



wassp[®]
MULTIBEAM

OPERATOR MANUAL

WMB-3250

Doc. P/N: WSP-009-004
Version: V1.3
Issue Date: August 2013

Document Revision History

Revision Date	Reason for Change	Version
7th May 2012	Initial Revision	1.0
29th August 2012	Imagery Update	1.1
11th December 2012	Numerous updates, corrections and additions for RTM3	1.2
30th July 2013	WMB-3250 Updates	1.3

Disclaimer

WASSP Ltd. reserve the right to change this manual without notice. Although WASSP Ltd. has made every effort to ensure the information in this manual was correct at publication time, WASSP Ltd. does not assume and hereby disclaim an legal liability or responsibility to any party for any direct, indirect, special or consequential loss, damage or disruption caused by errors or omissions, whether such errors or omissions result from negligence, accident or any other cause.

Copyright and Confidentiality Notice

This document is copyright WASSP Ltd 2013. Circulation of this document is strictly prohibited without the written permission of WASSP Ltd.

Related Documents

Document P/Number	Title
WSP-009-005	WMB-3250 Installation Manual

General Notices

WASSP Ltd. reserves the right to change the contents of this manual and any system specifications without notice. Contact WASSP Ltd. regarding copying or reproducing this manual.

Warnings, Cautions, and Notes

Warnings, cautions, and notes are indicated by the following icons throughout this manual:



A WARNING indicates that if the instruction is not heeded, the action may result in loss of life or serious injury.



A CAUTION indicates that if the instruction is not heeded, the action may result in equipment damage or software malfunction.



A Note indicates a tip or additional information that could be helpful while performing a procedure.

Safety Notices

The installer of the equipment is solely responsible for the correct installation of the equipment. WASSP Ltd. assumes no responsibility for any damage associated with incorrect installation.

Electrical Safety

► Fire, electrical shock, or equipment damage may occur if the transceiver becomes wet.

► The equipment is rated for operation at:

- BTxR 24 V DC

- WASSP PC 9 - 36 V DC



(Check the PC power supply to verify this before connecting an incorrect voltage!)

► Make sure that the power is switched OFF at the main supply (e.g. switchboard) before beginning the installation. Fire or electrical shock may occur if the power is left ON.

► Do not open equipment covers unless you are totally familiar with the system's electrical circuits.

► Make sure all safety precautions for electrical equipment are taken when operating or servicing the equipment. These to be carried out in accordance with local or national regulatory body safety regulations.

► Make sure that the transducer cannot become loosened or insecure due to the vessel's vibration.

Contents

1.	Purpose of this Manual	
2.	Introducing the WASSP System Multibeam Sonar System	
2.1	Main Features	5
2.2	System Configuration	7
3.	Operating Procedures	
4.	Menu Task Bar	
4.1	Connect Status Icons	12
4.2	Transmit Mode Button	13
4.3	Gain Control Knob	14
4.4	Range Control Knob.....	14
4.5	Power Level	15
4.6	Pulse Width.....	15
4.7	System Views	16
4.7.1	Single Screen Layout.....	16
4.7.2	Vertical Split Screen Layout.....	17
4.7.3	Horizontal Split Screen Layout.....	17
4.7.4	Three Split Screen Layout.....	18
4.7.5	Four Screen Layout.....	19
4.7.6	Window Button.....	19
4.8	Ship Setup Utility	20
4.8.1	General Tab.....	21
4.8.2	NMEA.....	22
4.8.3	Offset Corrections Tab	22
4.8.4	Sound Speed Tab.....	23
4.8.5	Sensor Values Tab	24
4.8.6	Power Tab.....	25
4.8.7	Processing Tab.....	26
4.9	System Configuration Utility.....	27
4.9.1	Data Recorder / Replay Controls Window	28
4.9.2	Colours Window	29
4.9.3	Tides Window	30
4.9.4	Rescan Dongle Button.....	31
4.9.5	Configuration Manager	31
4.9.6	Depth & Speed Window	32
4.9.7	Movement Control Window.....	32

5. Viewing Modes

5.1 Sonar View33

 5.1.1 Right-Click Options.....34

 5.1.2 Advantages and Disadvantages of the Sonar View34

5.2 Single Beam View.....35

 5.2.1 Right-Click Options.....36

 5.2.2 Display Offset (Shifting).....37

 5.2.3 Bottom Colour Intensity38

 5.2.4 Water Column Options.....39

 5.2.5 Advantages and Disadvantages of the Single Beam View40

5.3 Sidescan View41

 5.3.1 Right-Click Options.....42

 5.3.2 Advantages and Disadvantages of the Sidescan View42

5.4 Waterfall View.....43

 5.4.1 Right-Click Options.....44

 5.4.2 Waterfall Colour Controls45

 5.4.3 Changing the Viewing Angle.....46

 5.4.4 Advantages and Disadvantages of the Waterfall View46

6. Troubleshooting

6.1 Checking Software Installation47

7. Frequently Asked Questions (FAQs)

7.1 The System is transmitting too slowly, how can I speed it up?50

7.2 The system has stopped transmitting without operator intervention. Why?50

7.3 When I press the Transmit button, nothing happens and there is no activity on the WASSP display. How do I fix this?.....50

7.4 When I run WASSP, it displays an error message - what does it mean? Is my WASSP system faulty?51

 7.4.1 GUI MESSAGES51

 7.4.2 PM MESSAGES53

7.5 Why is there a ring displayed just above the seafloor? What causes these ‘ring’ marks? How can I get rid of them?.....54

7.6 What is this constant signal on the sonar/single beam display?55

7.7 Why is my WASSP System not tracking the seafloor?55

7.8 Why doesn’t the seafloor line up when I go over it again?56

7.9 Why does the seafloor move if the system is Motion Compensated?57

7.10 The mode button animates as if pinging but nothing happens. What is wrong?.....58

8. Appendix A: Restoring the WASSP Processor

9. Product Information for the People’s Republic of China

1. Purpose of this Manual

This operator manual describes how to operate the WASSP System Multibeam Sonar System program through its graphical user interface. There may be variations due to on-going developments and enhancements.

2. Introducing the WASSP System Multibeam Sonar System

The WASSP is a multibeam Sonar system that uses a wide-angle sonar transducer to profile the water column and seafloor to a high resolution. It is this unique combination of multibeam sonar and computer processing power which provides you with unparalleled information about the underwater environment. It gives you a wide 120° port-starboard swath of the water column and seafloor, allowing you to find and position reefs, wrecks, and objects in the water column or on the seafloor. From the 120° swath, the system processes 224 dynamic beams, with each beam containing detections from the water column and seafloor.

The information is presented in a user-friendly, mouse controlled, Windows-based operating system. The system can output data to plotting software packages. For optimal performance, roll, heave, pitch, heading and position inputs are all required.

Mapping an area of the seafloor requires motion compensation to compensate for the motion of the vessel. The efficiency of motion compensation strongly depends on the quality of the motion data. Accurate ship measurements must be taken and the dockside and sea trial commissioning procedures carried out thoroughly during installation. Even with good sensors, mapping performance in rough seas will be less accurate than in calm water.

The WASSP System can be applied to a variety of survey methods, as well as search and rescue, customs, and police applications.

2.1 Main Features

The WASSP System has the following main features:

- ▶ **Simple to use**
- ▶ **Improved performance**
The use of separate transmit and receive arrays has enabled WASSP Ltd. to optimise both transmit performance and receive sensitivity, giving improved performance over traditional sonar and sounders.
- ▶ **High detail picture of the marine environment**
The transmit beam spreads over a 120° port-starboard swath and covers 4° fore-aft while the receive beam covers 10° fore-aft, displaying a highly detailed picture of the marine environment.
- ▶ **Beam stabilisation**
Beam stabilisation compensates for the movement of the vessel, providing accurate seafloor profiles.
- ▶ **Variable beam width**
Unique to the WASSP, the single beam view can not only be stabilised, but the beam width can be varied from 5° to 40°.
- ▶ **Bottom lock**
Bottom lock provides a traditional bottom lock mode where the changes in bottom depth are ignored and the bottom is drawn flat. Echoes are shown relative to the flat bottom image, enabling better discrimination on the seafloor.

▶ **Computer based profile storage**

A computer-based system means the WASSP can generate and store very detailed seafloor profiles.

▶ **160 kHz operating frequency**

Operating at a frequency of 160 kHz provides high seafloor definition with a large range.

▶ **Depth and seafloor coverage**

Seafloor coverage is determined by the beam width in use: For a 90° beam width, the seafloor coverage will be approximately twice the water depth. For example, 100m depth gives 200m seafloor coverage. For a 120° beam width, the seafloor coverage is 3.4 x depth. For example, 200m depth gives over 600m seafloor coverage.

▶ **Unique power management system (14 power levels)**

14 power levels provide optimal performance over a wide range of seafloor types and water depths.

▶ **Efficient seafloor mapping**

Profiles 90 times faster than conventional single beam echo sounders, leading to reduced costs and improved accuracy.

▶ **Future proof technology**

The computer based operating system and BTxR firmware are both upgradeable as new features and methods in software are developed.

▶ **Third party integration**

Through interfacing, real time to third party software applications and outputting to standard formats, bathymetric and water column data can be collected and processed using specialist tools.

2.2 System Configuration

See Installation Manual for full details.

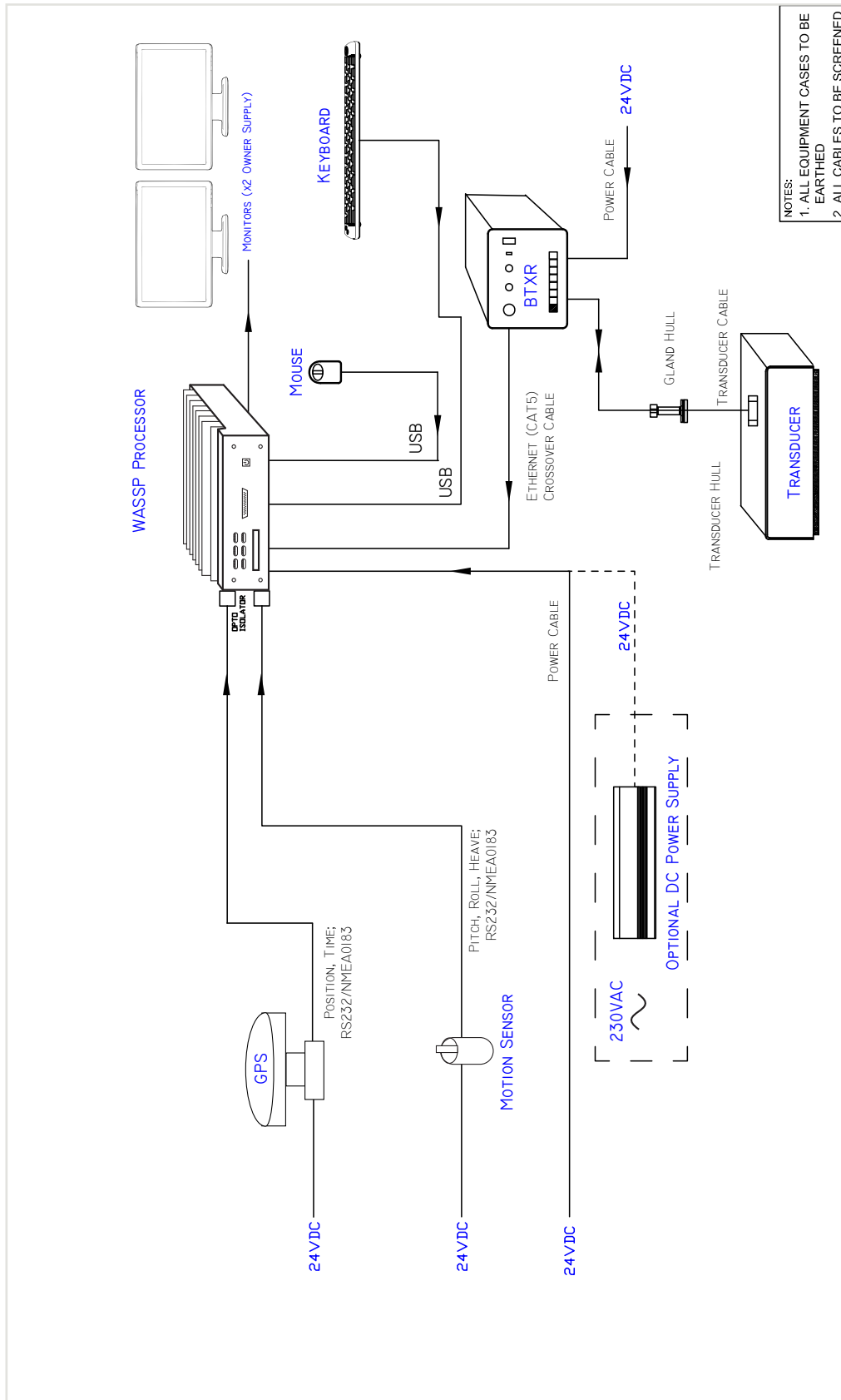
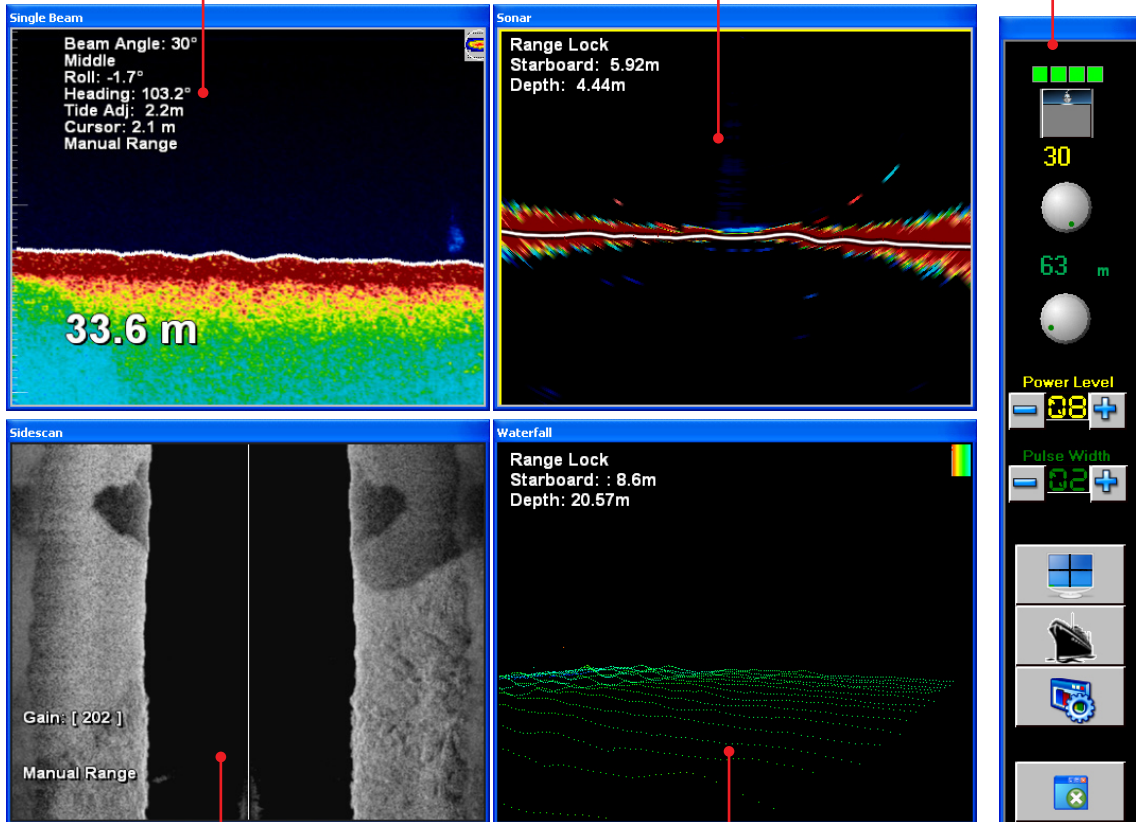


Figure 1. Overview of a fully functional WASSP System

For more details see “5.2 Single Beam View” on page 35

For more details see “5.1 Sonar View” on page 33

For more details see “4. Menu Task Bar” on page 11



For more details see “5.3 Sidescan View” on page 41

For more details see “5.4 Waterfall View” on page 43

Figure 2. WASSP System User Interface

3. Operating Procedures

1

Start up WASSP Application:

- a. The WASSP PC Application software self loads on system start up.
- b. When the WASSP System program starts up, a Navigation Warning screen similar to the one shown in “Figure 3. WASSP System Multibeam Sonar System Navigation Warning” is displayed.
- c. Click on OK to accept the navigation warning message.

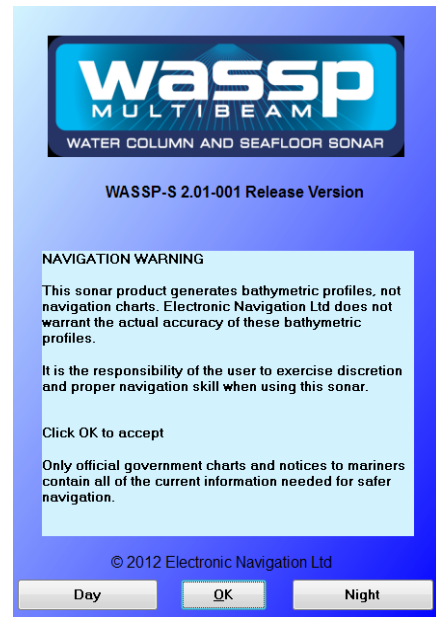
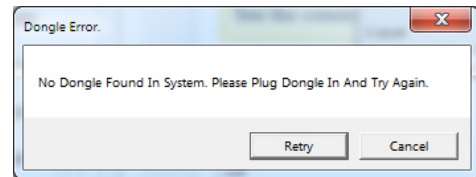


Figure 3. WASSP System Multibeam Sonar System Navigation Warning

If no dongle is found, a Dongle Error box appears on the screen.

