in the RESON 7k format and is described by references [1] and [2].

A maximum file size of approximately 200MB has been chosen as the default for logged data. When the logged data file exceeds this size, a new file is created and the original is saved. To assist with post-processing, an overlap is maintained between files.

The maximum file size and overlap size may be configured in the DVU (see 3.2.10.3 Logging Options) or directly in the Registry (see Table 1: Default PLC Registry Settings).

3.3.6 Remote Control

The PLC supports a comprehensive range of commands for the purposes of data logging and control of both the PLC and its subordinate sensor suite.

The communications format and protocol are available upon request for the purposes of interfacing to specific vehicle controllers. The details are beyond the scope of this manual and can be found in references [1] and [2].