Ensure a dongle has been plugged into the computer’s USB port and click Retry.

- d. Verify that the BTxR and appropriate sensors are switched on.
- e. Check the connection status for Processing Module, Transfer Task, BTxR and Navigator. Connection Status icons will appear green when connected. See “4.1 Connect Status Icons” on page 12.



You can click **Cancel** and run a demo file from the System Configuration Utility.

2

Choose a display mode:

See “4.7 System Views” on page 16.



Note: It is usually easier to select the display modes after you have started transmitting, as you can see the actual modes displayed.

3 Transmit / Receive:

- a. Click the MODE button to switch from STBY (standby) to TX (transmit) mode.

When transmitting, the MODE button animates showing a pulse being transmitted. See “4.2 Transmit Mode Button” on page 13.

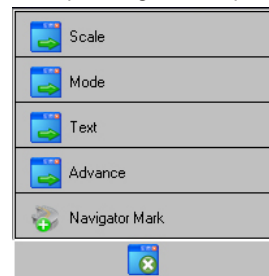


Note: The MODE button is disabled while playing back a demo file. While in the TX (transmit) mode a demo file cannot be played back.

4 Set up the selected screen layout:

Right-click anywhere in the selected screen layout window. See “5. Viewing Modes” on page 33 for full details.

Example of right-click options



5 Use system as required.

6 Quit the WASSP GUI program:

- a. Click the **Transmit Mode** button to set the BTxR to standby.
- b. Click **Close** on the task bar.
- The **Exit System** box appears.
- c. Click **OK**.

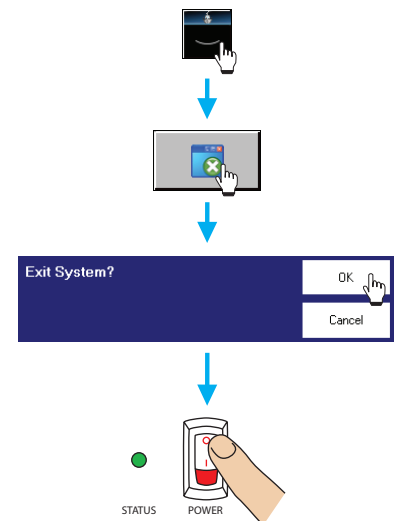
All files opened by the system are closed automatically and the program shuts down.

- d. Shut down the computer following standard Windows procedure.
- e. Turn the BTxR OFF using the POWER button on the faceplate.
- f. Turn off the sensors according to the manufacturer’s instructions.

The WASSP system is now shut down.



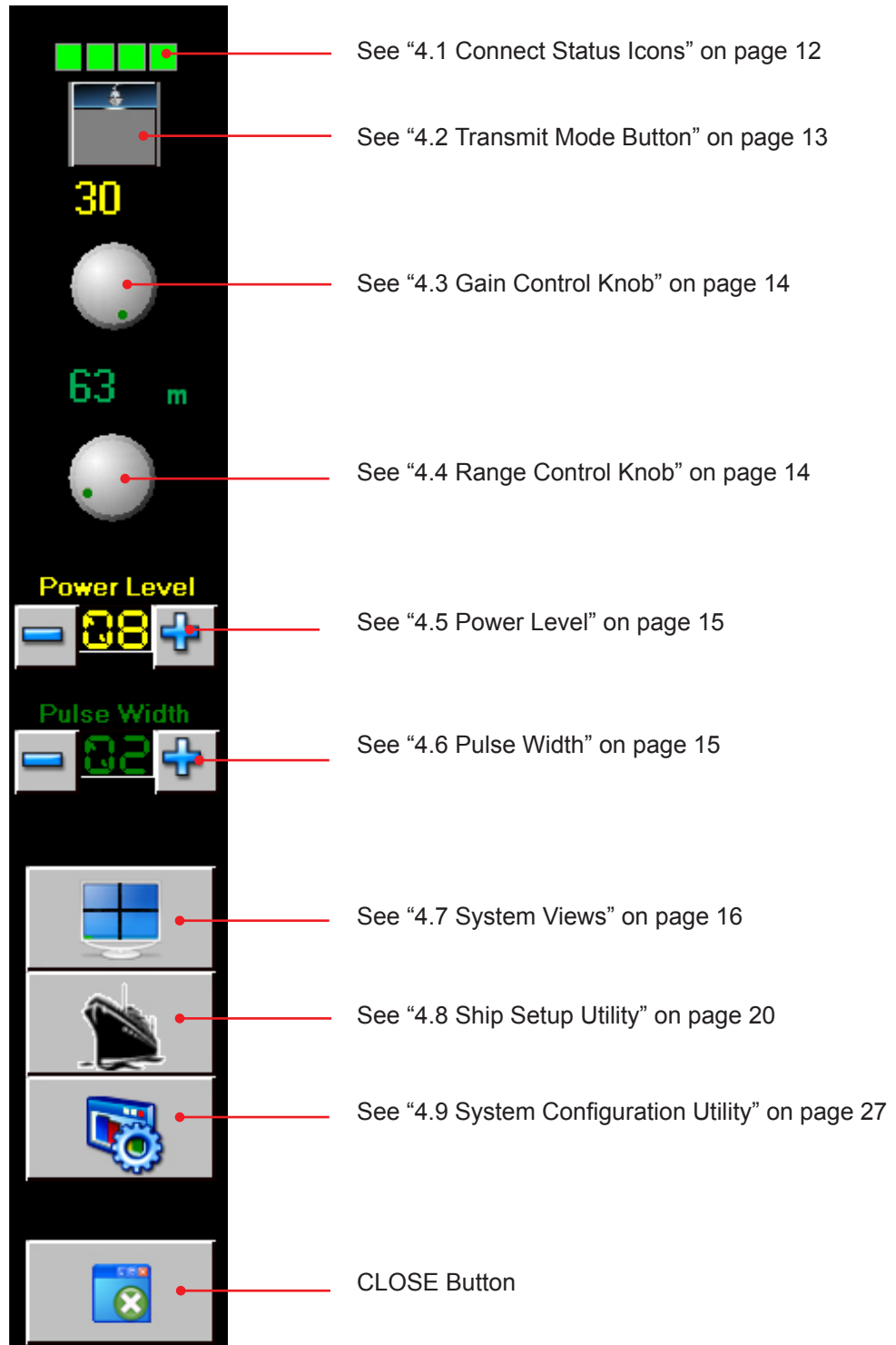
Follow the defined shut down procedure in order not to lose data



The WASSP PC should always be closed down through the operating system.

Pulling the power can cause unrecoverable corruption.

4. Menu Task Bar



4.1 Connect Status Icons

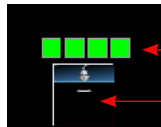


The Connect Status Icons indicate the connection status of all the WASSP Modules. The WASSP system modules that need to be connected are:

- ▶ Processing Module; this is used to pass data to the WASSP GUI,
- ▶ Transfer Task; this is used to connect sensor data,
- ▶ BTxR; this is used to transmit and receive multibeam data, and
- ▶ Navigator; this is optionally used to display multibeam data on the chart overlay viewer.

Connection Status icons will appear green when connected. Double-click on the icons to display the **WASSP Network Status** window.

If red, refer to Operator Manual “7. Frequently Asked Questions (FAQs)” on page 49.



Connection status icons will appear green if connected, red if not connected.

Transmit Mode Button controls transmit and displays Transmit status

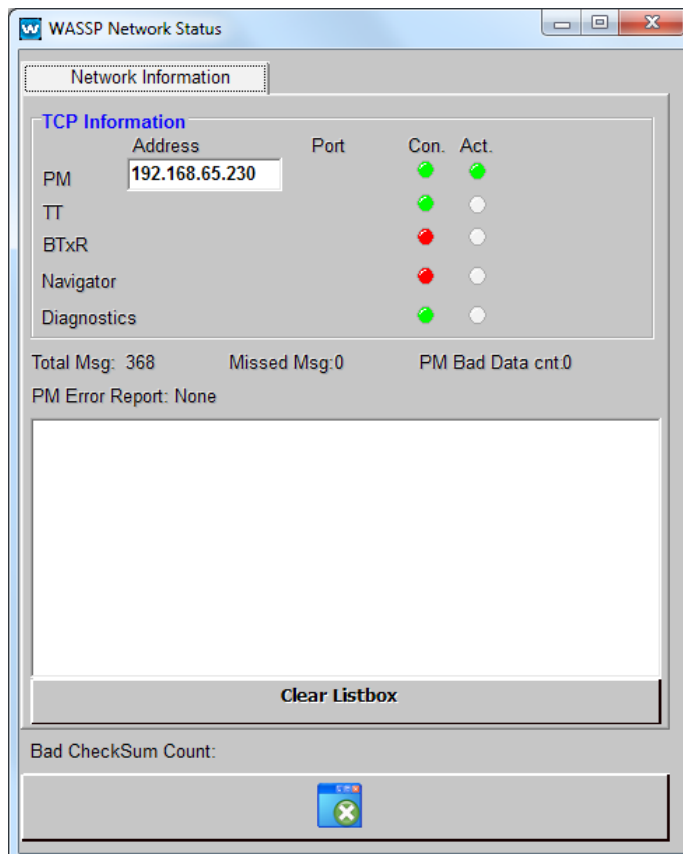


Figure 4. WASSP Network Status Window

4.2 Transmit Mode Button



The Transmit Mode Button controls transmit and displays transmit status. This button has five modes:

- ▶ Standby Mode
- ▶ Transmit Mode
- ▶ Calibrate Mode
- ▶ Demonstration Mode
- ▶ Ending Transmission

When the WASSP software application starts up, the MODE button will change as it steps through its start up and self calibration routine. See “Figure 5. Transmit Mode Routine”.

There are 3 states:
Standby, Self calibration and Transmit.



Figure 5. Transmit Mode Routine

During transmission, the button animates, showing a moving pulse for each pulse being transmitted.



This icon indicates that Transmission is stopping and the system is moving into standby mode.



A BLACK button with DEMO displayed indicates the system started without a dongle. In this mode only replay files can be viewed.

4.3 Gain Control Knob



Adjusts the display gain of the received information on the sonar and single beam views. The digital display above the knob shows the gain setting.

Manually adjust by either clicking the knob then using the scroll wheel on the mouse, or by using the mouse pointer to drag the knob clockwise to increase and counter-clockwise to decrease.

To adjust the minimisation and the clutter for a clearer display, access **Advanced Options**, by double-clicking on the Gain Control button.

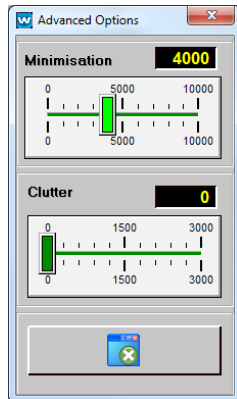


Figure 6. Advanced Options Window

4.4 Range Control Knob



Adjusts the depth range of the receiver between 5 and 200 metres. The numeric display above the knob shows the range setting in metres.

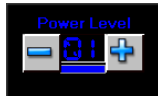
The numeric display is YELLOW for manual and GREEN for automatic range control (default).

Manually adjust by either clicking and then using the scroll wheel on the mouse or by using the mouse to drag the knob clockwise to increase and counter clockwise to decrease. Double-clicking on the number causes the control to switch between manual and automatic modes. Set the range to adjust automatically until familiar with the operation of the unit.



Double-click on the depth range window to switch between manual and automatic modes.

4.5 Power Level



The transmit power level selector / indicator controls how much power is put into the water i.e. the strength of the ping. It can operate in both manual or automatic modes. However, initially use auto power by signal (BLUE) or ~Power Level 7 in the manual mode until you are familiar with the operation of the unit.

Manual Mode (Yellow)

There are 14 transmit power levels that can be selected. Click the increment (+) or decrement (-) buttons to adjust between 01 and 14.

Auto Mode (Blue / Green)

Double-clicking the LED indicator selects the auto mode, indicated by the LEDs changing to GREEN or BLUE. GREEN automatically selects the power based on the depth. BLUE automatically selects the power based on the return signal level. See “4.8.6 Power Tab” on page 25 if you wish to change the Automatic Power settings.

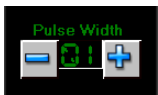


To allow Auto Mode to change from Power Level 8 to Power Level 9, the Pulse Width must be set to at least 0.2ms (02), otherwise the power level will not increment. Ensure that the pulse width is set to Auto Mode to avoid weak seafloor returns in deeper water (see below).



Double-click on the transmit power level window to switch between manual and automatic modes.

4.6 Pulse Width



The Pulse Width adjusts the duration of a single pulse from the transducer. Higher pulse widths allow more power but at the expense of resolution. The Pulse Width is displayed as preset times in tenths of milliseconds.

Set to adjust automatically by using Auto Mode until familiar with the operation of the unit.

Manual Mode (Yellow)

There are 5 pulse width levels that can be selected. Click the increment (+) or decrement (-) buttons to adjust between 1, 2, 5, 10, 20.

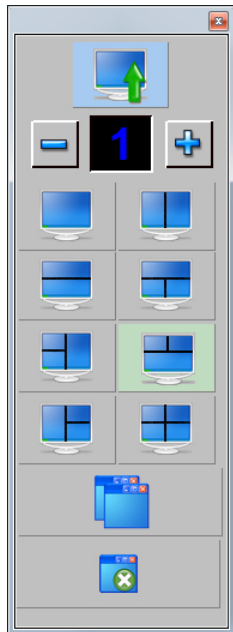
Auto Mode (Green)

Double-clicking the LED indicator selects the auto mode, indicated by the LEDs changing to GREEN.

4.7 System Views



The **System Views** button allows you to change the presentation of the seafloor profile on the screen using a variety of options. When clicked, a System Views window appears.



These buttons allow you to change the presentation of the seafloor profile on the screen using a:

- ▶ Single Screen Layout
- ▶ Vertical Split Screen Layout
- ▶ Horizontal Split Screen Layout
- ▶ 3-Screen
- ▶ 4-Screen Layout
- ▶ Resize individual windows button

For each screen layout, there are four viewing modes available. Each viewing mode displays a different way of viewing the information from the seafloor and water column. The viewing modes are:

- ▶ Sonar View
- ▶ Single View
- ▶ Sidescan View
- ▶ Waterfall View



More detail on Viewing Modes can be found in section "5. Viewing Modes" on page 33

4.7.1 Single Screen Layout



This is a single screen layout that allows you to toggle through the four viewing modes.

"Figure 7. Single Screen Layout showing the Sonar View" on page 16 below shows the layout of the screen when the top button is selected. The screen is displaying the sonar view. All four viewing modes are available, but only one is displayed at a time.

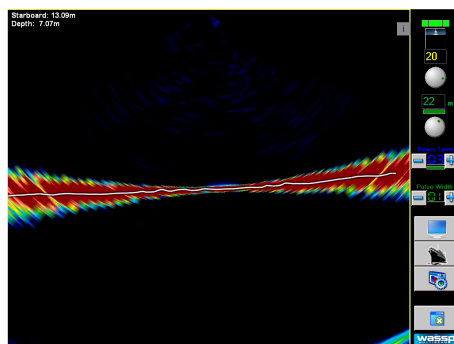
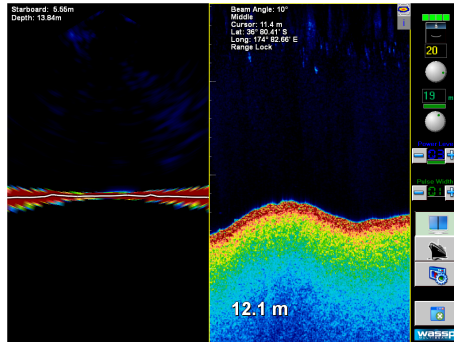


Figure 7. Single Screen Layout showing the Sonar View

4.7.2 Vertical Split Screen Layout



This is a split screen layout that allows you to toggle through eight preselected toggle combinations of the four viewing modes with any two being displayed at one time. The screen is vertically split, see “Figure 8. Vertical Split Screen” as an example.



Right-click options are available for each viewing mode.

Figure 8. Vertical Split Screen

4.7.3 Horizontal Split Screen Layout



This is a split screen layout that allows you to toggle through eight preselected toggle combinations of the four viewing modes in a one above, one below configuration with any two being displayed at one time.

The screen is horizontally split, as in the example “Figure 9. Horizontal Split Screen Layout”

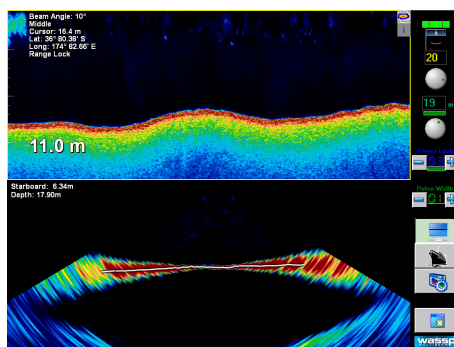
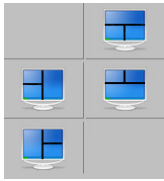


Figure 9. Horizontal Split Screen Layout

4.7.4 Three Split Screen Layout



Each of the four split screen layouts buttons allow you to toggle through eight preselected toggle combinations of the four viewing modes with any three being displayed at one time. “Figure 10. Three Split Screen Layout” shows examples of the layout of the screen when using this layout.

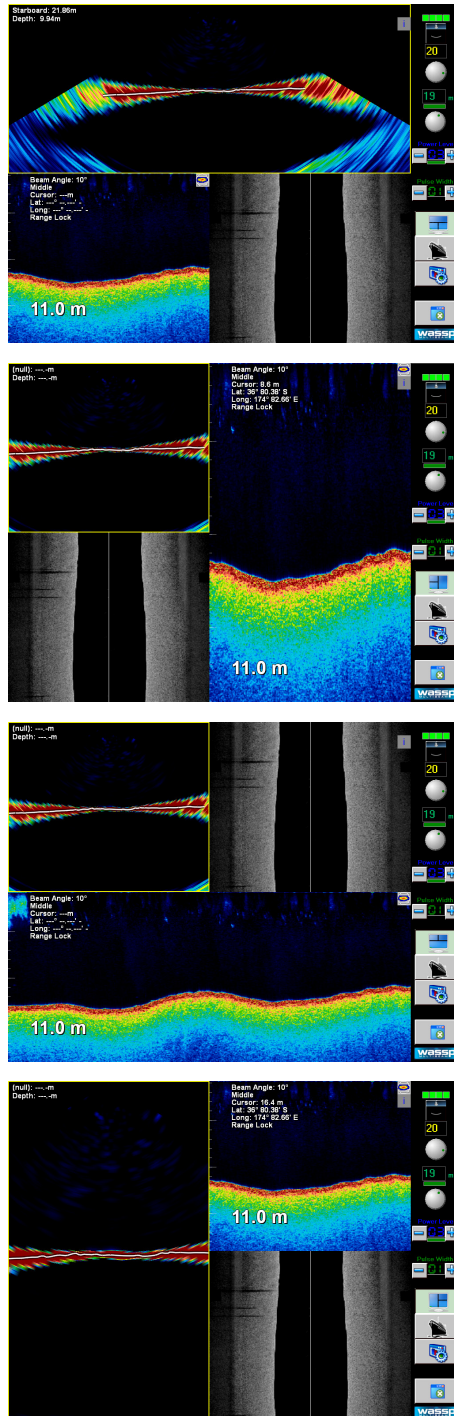


Figure 10. Three Split Screen Layout

4.7.5 Four Screen Layout



This is a four screen layout that allows you to toggle through eight preselected combinations of the four viewing modes in a two above, two below configuration with all four being displayed at one time. See “Figure 11. 4-Screen Layout”.

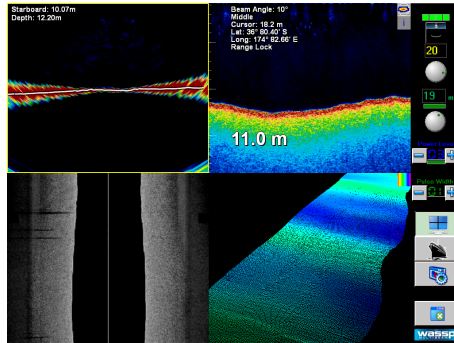


Figure 11. 4-Screen Layout



Right-click and independent zooming options are available for each viewing mode.

4.7.6 Window Button



This button will toggle between fixed sized windows and custom sized windows which can be resized and moved.

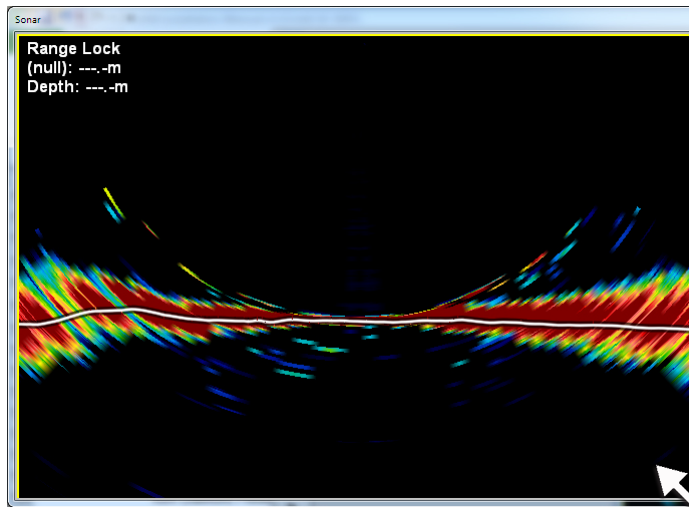


Figure 12. Customise Window Size



Hover and drag window to desired size and location

4.8 Ship Setup Utility



The Ship Setup Utility window provides access to options for the ship setup settings.

See “Figure 13. Ship Setup Options - Example” below.



These functions can adversely affect the performance of the WASSP system. Read this section carefully as any changes you make may not be recoverable.



Figure 13. Ship Setup Options - Example

Seven page tabs provide access to the following **Ship Setup** settings:

- ▶ General
- ▶ NMEA
- ▶ Offset Corrections
- ▶ Sound Speed
- ▶ Sensor Values
- ▶ Power
- ▶ Processing

Most of the Ship Setup Options should only need to be configured once in the lifetime of the WASSP system installation. These are normally set during installation and commissioning of the system (see the Installation Manual section “10. Commissioning” on page 37).

If vessel sensors are changed, refer to Installation Manual “8. Sensors” on page 26 to change settings.

4.8.1 General Tab

General settings provide:

- ▶ **Identification:** The **BTxR Serial Number** and **Transducer Serial Number** are filled in at time of installation. These should not be changed by an operator. The BTxR Version is reported from the Transceiver for diagnostic purposes.
- ▶ **Screen Resolution:** Windowed (custom resolution) or Full Screen options.
- ▶ **Depth Units:** Metres (default), feet, or fathoms.
- ▶ **Vessel Identification:** Vessel's name, country and home port are entered here during commissioning.
- ▶ **Dealer Information**



Note, settings shown are example values. These values are all ship specific.

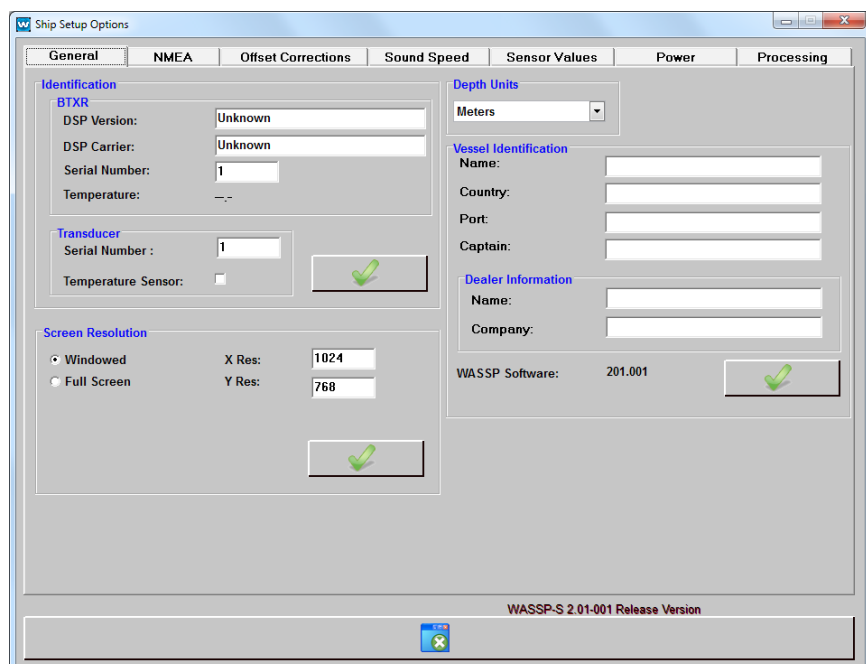


Figure 14. Ship Setup Options – General Tab

4.8.2 NMEA

For the WASSP system to perform effectively, motion, position, heading and heave sensors are required. The overall performance will be directly affected by the quality of the sensors chosen. The sensors will have been set up during Commissioning. See the Installation Manual section “8. Sensors” on page 26 for full details.

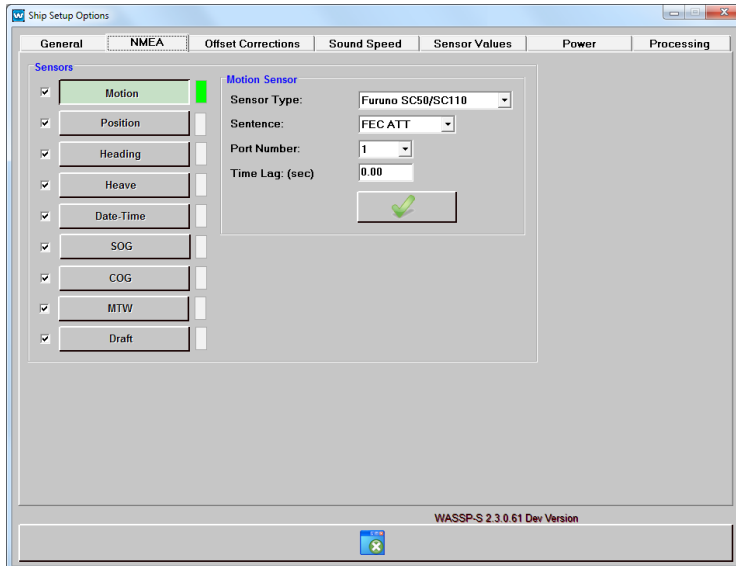
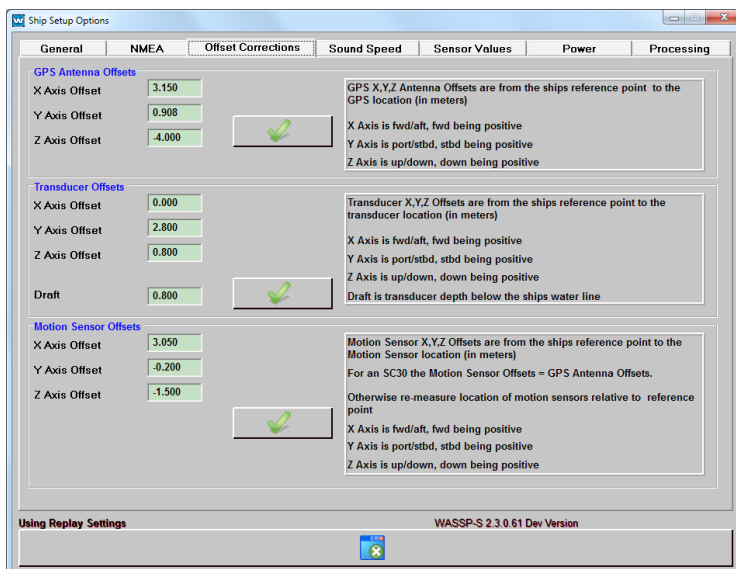


Figure 15. Ship Setup Options – NMEA tab

4.8.3 Offset Corrections Tab

If the transducer or sensors are moved, these settings will need to be modified. See the Installation Manual section “10.1.1 Commissioning Step 1: Ship Measurements” on page 38 for details on how to modify these settings.




 Note, offset values shown are examples only. The actual values for your vessel must be used.

Figure 16. Ship Setup Options – Offset Corrections tab

4.8.4 Sound Speed Tab

Sound speed varies with temperature and salinity, so this changes throughout the year. Use a temperature sensor to set the sound speed if possible. Otherwise, the operator should become familiar with this process themselves and adjust on a regular basis (at least monthly) as necessary.

The **Sound Speed** tab allows you to set surface speed correction settings for fresh and sea water. Valid values for both sea and fresh water range between 1000 and 2000 m/s.

Knowing the temperature gives a close approximation for the sound speed. In Manual mode the Surface Sound Speed can be modified directly or computed from the temperature and salinity values.

Refer to the section “10.2.4 Sea Trial - Commissioning Step 11 : Sound Speed” on page 51 of the WMB-3250 Installation Manual for full instructions.

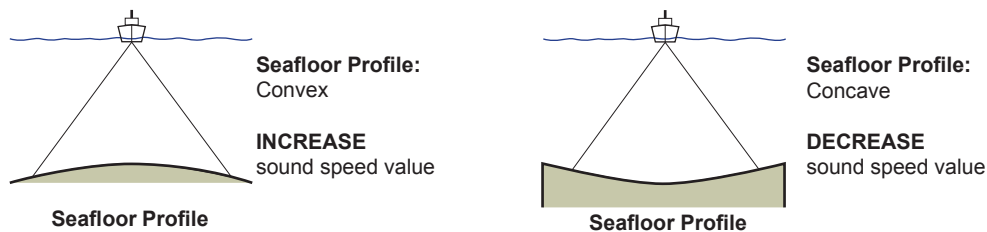


Figure 17. Sound Speed Effect and Required Corrections

Sound Speed Guide:

- ▶ 1500 m/s for sea water.
- ▶ 1435 m/s for fresh water.

Salinity values:

- ▶ 30-37(35) for sea water.
- ▶ 0-1(1) for fresh water

NMEA Temperature:

- ▶ If the Surface Temperature data window does not display a valid temperature value, check that the incoming NMEA data contains the “MTW” sentence.

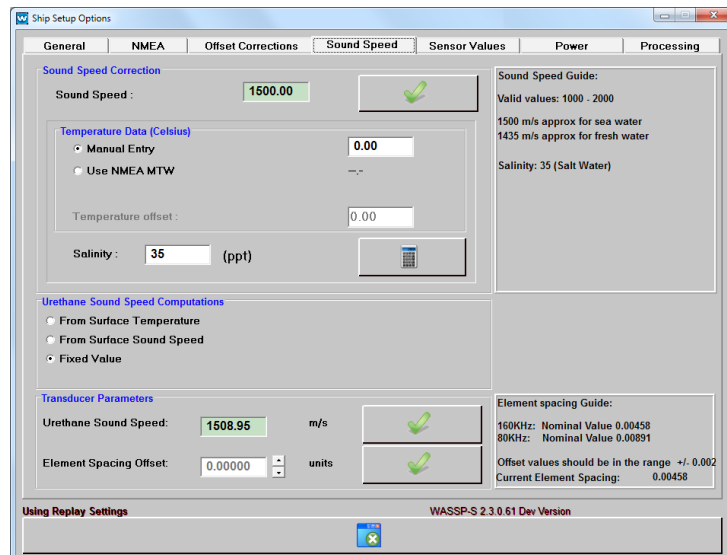


Figure 18. Ship Setup Options – Sound Speed tab

4.8.5 Sensor Values Tab

The **Sensor Values** tab provides a selection of motion compensation options and corrections for sensor misalignment. These settings should not be changed by the operator outside of the commissioning process.



Figure 19. Ship Setup Options – Sensor Values Tab

The values under Current Values are the selected live motion readings from the NMEA sensors that the WASSP system is connected to and reading from (with offsets applied).

If roll correction is enabled and configured correctly and the vessel is rolling less than 15°, the sonar picture should remain on almost the same angle from ping to ping on flatish ground.

If the sonar picture rocks as the vessel rolls then the roll compensation setting is likely to be wrong or the motion sensor is not being read by the WASSP system. Refer to Installation Manual “10.2.8 Sea Trial - Commissioning Step 15 : Pitch and Heading (Optional)” on page 57.

4.8.6 Power Tab

The **Power** tab reveals three Power Options:

4.8.6.1 Manual Power

This setting allows the user to choose any system power level using the Power Level on the Menu Task Bar (See “4.5 Power Level” on page 15).

4.8.6.2 Auto Power by Depth

Auto Power by Depth displays 14 power levels, seven in the low range and seven in the high range, that can have each level individually set from fourteen drop down boxes. A **Defaults** button sets all fourteen power levels to a default setting. When setting power level depth settings individually, click the green **Tick** button when you have completed the settings.



Note: Automatic Power will only work when the Power Indicator is Green or Blue!



Note: There are TWO different Automatic Power modes. Automatic Power by Signal and Automatic Power by Depth. Automatic Power by Signal is better for seafloor mapping out on the sides near the seafloor.

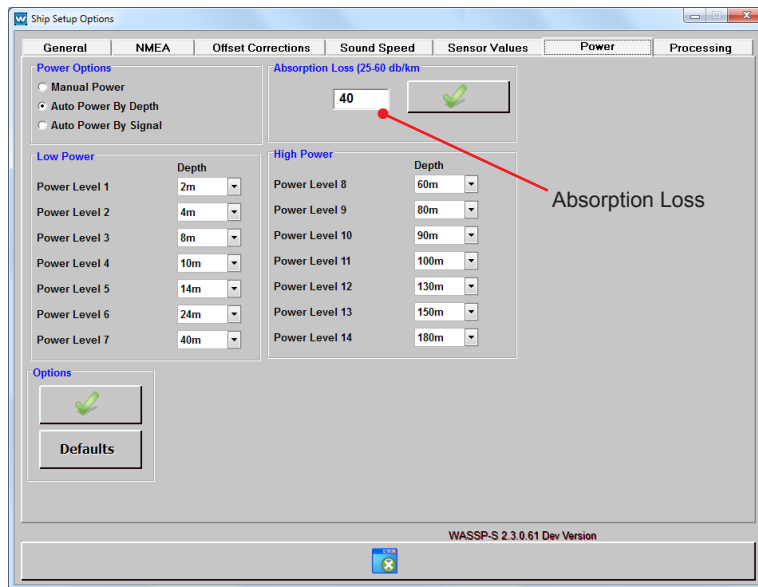
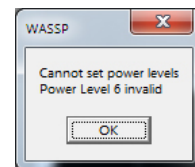


Figure 20. Ship Setup Options – Power Tab

If a power level is set out of sequence, for example level 5 is set to 14 m, level 6 is 50 m and level 7 is 40 m, then a WASSP information box appears and informs you that a specific power level is invalid (level 6 in our example). Level 6 can then be set individually to a level below that of level 7 and above level 5.

Click the tick and reset Power Level 6 to a level between Power Levels 5 and 7.

If no other power levels have been changed, clicking “Defaults” will reset the power level.



4.8.6.3 Auto Power by Signal

sets the power based on the maximum acoustic echo received (normally the seafloor). The received level is set to prevent saturation of the receiver. This should provide the best overall system performance.

4.8.6.4 Absorption Loss

As sound travels through water, some of the energy contained is absorbed by the water, resulting in attenuation of the signal. The chosen value of absorption loss is used when calculating backscatter. For a 160kHz WASSP system, a default value of 40dB/km is used. This is set at time of installation and should not be changed without a clear understanding of the absorption properties of the water in the area you are working in.

4.8.7 Processing Tab

The **Processing** tab contains the options for 3rd party output and sonar processing.

4.8.7.1 Third Party Output Options

The output format to third party software can be selected here.

- ▶ If you are outputting to the HYSWEEP[®] module of HYPACK[®], select the HYSWEEP[®] output. See “9. Hydrographic Software Integration” on page 31 of the Installation Manual for more information.
- ▶ If you are outputting to QINSy, select the QINSy output.

If you are having trouble receiving NMEA sentences from the installed sensor, or if your sensor is not supported by QINSy or HYPACK[®] but is supported by WASSP, enabling the output of HDT and TSS may fix this.

4.8.7.2 Beam Distribution

▶ Equal Distant

This distribution sets the sonar beams at a fixed separation across the swath, resulting in a seafloor line with evenly separated detection points. This will give a more even sounding density:



▶ Equal Angular

This distribution sets the sonar beams at equal angles from port to starboard, meaning that, on a flat seafloor, the detection points are more numerous near the middle of the swath, and less numerous at the sides, putting more soundings where the soundings are likely to be more accurate:



▶ Ignore Degrees to:

Adjust the swath width if you find that detections at the swath edges are causing issues with seafloor mapping.

e.g. With 10° ignored on each side, the middle 100° of the swath will be used to map the seafloor.

In rough/noisy conditions, this could save time on post-processing.

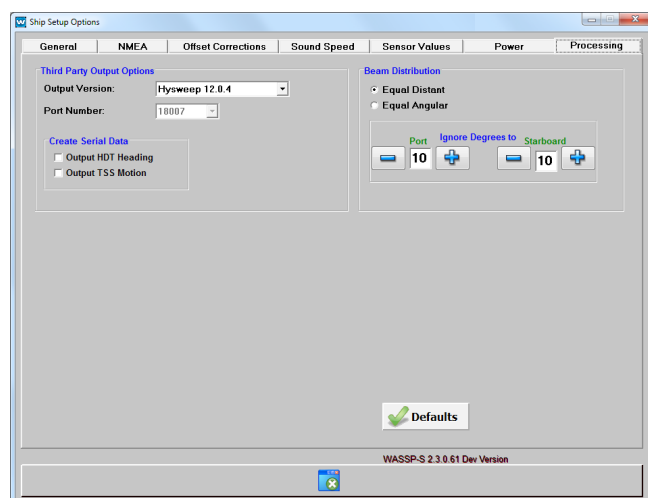


Figure 21. Ship Setup Options - Processing Tab

4.9 System Configuration Utility



The System Configuration Utility window provides access to options that are required on a less frequent basis than those on the main screen.

See “Figure 22. System Configuration Utility” below.

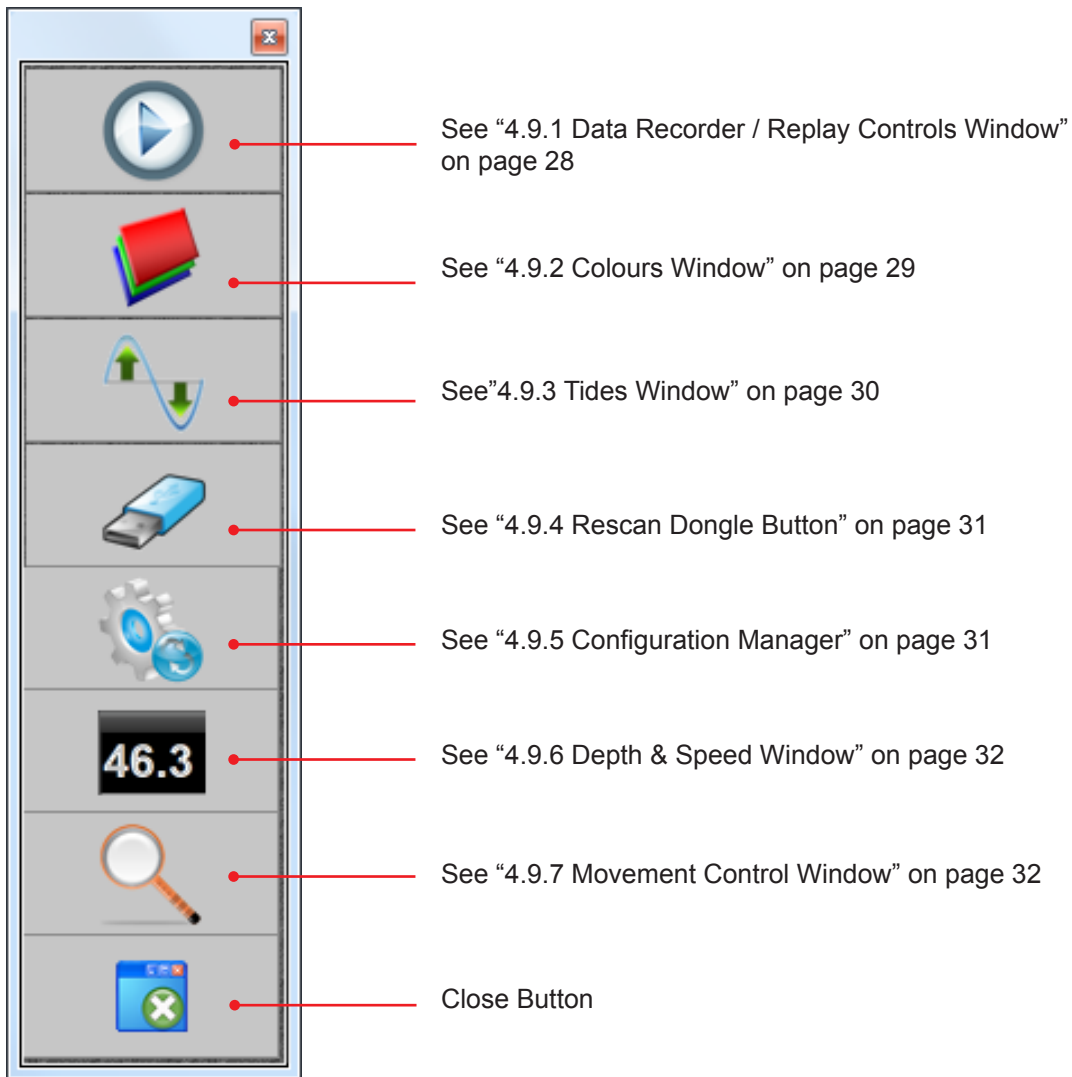
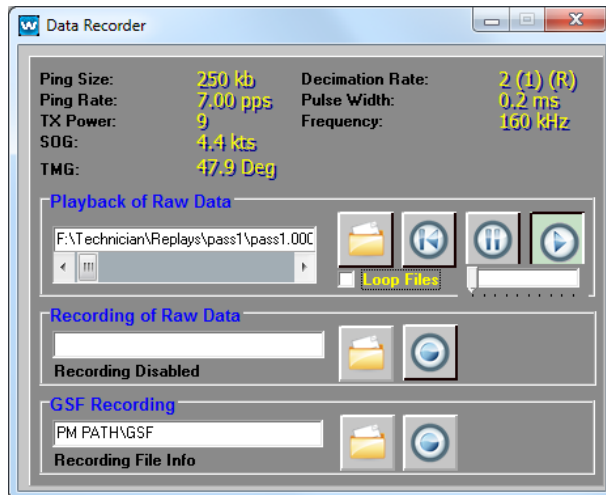


Figure 22. System Configuration Utility

4.9.1 Data Recorder / Replay Controls Window



Clicking the **Data Recorder** button opens the **Data Recorder** control panel. This allows raw data from the BTxR to be recorded and replayed.



Note: When replaying a demo file, the MODE button must be on STBY. If left in the TRANSMIT mode, the SELECT FILE TO PLAY button on the Replay Controls box is not active.

Figure 23. Data Recorder Window

4.9.1.1 Loop Files Check Box

Selecting this check box allows single files in a selected folder to loop, or all the data files in a folder to run continuously one after the other in a loop.

The functions of the buttons shown in “Figure 23. Data Recorder Window” are as follows:



Rewind to Start of the File.



Select File to Play.



Pause Playback of Current File.



Record (Displays a Save As dialogue box).



Play Current File.

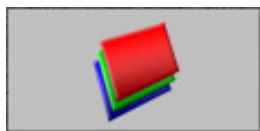
Recorded data files contain:

- ▶ Raw sensor data
- ▶ NMEA serial information (whether or not it was used by the WASSP system at the time)
- ▶ Current Ship Setup settings
- ▶ Any sensor information collected by the transceiver

All of this data is time stamped.

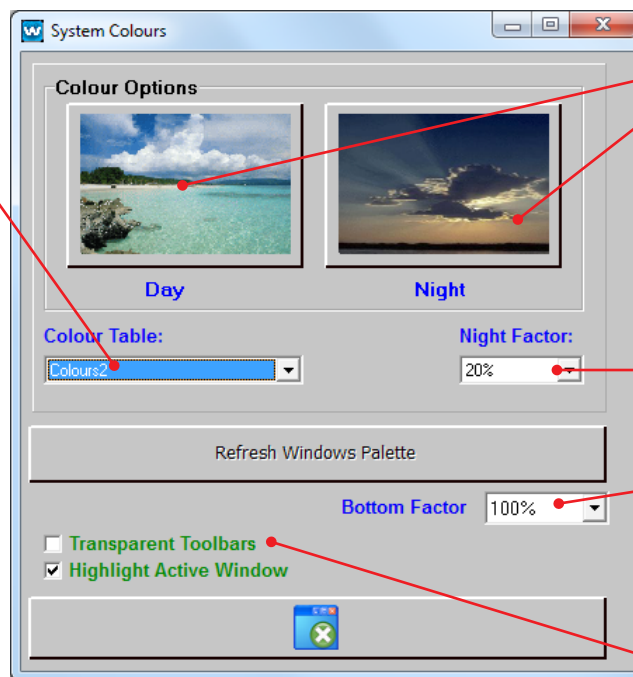
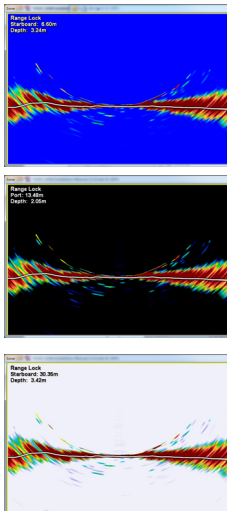
The size of raw data files is very large (~100MB per minute) and recording raw data files is not recommended for inexperienced operators. Recording data files allows you to look at acquired soundings data at any time.

4.9.2 Colours Window



In the Colours window, shown in “Figure 24. System Colours Window” click the **Day** graphic for bright ambient light conditions, or the **Night** graphic for reduced lighting conditions, such as wheelhouse night conditions. See below for other colour options.

3 choices of background: blue, black or white:



Click on image to toggle between day and night settings

Adjusts the display brightness

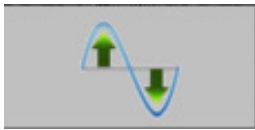
Bottom Factor adjusts display intensity. See “5.2.3 Bottom Colour Intensity” on page 38

Turns toolbars transparent

Figure 24. System Colours Window

The **Highlight Active Window** option will draw a yellow border around the currently selected window. When selected, this will help distinguish which display will be affected by mouse wheel scrolling or keyboard shortcuts.

4.9.3 Tides Window



The **Tides** window allows you to change the way WASSP System uses tide information. Assuming the **Disable Tides** check box is cleared, the WASSP System uses the GPS positioning information coming through the computer communications port to automatically select the closest tide station. The WASSP System then calculates a tide offset value and adjusts the seafloor profile data using the tide offset value.

Selecting the **Disable Tides** check box can cause the seafloor depth to vary as the tide waxes and wanes, resulting in inconsistencies in seafloor mapping. **Disable Tides** when operating on a lake. With the Disable Tides box cleared (default), the tide settings are constantly updated. The Tides button displays tide information for the operator.

The **Local Time Difference** box shows the difference in hours between coordinated universal time (UTC) and the local time. For example, if you are in New Zealand waters outside the period that includes daylight saving, the Local Time Difference setting should be set to 12, the number of hours New Zealand is ahead of UTC with daylight saving. So if UTC is 10.00 **am** and local time is indicated as 12 hours, then the local time would actually be 10.00 **pm**.

The **Database** tab allows selection of either the default tide data file or the European tide database. Vessels operating in Northern Hemisphere waters may get better performance from the tide information by selecting the European tide data.

Displays the current local time if the Local Time Difference box is set correctly

Local Time Difference box

Disable Tides check box

Search if your area is included

Tide Database selection tab

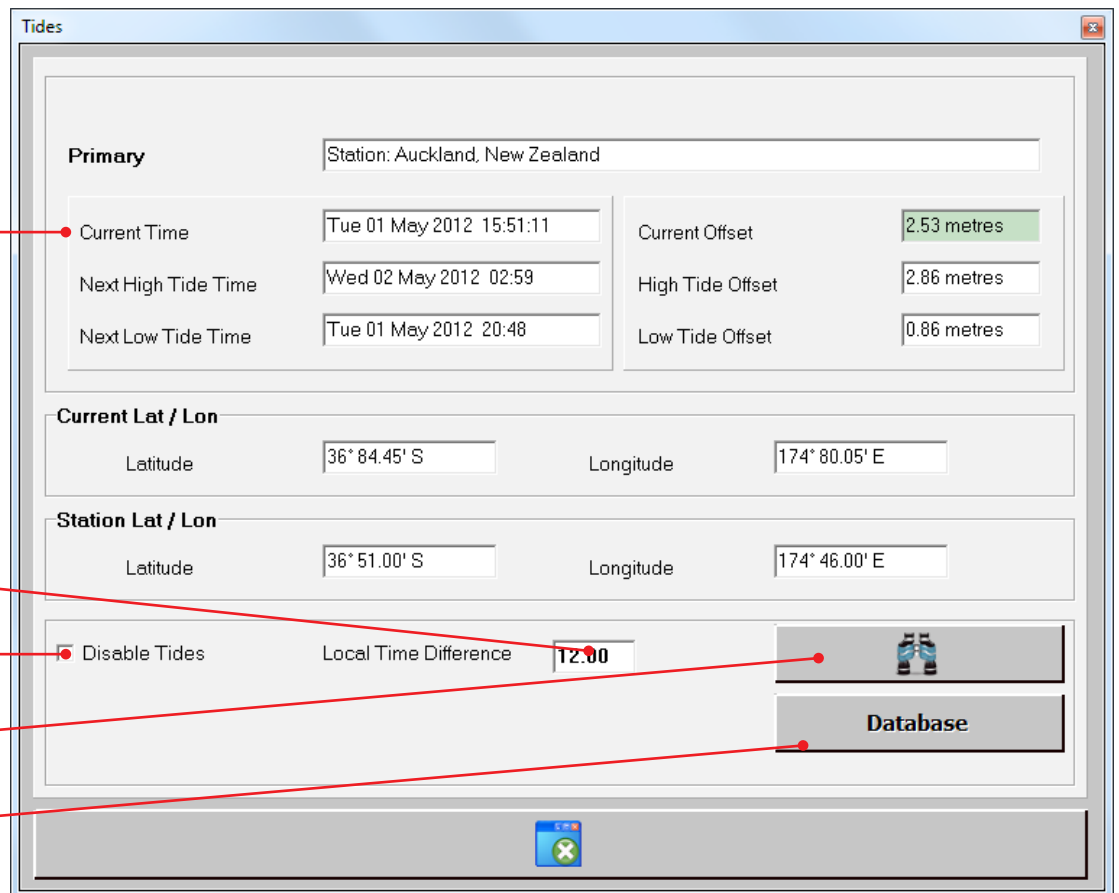


Figure 25. System Configuration Utility – Displaying Tides Window

4.9.4 Rescan Dongle Button



The **Rescan Dongle** button allows you to change the dongle without shutting down the program.

This is used by a Technician to enable additional menu options for servicing requirements.

If you want to change the dongle while the program is running, remove the dongle and insert a new one, then click the **Rescan Dongle** button. The program rescans the dongle and should read the new one you have inserted.

4.9.5 Configuration Manager



This button opens the Configuration Manager. The Configuration Manger allows an operator to save and load complete sets of configuration settings including all of the settings from commissioning. This allows different configurations to be switched between in a few seconds.

Load Button:
Press this after selecting a configuration to load.

Delete Button:
Pressing this button deletes the currently selected configuration.

Defaults Button:
Use this button to start from a fresh configuration. All current configuration settings will be lost if you do not save it first. Ship Setup information will be kept to prevent the need for a new sea trial.

Clean Button:
Deletes all ship measurements.

Save Button:
This button saves the current configuration settings to a file entered in the box beside it. The default is autoSave.

Configuration File Selection: Choose a configuration file to Load or Delete.

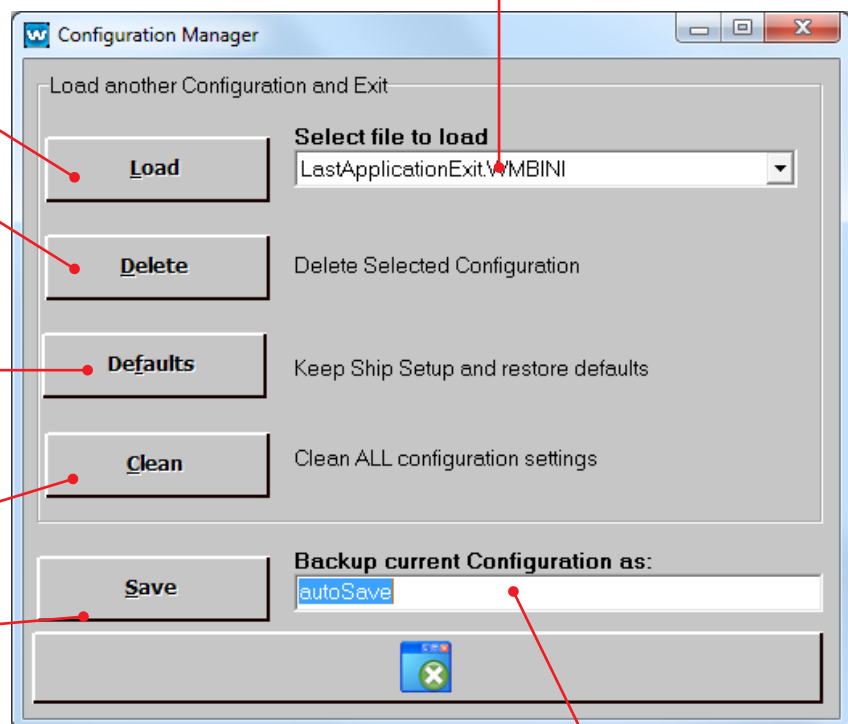


Figure 26. Configuration Manager



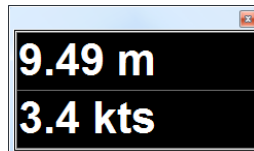
Note: Settings are saved automatically on exit of the application in a file called "LastApplicationExit" and in the working INI file.

Save File Name: Type in a name to use for Saving the current Configuration as.

4.9.6 Depth & Speed Window



The Depth & Speed Window will open a depth and speed window. The window can be moved to any convenient location on the screen by clicking and dragging the frame using the mouse. To close the window, click on the "X" close box.



'X' Close Box
Click on this to close the depth window.

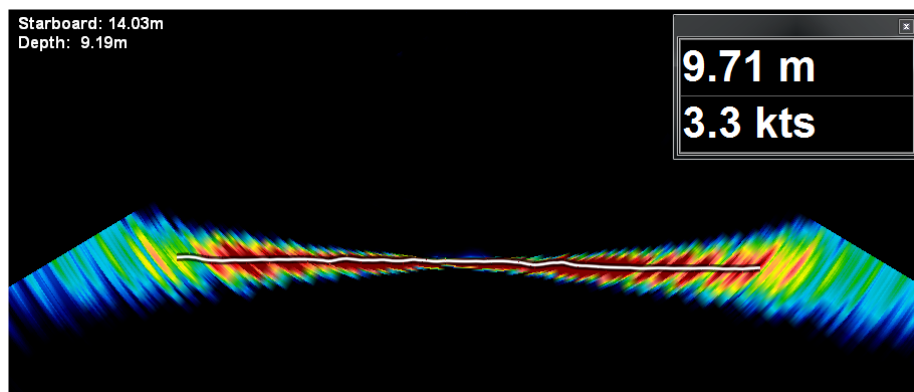


Figure 28. Sonar View screen showing Depth & Speed Window in place.

4.9.7 Movement Control Window



Movement controls to the left, up, right and down, plus zoom in and out on the selected screen.

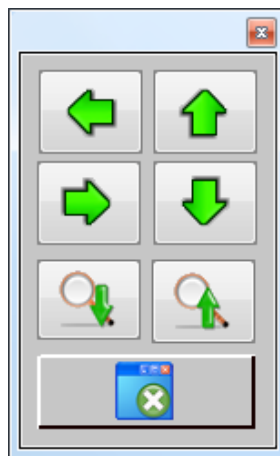


Figure 27. System Configuration Movement Controls

5. Viewing Modes

All Views have independent zoom functionality accessible by rolling the wheel of a wheel mouse. This zoom function is also accessible on some displays by using the keyboard, W = Zoom In, S = Zoom Out and the Movement Control Window (see “4.9.7 Movement Control Window” on page 32. To return to the default view configuration, double-click on the view.

5.1 Sonar View

The sonar view shows the water column and seafloor profile below the transducer. This represents a sonar view of the water column and seafloor as seen from behind the vessel. See “Figure 29. The Sonar View showing the seafloor line”.



If there is a secondary sonar or sounder operating on the vessel, you may see pulses of interference from this device on the Sonar, Single/Triple Beam and Sidescan displays. It is highly recommended that any secondary sounders are turned off in order to receive the best signal.

A 120° wide by 4° long swath or footprint is covered. The system generates 224 beams over the 120° footprint to provide a very high-resolution sonar view. The centre 90° of the swath or footprint is used to develop seafloor profiles and gives a seafloor coverage of twice the depth (e.g. 100 m depth gives 200 m seafloor coverage).

The following methods are used to control the **Sonar View**:

- ▶ Right-Click Options
- ▶ Independent Zooming



Right click anywhere in this window to open the menu options

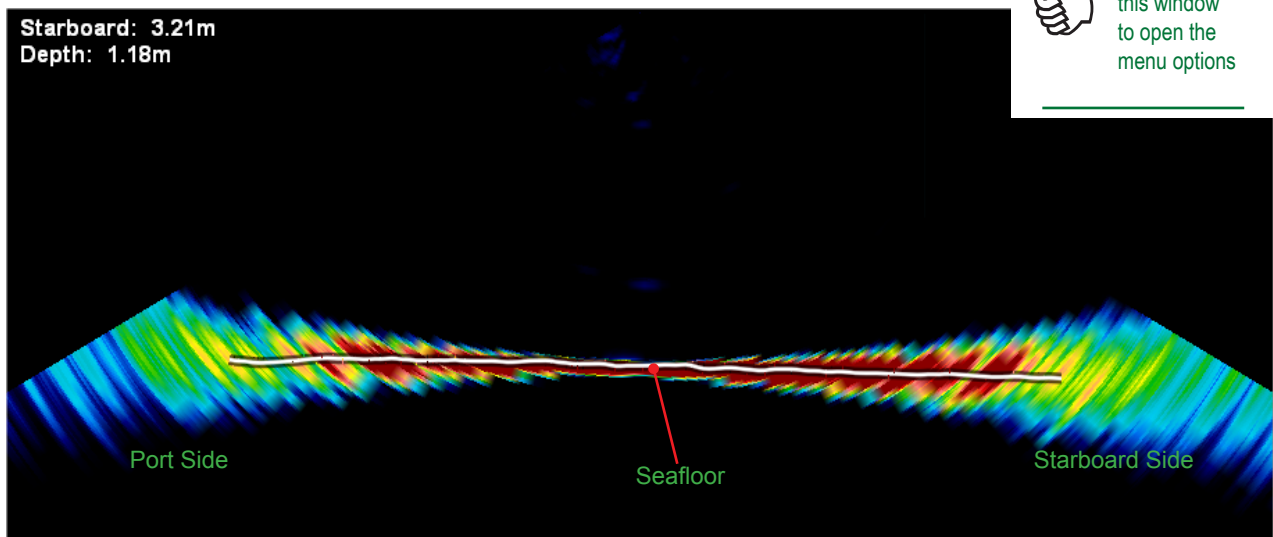


Figure 29. The Sonar View showing the seafloor line

5.1.1 Right-Click Options

Using the right mouse button, right-click in the **Sonar View** to display the following menu options. Click **Grid** or **Text Box** to display sub-menus:

5.1.1.1 Grid

Overlays a grid over the sonar view to enable you to quickly judge distances to targets.

A list of various measurements in metres appears.

5.1.1.2 Text Box

Provides the option of a text box to appear in the top left-hand corner of the **sonar** view window. The text box provides status, x and y axis information on the location of the cursor within the window. You can then place the cursor on a target and know the x y distances to the target.

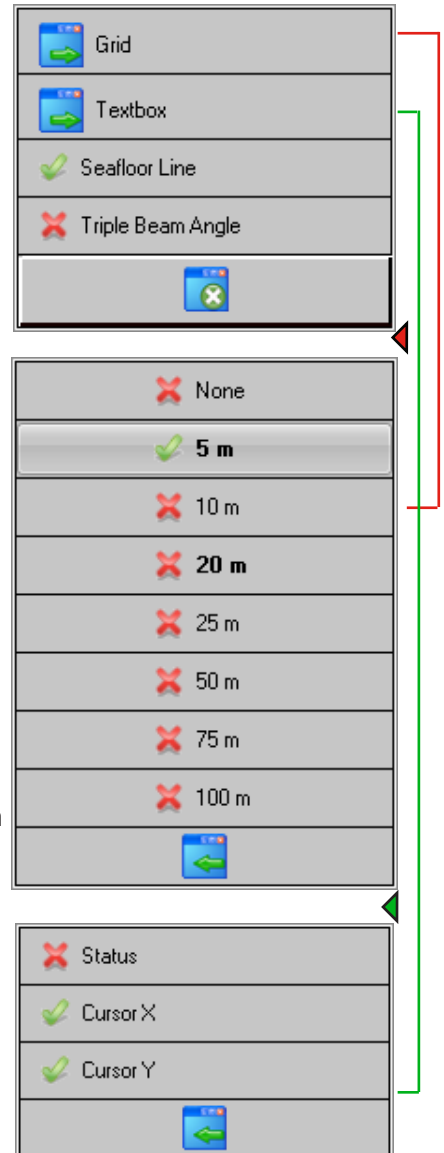
5.1.1.3 Seafloor Line

Is the software-generated line of the estimated profile of the seafloor.

Click to apply (tick), click to clear (X).

5.1.1.4 Triple-Beam Angle

When this is enabled, a graphical representation of the size and location of beams used in the Triple-Beam display is drawn on the Sonar View.



5.1.2 Advantages and Disadvantages of the Sonar View

5.1.2.1 Advantages

- 🕒 Shows an instant snapshot of the area inside the 120° x 4° swath.
- 🕒 Shows seafloor profile under the vessel at the same time.
- 🕒 The best tool for judging power level and side lobe suppression levels.
- 🕒 Shows full resolution of sonar data collected and could allow an operator to pick up smaller seafloor features.

5.1.2.2 Disadvantages

- 🕒 No history. Information from previous snapshots is not shown.
- 🕒 Not all pings are shown at high ping rates.

5.2 Single Beam View

This feature displays information that is similar to the traditional sounder display of the water column and seafloor with history along the vessel's track. The following methods are used to control the single beam screen:

- ▶ Right-click Options.
- ▶ Independent Zooming.
- ▶ Shifting.



If there is a secondary sonar or sounder operating on the vessel, you may see pulses of interference from this device on the Sonar, Single/Triple Beam and Sidescan displays. It is highly recommended that any secondary sounders are turned off in order to receive the best signal.

Moving the cursor to a specific area displays in the Text Box:

- ▶ The area below the vessel Port / Middle / Starboard.
- ▶ The depth where the cursor is pointing. This is useful for determining the depth of water column marks

Click on this icon to display the Water Column menu (See "5.2.4 Water Column Options" on page 39).

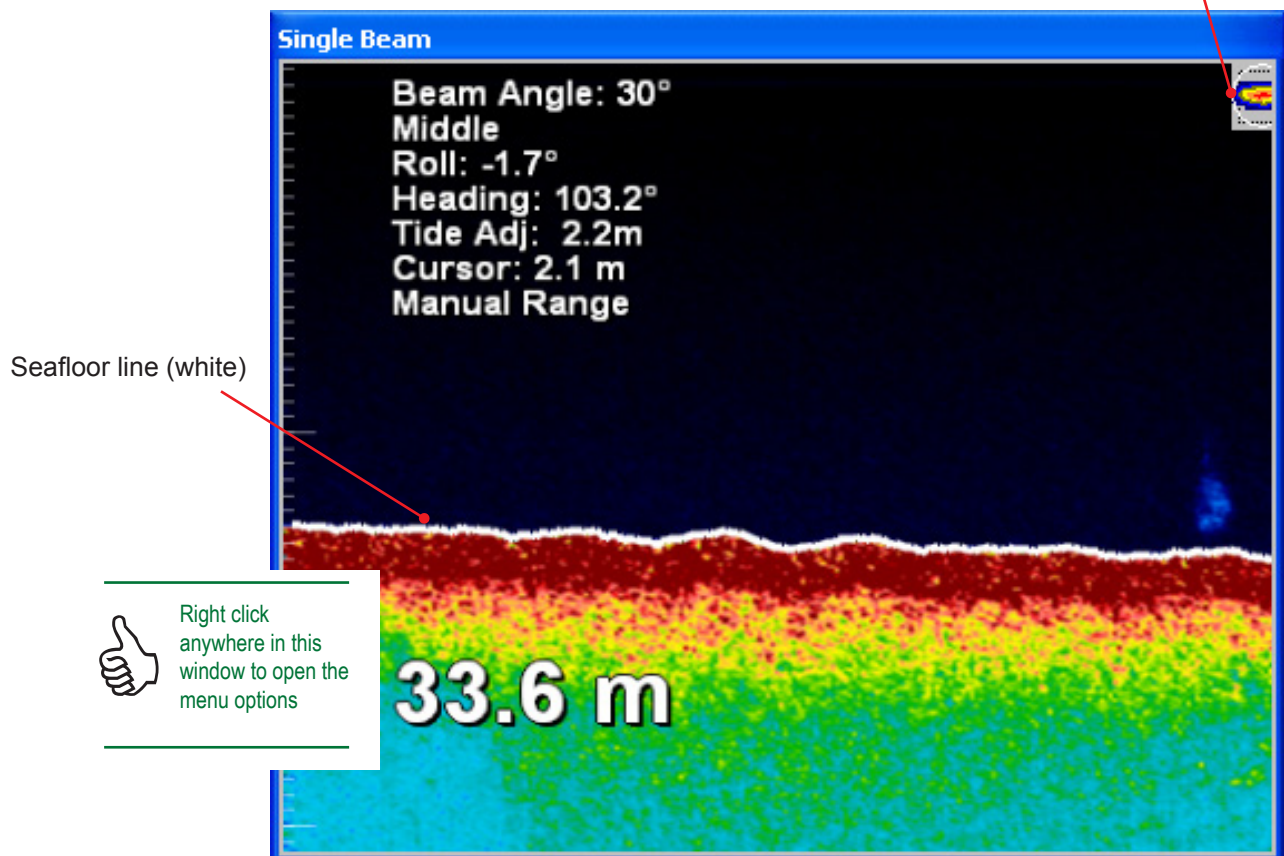
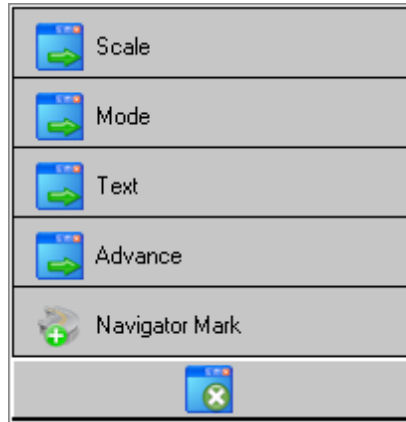


Figure 30. Single Beam display.

5.2.1 Right-Click Options

Right-click in the **single beam** view screen to display the following menu options:

Click **Scale, Mode, Text, Advance, Navigator Mark** to display sub-menus.

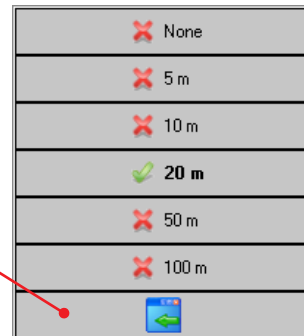


5.2.1.1 Scale

Displays scale lines on the screen at the chosen depth increments.

Placing a tick in the box associated with each option will cause the data to be displayed and a cross will take it off the display.

Click the **Return** button to return to the menu.



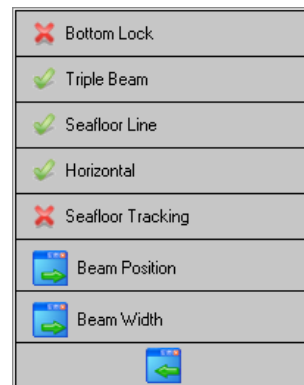
5.2.1.2 Mode


Provides options for displaying Bottom Lock, Triple Beam, Seafloor Line and Seafloor Tracking, and further Triple Beam options.

Bottom Lock fixes the display relative to the seafloor rather than relative to the sea surface.

Seafloor Line highlights the Seafloor Line.

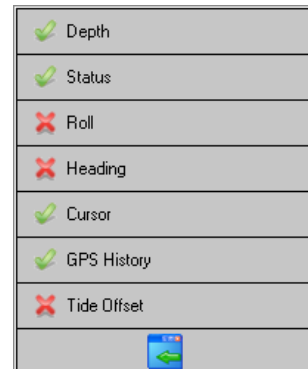
Seafloor Tracking is the method used by the program to constantly display the seafloor during scanning operations regardless of the changes in seafloor depth. This is indicated by the word **(Tracking)** being tagged to the end of the words **Manual Zoom** in the Text Box. Seafloor Tracking must be selected in the sub-menu and the Range Control Knob set to automatic (GREEN). If Seafloor Tracking is unchecked in the sub-menu, the word (Tracking) disappears from the Text Box. If the Range Control setting is in manual mode (YELLOW) and the seafloor then drops below the range setting, the seafloor will stop being tracked (and lost from the screen).



 **Note:** Seafloor tracking only becomes active when the display is in Manual Zoom.

5.2.1.3 Text A text box can be displayed on the single beam view. Click **Text** to display options.

Placing a tick in the box associated with each option will cause the data to be displayed and a cross will take it off the display.



5.2.1.4 Advance Changes the pixel width and consequently the rate (from 1 to 5) at which the single beam view scrolls across the display.

Click to display options and select rate. The higher the advance rate, the faster the scrolling across the display.



5.2.1.5 Navigator Mark When you right click on the single beam view and then click the **Navigator Mark** button, this sends a mark to the Navigator Application. Used to mark points of interest (see Navigator Manual for full details).

5.2.2 Display Offset (Shifting)

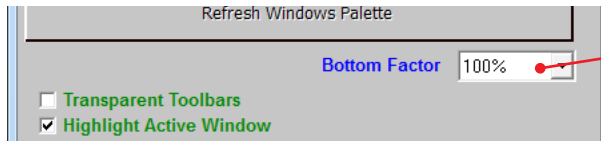
The Display Offset function allows you to shift the focus of the display to a depth range below 0 metres, while remaining at the same zoom level.

For example, to shift from the 0 to 50 metres range to the 50 to 100 metres range, click and hold the left mouse button while rolling the scroll wheel until you reach approximately the 50 to 100 metre depth range. A display box appears on the screen to inform the operator of the offset depth value. Release the left mouse button and you can zoom in or out again, but now zoom occurs from 50 metres.

This is not available in Bottom Lock mode.

5.2.3 Bottom Colour Intensity

To adjust the colour intensity of the seafloor bottom, change the Bottom Factor in the Colours Menu (See “4.9.2 Colours Window” on page 29). Increase the intensity to see the strength and profile of the seafloor returns.



The Bottom Factor value adjusts display intensity.

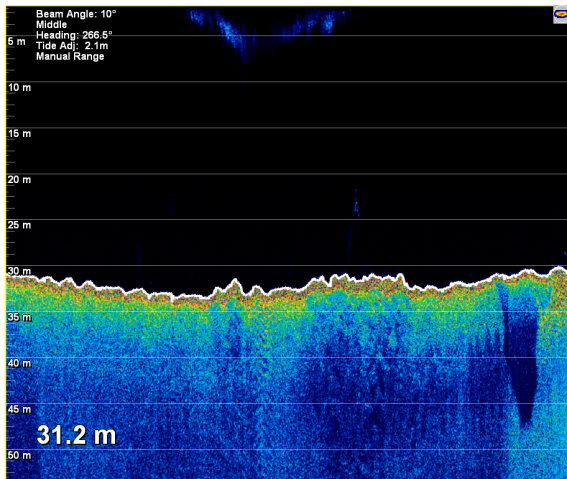


Figure 31. Single Beam View with Bottom Factor set at 100%

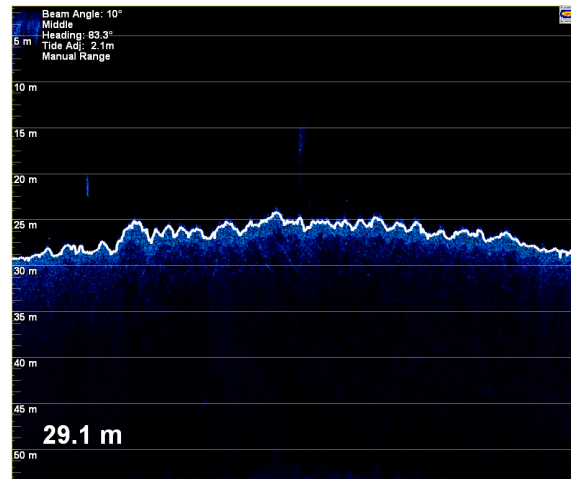


Figure 32. Single Beam View with Bottom Factor set at 15%

5.2.4 Water Column Options

When the icon in the top right of the Single/Triple Beam view is clicked, the Water Column Options Menu is displayed (see “Figure 33. Water Column Target Controls showing Histogram”)

- ▶ The **Fish Threshold** control allows you to tune the “Fish Detection” for your vessel. The control has a range of 0 to 30. It is recommended that this threshold is set high enough that only the desired targets are ‘detected’. The Colour bar shows a gain adjusted colour table to help reference this threshold to normalised signals on the Sonar and Fish Finder displays. Try varying the Target Threshold setting up and down until you get one which is optimum for your vessel’s installation. This control also effects the output to Navigator and the Fish Histogram.
- ▶ **Fish Histogram** this feature allows a simple histogram to display the water column targets detected by normalised amplitude. The History ranges from 0 (30 seconds) to 30 minutes. A Target count notes the total targets detected and the Histogram shows the number of each intensity of target on a log scale. The **Clear History** Button allows all of the Histogram bins to be cleared at any time.

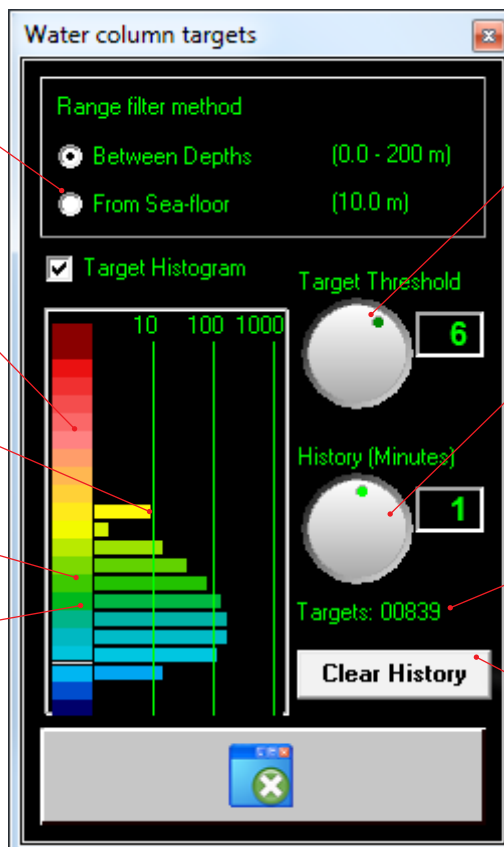
When the **Between Depths** or **From Seafloor** selections are clicked the **Fish Histogram** will **Hide** to allow the ranges to be changed if desired.

These Colours vary with the Gain Dial Selection.

This Bar shows that around 10 Targets at this amplitude have been detected in the last time period (1 minute).

This line shows the current Target Threshold.

No Targets will be shown on the Histogram if they are below the Target Threshold.



Target Threshold Dial, adjust this to change the lowest intensity of sonar echoes to use for fish targets.

History Dial, range of Histogram is 30 seconds to 30 minutes. The default setting is 1 minute.

Total Target Count.

Clears all target Histogram information.

Figure 33. Water Column Target Controls showing Histogram

5.2.5 Advantages and Disadvantages of the Single Beam View

5.2.5.1 Advantages

- ① Shows past information.
- ① Width and colours of seafloor return can be used to help determine bottom types.
- ① Display redraws dynamically when range, gain, or zoom change.

5.2.5.2 Disadvantages

- ① Harder to relate the location of features seen to the vessel's position.
- ① Does not show all information seen by the sonar view.

5.3 Sidescan View

The Sidescan view is a Sidescan picture generated from the sonar data received by the system. The display is drawn on the screen as a waterfall – the newest information appears at the top of the screen, while the oldest falls off the bottom of the screen. This is similar to the way sonar displays operate, except that in their case the new data appears on the right and the old data disappears off the left of the screen.

The left side of the Sidescan view shows the signals received from the port side while the right shows signals received from the starboard side. By default, the Sidescan view starts at the centre of the vessel and works its way out to port and starboard.

As the Sidescan image moves further out along the seafloor, the picture shows features on the seafloor. Objects, such as rocks, appear as bright white marks followed by a shadow. Harder ground gives strong returns (lighter on the grey scale), while a patch of mud or kelp causes a dark patch/shadow to appear. See “Figure 34. Sidescan View”

The primary advantage of the Sidescan view over the other views is in locating and identifying objects on the seafloor off to each side of the vessel. Some structures such as a shipwreck may appear like a large fish school on the other views.

In “Figure 34. Sidescan View”, the Sidescan view allows you to interpret the sonar information from a different view point, showing a wreck just above the seafloor as a clearly shaped structure.

Due to the nature of the origin of the data, any signals of significant strength register as a faint mirror on the opposite side of the display. Standard Sidescan systems generally rely on a towed transducer that is held deeper in the water, having the advantage of a lower aspect ratio.

The following methods are used to control the Sidescan view window:

- ▶ Right-click Options
- ▶ Independent Zooming
- ▶ Shifting

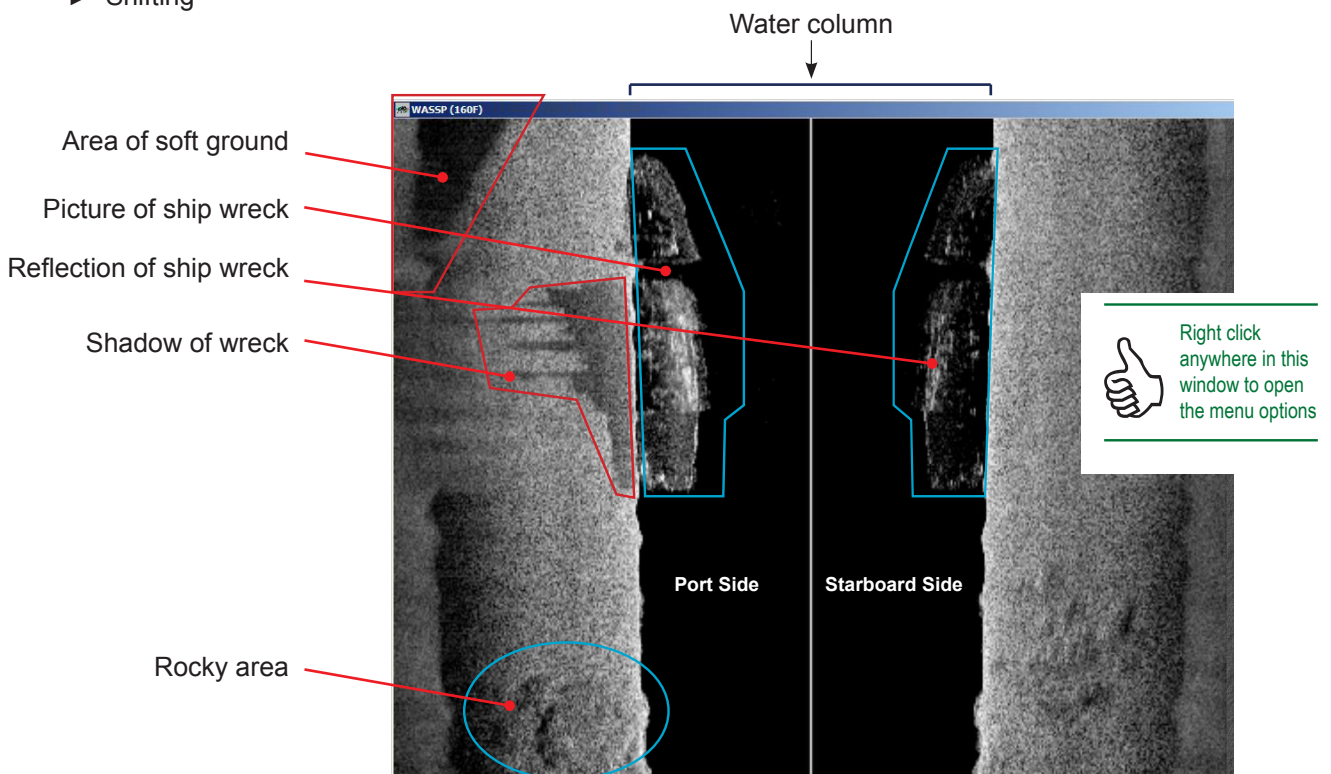


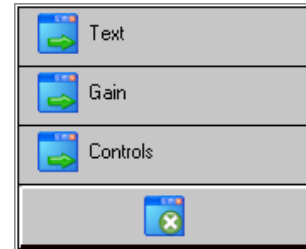
Figure 34. Sidescan View

5.3.1 Right-Click Options

Right-click in the **single beam** view screen to display the following menu options:

5.3.1.1 Text

Provides the option of a text box to appear in the top left hand corner of the **Sidescan View**. The text box provides x and y axis information on the location of the cursor within the window. You can then place the cursor on a target and know the x y distances to the target.

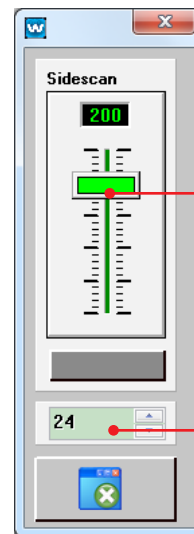


5.3.1.2 Gain

When you click the **Gain** button the **Sidescan Options** box appears and enables you to adjust the gain factor for the Sidescan view.

The slider allows you to increase or decrease the brightness scale of the Sidescan View.

Gain Threshold sets a cut off limit for the gain control.



Sidescan brightness adjustment

Sidescan gain threshold limit

5.3.1.3 Controls

The Controls box can be used to pan and zoom on the **Sidescan View**.



5.3.2 Advantages and Disadvantages of the Sidescan View

5.3.2.1 Advantages

- 🕒 Shows a detailed picture of the seafloor, allowing you to locate and identify objects off to each side of the vessel.
- 🕒 Can detect small objects or changes in the seafloor texture or density.

5.3.2.2 Disadvantages

- 🕒 Harder to tie features down to an exact location relative to the vessel.
- 🕒 Doesn't compensate for slope of the seafloor.

5.4 Waterfall View

The Waterfall View displays a “3-Dimensional” view of the seafloor made up of discrete points representing every seafloor detection point generated for each ping. The data shown on this display constitutes the raw points sent to third party software such as WASSP Navigator, HYSWEEP[®] and QINSy and that saved to GSF.

This display allows easier detection of small objects on the seafloor as well as a clear display of the state of seafloor detection, allowing features or noise/interference/error sources to be identified early in the processing pipeline.

The data is displayed in a successive fashion, with an option to separate each ping with a defined spacing useful for compression or expansion (Fixed), or to set the spacing relative to the vessel's speed (Actual).

The following methods are used to control the Waterfall View:

- ▶ Right Click Options
- ▶ Independent Zooming
- ▶ Shifting

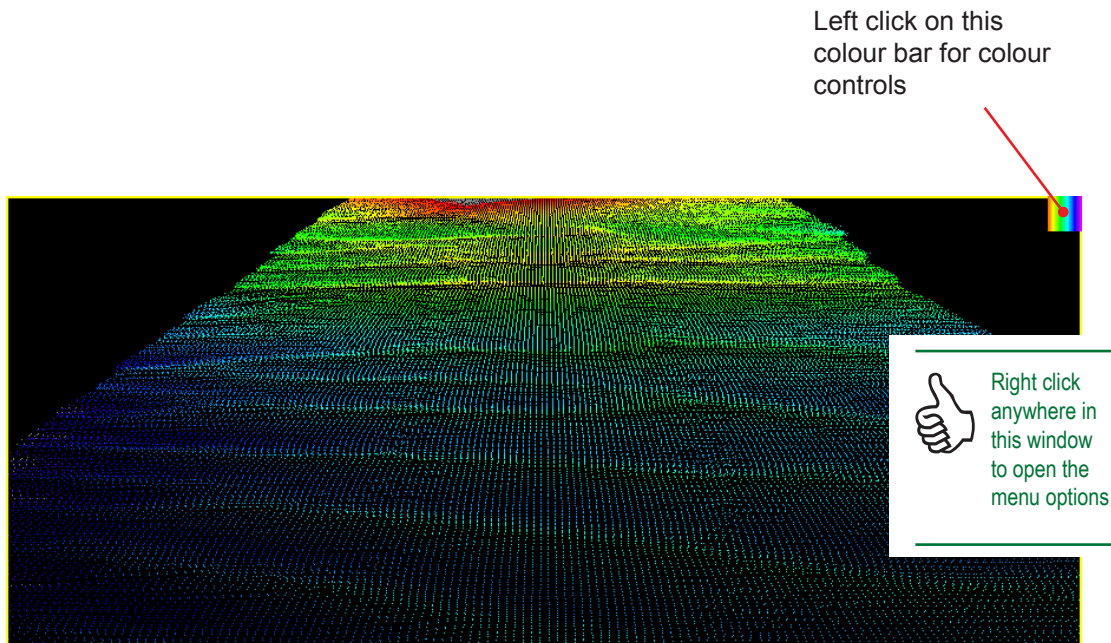
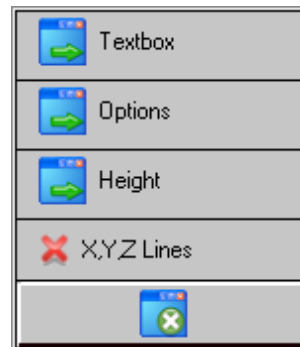


Figure 35. Waterfall View

5.4.1 Right-Click Options

Right-click in the **waterfall** view to display the following menu options:

5.4.1.1 Text Box Provides the option of a text box to appear in the top left hand corner of the waterfall view.



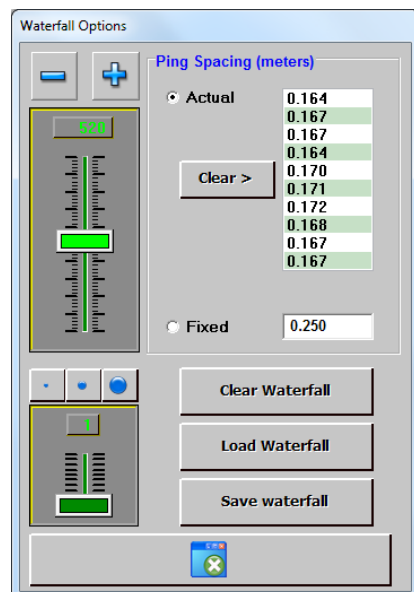
5.4.1.2 Options When you click the **Options** button, the **Waterfall Options** box appears with several controls for customizing the waterfall view.


The large slider sets the ping offset, shifting the view focus up or down the waterfall.

The Ping Spacing can be set to **Actual** or **Fixed**. Actual will set the ping spacing relative to the vessel's speed, and Fixed will set the spacing to the value defined in the text box.

The small slider adjusts the size of the displayed detection points. Larger values will make it easier to see displayed points when doing close inspection of seafloor detections.

You can Save the current waterfall view, Load a saved waterfall view or Clear the current waterfall view.



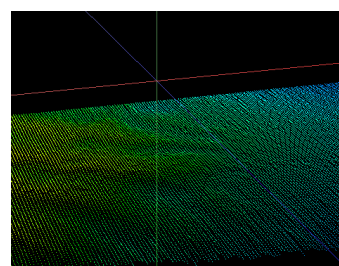
 Remember, if you get lost while using this display, double-click to return to the default 'behind ship' view.

5.4.1.3 Height 1:1 is true scale (the height is relative to width). By changing the height ratio, features are accentuated.



5.4.1.4 X,Y,Z lines X,Y,Z lines as reference points. Click to turn on or off.

The image on the right shows the X,Y,Z reference lines enabled.



5.4.2 Waterfall Colour Controls

This control adjusts the colours to use for specific depths on the Waterfall View. Points along the seafloor line that are outside these ranges will be drawn in grey.

5.4.2.1 Manual Colours

Depth to use for Shallowest (Red) end of colour table

Slider control for red depth

Activate Automatic Depth Colours about current depth

Current Tide adjusted depth reading

These buttons allow fine control of either the red or blue depths

Slider control for the blue depth

Depth to use for Deepest (Blue) end of colour table

5.4.2.2 Automatic Colours

Depth to use for Shallowest (Red) end of colour table. This will be adjusted automatically every 10 seconds unless colours are locked.

Current Tide adjusted depth reading

Lock colours, current colours will be used until settings changed

Deactivate Automatic Depth Colours

Increase the range of depths to use about current depth

Range above and below current depth to use for colour table

Decrease the range of depths to use about current depth

Depth to use for Deepest (Blue) end of colour table. This will be adjusted automatically every 10 seconds unless colours are locked.

Figure 36. Colour Controls

5.4.3 Changing the Viewing Angle

The angle that the Waterfall image can be viewed at can be changed. Click and hold the left mouse button anywhere in the Waterfall view screen. The Waterfall view can then be angled around the vessel position to optimise the view by moving the mouse. Double-click to return to the default viewing angle.

5.4.4 Advantages and Disadvantages of the Waterfall View

5.4.4.1 Advantages

- ④ Gives a full representation of every beam on every ping to the user.
- ④ Shows seafloor features in quasi 3-D allowing an operator to gain a more complete picture of the seafloor.
- ④ Rotation allows an operator to better distinguish patterns, trends, and objects.

5.4.4.2 Disadvantages

- ④ No hardness indication.
- ④ Representation is constant heading so does not give a true geo-referenced view of the seafloor.



6. Troubleshooting

If the WASSP System program provides no data when you transmit, check the following:

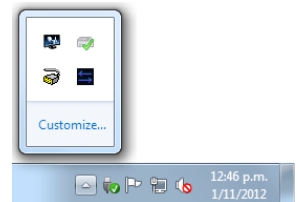
- ▶ Ensure that all cables and connections have been installed correctly. For example, Ethernet, cables, GPS, NMEA sensor, and so on. Refer to Installation Manual for details.
- ▶ Software installation and settings. See “Checking Software Installation” procedures below.
- ▶ NMEA data sentences. See Step 5 of the “Checking Software Installation” procedures below.

6.1 Checking Software Installation

To check the software installation, proceed as follows:

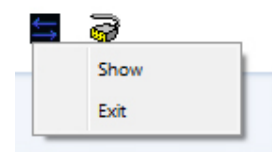
- 1 Confirm the **WASSP Processing Module** () and the **Transfer Task** () symbols are present in the Windows Task Bar.

If either are not in the Task Bar, run from Start > All Programs > WASSP



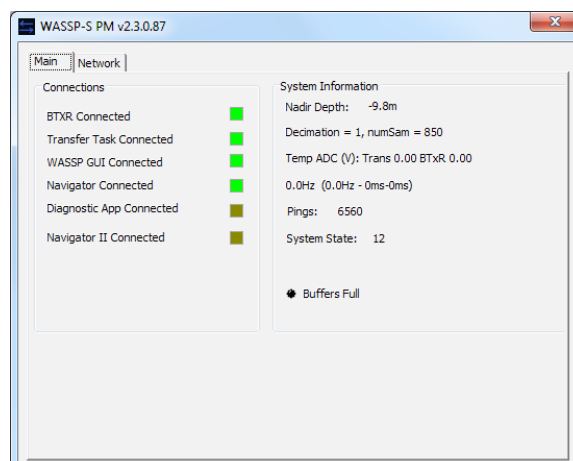
- 2 Right-click the **WASSP Processing Module** symbol.
Click **Show**.

The WASSP Processing box appears.



- 3 Make sure that BTxR, Transfer Task and WASSP GUI are shown as connected.

If not connected, check that power to the BTxR is ON and the ethernet cable is connected between the BTxR and the computer, and plugged into the correct ethernet port.



- 4 Check the **NMEA Settings**. Refer to Installation Manual section “8. Sensors” on page 26. If any of the Activity indicators are red, configure the port settings correctly. Check the NMEA data is being received.
- 5 If the system is correctly configured and the BTxR is ON, the button turns YELLOW almost immediately while performing a self calibration, and turns BLUE approximately 3 seconds later. See “4.2 Transmit Mode Button” on page 13.

- 6 Click the **Transmit Mode** button to start pinging.



- 7 Confirm ping.
The MODE button should animate showing a ping from the vessel.



- 8 Adjust the range until the picture can be seen on the sonar view.
(Double-click on the digital display to switch to auto-ranging).



- 9 Confirm the Waterfall view draws seafloor at right angles to the direction of travel.
If Navigator is installed, this can be verified on the Navigator Display (refer to Navigator Manual).

- 10 Double-click the **Power Level** indicator until it turns GREEN or BLUE (Auto Power).



- 11 Click each view and confirm that all views display and draw.

- 12 If the seafloor profile is being drawn but with significant errors, change the Minimisation. See “Figure 6. Advanced Options Window” on page 14.

Turn on the seafloor line to confirm the state of the seafloor detection algorithm. Use Auto Power by Signal (BLUE) until you are confident with the system operation.

- 13 The system requires GPS position, time, motion and ship’s true heading to create a correct sea profile on the displays.
For accepted NMEA sentences and supported sensors, refer to “8. Sensors” on page 26 of the Installation Manual.

7. Frequently Asked Questions (FAQs)

Following is a list of frequently asked questions (FAQs) covering common problems encountered when operating the WASSP system. Note the Troubleshooting section of this manual covers most of the typical operational problems, and this section should be consulted only after reading the Troubleshooting section. Each FAQ is numbered and answered in the following pages.

“7.1 The System is transmitting too slowly, how can I speed it up?” on page 50

“7.2 The system has stopped transmitting without operator intervention. Why?” on page 50

“7.3 When I press the Transmit button, nothing happens and there is no activity on the WASSP display. How do I fix this?” on page 50

“7.4 When I run WASSP, it displays an error message - what does it mean? Is my WASSP system faulty?” on page 51

“7.5 Why is there a ring displayed just above the seafloor? What causes these ‘ring’ marks? How can I get rid of them?” on page 54

“7.6 What is this constant signal on the sonar/single beam display?” on page 55

“7.7 Why is my WASSP System not tracking the seafloor?” on page 55

“7.8 Why doesn’t the seafloor line up when I go over it again?” on page 56

“7.9 Why does the seafloor move if the system is Motion Compensated?” on page 57

“7.10 The mode button animates as if pinging but nothing happens. What is wrong?” on page 58

7.1 The System is transmitting too slowly, how can I speed it up?

Remember that the WASSP System system must acquire twice the depth of a single beam sounder to enable the full seafloor profile across 120°. If the entire profile is to be captured, the ping rate will need to be at least half that of a standard single beam sounder.

Manually adjusting the range down will increase the ping rate significantly but will result in the loss of seafloor information, including break up of the 3-D display after a point. If you are only interested in the centre beam of the triple beam display, the range control can be reduced to just over half the current depth in metres. The optimal range is twice the current depth in metres. The range control should normally be set to automatic (green digital display).

Other programs running at the same time as the WASSP System program consume processing power and take processing time away from the WASSP System system, slowing down the rate of transmission. For optimal performance, ensure the WASSP System program is the only application running.

7.2 The system has stopped transmitting without operator intervention. Why?

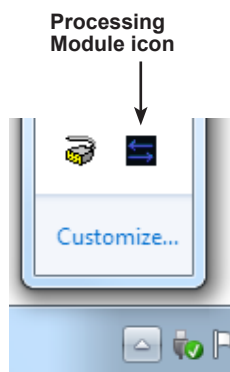
If time is taken from the system by another application for long enough, the WASSP System may restart transmission in a number of seconds. The WASSP PC is a dedicated system and should not be used for other applications.

If the system does not restart, try stopping and then starting the system using the MODE button on the tool bar. If this does not work, try to restart the WASSP System program and the transceiver. The most likely cause of this is a sudden power supply spike or drop.

7.3 When I press the Transmit button, nothing happens and there is no activity on the WASSP display. How do I fix this?

First make the following checks of your WASSP installation:

- Check that the BTxR power is ON and the LED light on the front panel flashes every few seconds.
- Make sure the network cable is connected at both the BTxR and the WASSP PC ends (unplug and re-plug to make sure).
- Check that the Processing Module application is running (look for the icon in the Windows Taskbar at the bottom of your PC screen) and was running when you started WASSP. If not, restart the WASSP GUI after running the Processing Module application



7.4 When I run WASSP, it displays an error message - what does it mean? Is my WASSP system faulty?

Consult the list below for the cause/course of action if an error message is displayed in WASSP.

7.4.1 GUI MESSAGES

7.4.1.1 Faults

▶ **F:0002: BAD COMMS TO RECEIVER BOARD (%s)**

%s => module detecting error.

The communications link between the receiver board and Mity Carrier board has experienced interference. This may be in the form of noise on the data line.

The System will attempt to recover by resetting the Receiver board.

This may be accompanied by the BTxR's LED turning orange.

▶ **F:0003: TRANSMITTER UNDER VOLTAGE SET (STATUS = %lx) (%s)**

%lx => status bits from transmitter board

%s => module detecting error

This message will occur when the voltage on the transmit board has not reached the required level for a transmit ping pulse.

If the system has been reset by another fault then the transmit board may be disabled, resulting in the under voltage error.

If this error does not get cleared (see below), check the PSU max current.

Check that it is not a secondary problem due to the BTxR resetting caused by an unrelated event.

▶ **F:0004: TRANSMITTER UNDER VOLTAGE CLR (STATUS = %lx) (%s)**

%lx => status bits from transmitter board

%s => module detecting error

This is a message informing the user that the voltage of the transmit board has reached the required level, and is no longer under-voltage.

This will only occur after the above error.

▶ **F:0007: DRIVER REFUSED TO PING: UPP NOT READY (delta %0.6fsec) (%s)**

%0.6f => time since last ping attempt

%s => module detecting error

A ping has been requested from the controller before the BTxR has dealt with the current ping. This is usually a result of a timeout, potentially because the carrier board has not received a full ping's worth of data, possibly due to bad ribbon cable (see F:0002).

▶ **F:0008: DRIVER REFUSED TO PING: BAD TX BOARD STATUS(delta %0.6fsec) (%s)**

%0.6f => time since last ping attempt

%s => module detecting error

A ping has been requested by the controller and refused, due to bad transmit board status (e.g. under voltage).

- ▶ **F:0010: DRIVER REFUSED TO PING: UNKNOWN ERROR (delta %0.6fsec) (%s)**
%0.6f => time since last ping attempt
%s => module detecting error

Something unknown has occurred, preventing the driver from pinging. Try restarting your BTxR.

Calibration Faults

- ▶ **F:0011: FAILED TO CALIBRATE: NO DATA (%s)**
- ▶ **F:0012: FAILED TO CALIBRATE: BAD DATA (%s)**

7.4.1.2 ERRORS

- ▶ **“No Link to Processing Module”**
This error will occur when the Processing Module is either not running, or running without a network connection to the BtxR.

- ▶ **E:0001: Shutting Down Module**
Module is undergoing a scheduled shutdown. This is instigated when the BTxR is attempting to recover from a serious error.

- ▶ **E:0002: Select Error (Count: timeout %u err %u) (%s)**
%u => timeout value
%u => error number
%s => module detecting error
Failed comms between the controller and the BTxR.

- ▶ **E:0003: Select Read Error (fd = %d) (%s)**
%d => source of bad read data.
%s => module detecting error
Caused by bad mityboard software internal communications.

- ▶ **E:0004: Bad read (numRead = %d fd %d) (%s)**
%d => number of bytes read
%d => source of bad read data
%s => module detecting error
Probably caused by bad communications between the Mity card and the Receiver board.

- ▶ **E:0005: Failed write (fd %d) (%s)**
%d => source of bad read data
%s => module detecting error
Caused by bad mityboard software internal communications.

▶ **E:0006: High Duty Cycle (pwr %d pw %.1f ss %hu es %hu) (%s)**

pwr %d => last valid power lever set
pw %.1 => last valid pulse width set
f ss %hu => last valid start slice number
es %hu => last valid end slice number
%s => module detecting error

The controller has attempted to set a combination of ping parameters which result in a duty cycle too large for the transmit board. The ping is commanded at the last valid combination, and the last valid combination of parameters returned to the controller.

7.4.2 PM MESSAGES

▶ **“Ping Settings: Bad Parameter”**

A decoding error occurred. This implies network corruption.

▶ **“TVG Data: Bad default file”**

Suggest restarting software and if problem persists, reinstall (files could be missing).

▶ **“Settings Update Not Allowed”**

PM application configuration has been restricted. This should not occur as it implies .INI file corruption. Restore / Clean the system configuration using the Configuration Manager.

▶ **“No Processing Module Dongle Detected”**

This message will occur when the dongle that the WASSP system is reading does not have an applicable WASSP licence. If another dongle is present, this must be removed. Insert WASSP Dongle then press ping button.

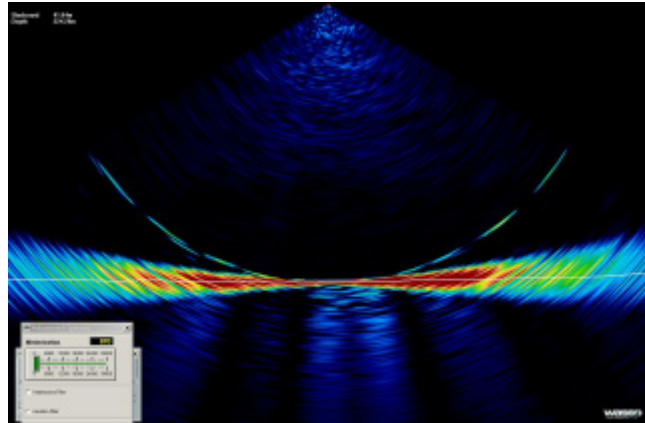


Other messages you may see could be internal software errors, or as yet undocumented information.

7.5 Why is there a ring displayed just above the seafloor? What causes these 'ring' marks? How can I get rid of them?

This ring is a by-product of the multibeam technology of your WASSP system. It is supposed to be there but in practice we want to make it as difficult to see as possible. To avoid these rings confusing the seafloor tracking algorithms or being confused as fish marks the Minimisation feature allows these rings to be suppressed on the Sonar display. Care should be taken because hiding these rings will also make it hard to see any signals below them such as fish on the bottom.

When a signal arrives at the receiver it creates a shadow like effect that creates a ring of much weaker echoes, the stronger the signal the stronger the rings. Unfortunately the signal return from the seafloor is many orders of magnitude stronger than a fish echo and thus the shadow of weaker echoes can be comparable to fish targets.



How do I know if I have a problem then?

When running with Auto Power By Signal (BLUE) and the power level is above 1 then the required minimisation should be 1500 or less. The lower this is the more chance of seeing fish below the ring but the more chance of the rings being visible on the Sonar display. If you are required to use a higher power level then it may well be impossible to hide them completely with Minimisation.

If you have the system working with no sign of these rings and then they start to appear and you have not changed the Minimisation settings then something has changed for the worse – keep reading.

a) Too much power – This is the most common cause of problems. When there is too much acoustic energy in signals returned from the seafloor they may distort. Distortion of the signals will cause ambiguity in resolving the position and thus create rings of very high amplitude. Unless in very shallow water Auto power by Signal mode will automatically try to select the highest power level that doesn't cause distortion. You may get the occasional strong return causing faint rings, but this is good so that you have as much power as practical for detecting fish.

b) Gain settings. This ring will appear more or less significant as the sonar gain is changed.

c) Shading of Receiver – Any difference across the receiver caused by marine growth or any other irregularity across the face of the receiver will contribute to a reduction in the discrimination of the WASSP system. This will lead to higher intensity rings.

d) Reconnection Fault – If the cable from the BTxR to the Transducer was disconnected and has been reconnected recently it is possible the receiver is connected incorrectly. Check the colour codes of Ethernet connections.

e) Calibration – It is possible that the system calibration was disrupted by another sounder, close the WASSP GUI and re-run to allow the system to re-calibrate.

f) Electronics Failure – If one or more central channels fail in the electronics this will increase the intensity of the ring.

g) Configuration – Changes made in the Technician configuration could significantly change the system performance. Restart the WASSP GUI if you are unsure what state the system is in. The Configuration Manager has a Defaults option to load your default configuration settings if all else fails.

7.6 What is this constant signal on the sonar/single beam display?

There are many sources of noise, interference and general acoustic reflections which can make these displays difficult to use. A description of the different types of noise and ways in which you might be able to determine and eliminate them follows.

Sonar/Sounder – Other Sound producing devices will produce constant blips on the WASSP sonar display which will vary in intensity and size depending on the transmission power and angle of the system.

Aeration – Air in the water around the transducer can cause transmitted signals to be absorbed or reflected prematurely resulting in false signal reports from the transducer.

Biomass – Large bodies of photo plankton can float through the sea covering very large areas. This may be the source of large areas of constant faint signal return through a region of the water column.

Own Transmission – WASSP shows all received signals starting from half way through the transmission pulse. Thus you should see a red or yellow ring at the top of the Sonar display. As power level and pulse width increase this signal return will be stronger and larger.

Keel Reflection – If the WASSP system is mounted in such a way that transmitted signals can reflect off the ships hull you may find that there is a constant strong return shown on the sonar display. This may happen even if the hull is just outside the 120 ° transmission swath. If a strong signal follows the boat and is within the dimensions of the ship then this signal is probably a reflection off your own ship. This will make it hard to detect fish at this depth but otherwise shouldn't affect the performance of your WASSP system.

Electrical – There are an almost infinite number of ways in which Electrical Noise can influence system performance. The first priority is that the system be well grounded – this means a large and preferably short grounding wire connects the Transceiver to the Power supply ground. WASSP is relatively protected by noise on Power supply sources but a very noisy supply could cause trouble. More likely causes of electrical interference are if noisy, high power machinery or wiring is run beside the transducer cable. Electrical noise is either constant, regular or transmit power dependant.

Water Temperature Layers – A thin faint horizontal line that is present ping after ping in the same place could be a temperature layer. The Sea is often layered with various temperature layers due to pressure and surface mixing. Often a reflection can be created at the depth where a significant change in water temperature occurs – causing an acoustic return.

Prop Noise – If the turbulent water flow off the props is directed onto the transducer face this could create aeration noise. Especially relevant for lower frequency models – it may be possible to pick up the prop noise as an acoustic source. For this reason it pays to mount the transducer some distance from the ships props. Prop acoustic noise will appear on the side of the Sonar display close to the prop and will look like a regular pulse or solid signal depending on the rotation speed.

Vibration – Shudders of vibration and vibrating mounting structures can induce significant noise. Additionally a vibration in mounting can cause motion compensation of the system to fail. Sharp jolts and vibrations will generate rings of high signal.

7.7 Why is my WASSP System not tracking the seafloor?

Any source of noise mentioned in the answer to “7.6 What is this constant signal on the sonar/single beam display?” above can cause the seafloor detection to fail if it is bad enough. In some cases bad noise can cause the tracking to fail and it could take a number of pings for the WASSP system to re-acquire the seafloor. In some instances noted below and in bad cases of

noise it may not be possible to automatically resume seafloor tracking.

Power – If too much power is being used for the depth of water you are operating in, the seafloor tracking signal could be noisy especially if there is enough power to cause signal distortion, as the tracking algorithm may track the rings produced by this. Conversely, too low a power level may result in the signal levels from the seafloor being below the noise floor of the system and thus they will be ignored as noise. This will tend to cause the surface noise to be considered as a bottom detection candidate.

Depth – The WASSP system can acquire a seafloor profile swath 3.5 times the nadir depth but this requires the acquisition depth to be at least twice that of the maximum depth on that swath. WASSP takes this into account so when the Depth Dial reads 100m, the system acquires to 210m. If the acquisition depth is in manual mode or the system fails to track down with the seafloor then you may need to manually increase the system range to allow it to re acquire the seafloor.

GPS Position – If there is no position the WASSP system will not output depth data and will cease to map the seafloor.

Minimisation – The seafloor tracking is affected by the Minimisation level; ensure this is set appropriately as described in the Installation Manual.

7.8 Why doesn't the seafloor line up when I go over it again?

There are several factors which can cause this to show on your WASSP display however remember that if the vessel is operating in a high sea state, your motion sensor may not be able to fully compensate for the vessel's movement:

GPS Time Lag – Ensure that any GPS delay is entered into the Ship Setup Configuration as this will cause large errors in depth. See section "10.2.6 Sea Trial - Commissioning Step 13 : GPS Time Delay (Required)" on page 54 of the Installation Manual.

Motion Compensation – To make good use of motion compensation we must ensure that the WASSP transducer and any Motion sensors are securely mounted and do not move at all. The dynamic and static accuracy of the motion sensor effectively determines the differences you can expect when you pass over the same area again.

Sea State – Motion Compensation is a complex process and makes some assumptions – the bigger the sea state and the smaller the boat the less reliable the seafloor data will be as there is more reliance on the accuracy of measurements and the input from the motion sensors.

Cornering – Motion compensation is costly to do to the nth degree. Most low end Motion sensors have poor performance on corners due to the centripetal acceleration forces caused by a turn affecting the delicate balance of the sensor. Thus seafloor detections collected while the boat is turning are likely to be of lesser quality than those collected in a straight line.

Water Temperature – The water temperature and salinity affect the sound speed and thus the angle at which the sound moves through the water column. This causes the seafloor to curve up or down as noted in the operator manual. If the seafloor exhibits a curve up or down on the edges, adjust the sound speed. Note: The surface water temperature will probably change during the course of a day.

Tide Correction – Tide is essential for matching up overlapping swaths. If you have disabled the Tide correction the swaths will rarely line up on your WASSP displays. Ensure that the ZDA sentence is being collected and sent to the WASSP computer so it can determine the UTC time and use the correct tide correction value.

Transducer Offsets – The transducer, GPS and draft offsets need to be input into the WASSP ship setup configuration so that the motion induced errors in the seafloor can be correctly

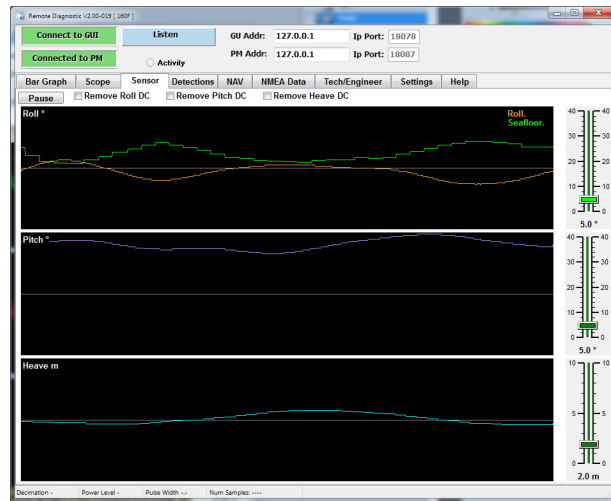
compensated for.

Roll Offset – If there is a fixed offset in the mounting of the transducer or Motion Sensor you will need to conduct a patch test to determine this error. Without this the roll correction will not work correctly.

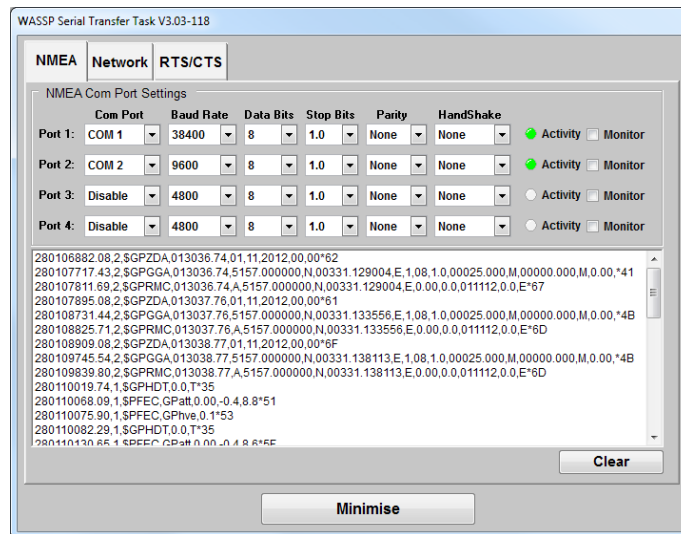
7.9 Why does the seafloor move if the system is Motion Compensated?

The views are only compensated for Roll to save on processing time and to avoid creating artefacts in the data. If the Sonar display is rotating then the Roll correction is not working. Remember too that if the vessel is operating in a high sea state, your motion sensor may not be able to fully compensate for the vessel's movement.

- ▶ Check Roll Information is being received (open the Diagnostics, click Listen, and select the Sensor tab). You should see a moving orange line on this display if the Roll information is being processed. The Ship Setup Options - Sensor Values tab will also show Current Values for NMEA data if configured to receive it.
- ▶ Check that the device that you receive roll information from is ON and that all your serial cables are still connected to your WASSP computer.
- ▶ Check that the correct sensors are selected in the NMEA tab of the Ship Setup Options - this configuration could have been inadvertently changed.
- ▶ Check that the Roll Correction settings have not been changed under Ship Setup Options - Sensor Values tab. If the transducer has been re-installed, the Swap Array setting could have changed in which case you will need to invert the Swap Array setting. If the roll offset is incorrect, a slight roll of the display will occur. If the Swap Roll setting is incorrect you will see a doubling of the actual vessel roll (i.e. the roll received when Roll Correct is disabled).



- Verify that the Transfer Task is receiving data on each activated port by checking that the Activity light flashes green (not red). The Transfer Task can be found in the Windows Task Bar. You can verify that the correct NMEA sentences are arriving on each port by selecting 'Monitor'. This will print out the received NMEA onto the window for that particular port.



- Finally if the seafloor is not uniformly flat you could see rapid changes in the sonar display with each ping as the ship moves across the seafloor. As there is no heave or pitch compensation on this display it will often move up and down and if the seafloor changes angle it will also appear to roll a bit. If you are unsure, check that the seafloor remains flat on a flat section of seafloor and remember that a vertical shift is expected if there is vessel roll, pitch and/or heave.

7.10 The mode button animates as if pinging but nothing happens. What is wrong?

Check your GPS is on. This can be validated by checking the network input screen or transfer task diagnostic displays.

Increase the gain, and range. Can you see noise on the Sonar Display? If not, reset the power to the Transceiver, and reset the PC and retry. If this problem persists and there are no error messages, contact your dealer. If you are getting an error message or messages, look at the relevant information for the error message in the section of the FAQ.

Ensure that the Transducer has not been disconnected from the BTxR, both the receiver cables and the transmit cables need to be connected in order for the WASSP system to operate. If problems persist after a full system shutdown and power up then contact your dealer.

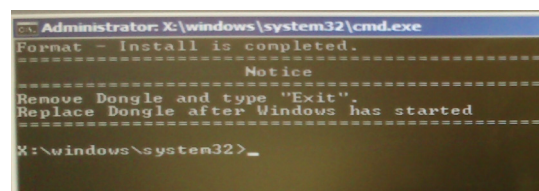
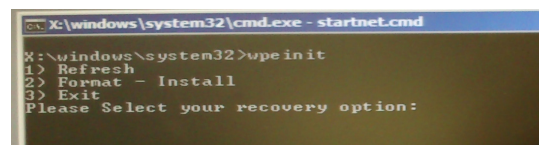
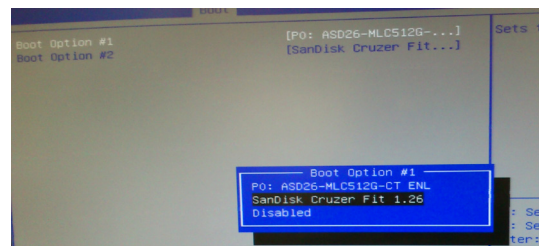
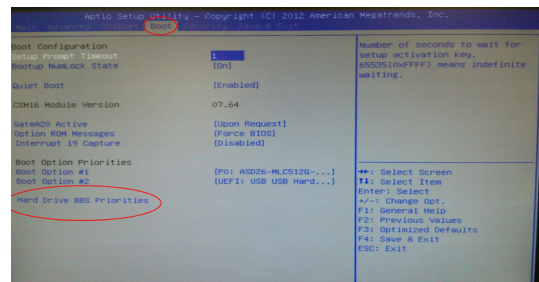
8. Appendix A: Restoring the WASSP Processor



WARNING:
THESE INSTRUCTIONS ONLY APPLY TO THE
MXE-5301/ENL WASSP PROCESSOR.

If, for whatever reason, the WASSP Processor you are using becomes corrupted, a technician may instruct you to follow instructions to restore the Processor. In this situation, follow these steps.

- 1 Ensure that you have the **WASSP Dongle** and your **keyboard** connected to the WASSP Processor.
- 2 Access the **BIOS** by tapping the **DEL** key on your keyboard continuously as you restart/turn on your PC.
- 3 Navigate to the **Boot** menu tab using the arrow keys on your keyboard. Also using the arrow keys, scroll down to the **Hard Drive BBS Priorities** menu and push **ENTER** to select it.
- 4 Change **Boot Option #1** to "**SanDisk Cruzer**" then push **ENTER** as seen in the image.
- 5 Press the escape (**ESC**) key to navigate back to the main boot menu and then **Save and Exit** the BIOS.
- 6 The WASSP Processor will then boot from the WASSP Dongle, enabling the following menu with selectable restoration options as per this image. **Choose an action** from the list.
- 7 After you have chosen an option, wait until you see the message as in the image on the right, and follow the instructions on screen.



9. Product Information for the People’s Republic of China

Toxic or Hazardous Substances or Elements						
Component Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr6+)	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
BTxR	X	O	O	X	O	O
PC	X	O	O	O	O	O
Transducer	X	O	O	O	X	X
WASSP Navigator Kit with software	O	O	O	O	O	O
ALUMINIUM Gland through hull type	O	O	O	O	O	O
PLASTIC Gland through hull type	O	O	O	O	X	X
STEEL Gland through hull type	O	O	O	O	O	O
USB Dongle with Software	X	O	O	O	O	O
Keyboard	X	O	O	O	O	O
Trackball	X	O	O	O	O	O
Ethernet Crossover Cable 15m	O	O	O	O	O	O
NMEA Optocoupler	X	O	O	O	O	O
9-pin NMEA Cable 5m	X	O	O	O	O	O
Power Cable - Transceiver 5m	X	O	O	O	O	O
Power Cable - Computer 3m	X	O	O	O	O	O
Cable Clamp for Transducer Cable	O	O	O	O	O	O
O: Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006						
X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006						

Table 100: Table of toxic or hazardous substances.

Product Marking Explanations

In accordance with the requirements specified in SJ/T11364-2006, all the Electronic Information Products (EIPs) sold in the People’s Republic of China are marked with a pollution control marking. The following marking applies:



This marking indicates that the homogeneous substance within the EIP contains toxic or hazardous substances or elements above the requirements listed in SJ/T11363-2006. These substances are identified in Table 100.

Environmentally Friendly Use Period

The number in the marking shown as 15 the illustration above, refers to the EIP’s Environmentally Friendly Use Period (EFUP). The EFUP is the number of years from the date of manufacture that toxic or hazardous or elements contained in EIPs will not leak or mutate under the normal operating conditions described in the EIP user documentation resulting in any environmental pollution, injury or damage.

Note: Except as expressly stated herein and as required under mandatory provisions of regulations of the People’s Republic of China, WASSP Ltd makes no representation or warranty of any kind expressed or implied, with respect to the EFUP and expressly disclaims any representations or warranties expressed or implied with respect to the EFUP.

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

Technical Specifications

Dimensions	
BTxR:	Height: 180 mm. Width: 221.5 mm. Length: 535 mm.
Transducer:	Height: 94 ± 2 mm. Width: 164 ± 2 mm. Length: 327 ± 2 mm.
WASSP PC	
Serial Ports:	4 - Motion / Position Sensors.
Ethernet Port:	2 - BTxR / 3rd Party Hydrographic Software
Displays:	1 or 2 - Owner supplied. Minimum resolution 1024x768.
Inputs:	Keyboard and Mouse / Trackball
BTxR	
Output power:	14 power settings from 40 W to 1 kW.
Pulse Lengths:	0.1 - 2.0 ms
TX rate:	Automatic ping rate, determined by depth. Max ping rate 40 Hz.
Frequency:	160 kHz.
Beam width:	224 beams equidistant spacing over 120° port/starboard swath, Transmit 4° fore/aft, Receive 10° fore/aft.
Depth Range:	2 - 200 m.
Depth Resolution:	75 mm.
Display	
Display range:	Range 5 to 200 m. Shift 5 to 200 m.
Display modes:	Sonar View. Single Beam View. Waterfall View. Sidescan View.
Display windows:	The eight window layout options: Single Screen Layout Vertical Split Screen Layout Horizontal Split Screen Layout 3-Screen (3 options) 4-Screen Layout Resize individual windows button.
Advance speed:	Slow – fast (5 speeds).
Interface	
Inputs:	NMEA 0183 and RS232 Position, Roll, Pitch, Heave.
Outputs:	Ethernet Navigator, Third Party Hydrographic Software Raw Data GSF Data
Recording:	Navigator maps (bathymetric data) Raw Data GSF Data
Power Supply	
BTxR:	24 V DC, 70 W.
WASSP PC:	9 - 32 V DC Check the PC power supply to verify this before connecting an incorrect voltage!
Environmental	
Temperature:	0 to 40 °C.
Relative humidity:	5 to 95% non condensing.
Vibration:	IEC 60945, protected equipment.
Weight	
BTxR:	5 kg.
Transducer:	12 kg including cable (10m).
Equipment List	
Standard:	See "13. APPENDIX A - Part Numbers" on page 64 of the Installation Manual for a full list.
Transducer:	Mounting options through hull or pole mounted. Optional cable lengths; 5 m, 10 m and 15 m
Glands:	Options for alloy, steel or plastic.
BTxR	
WASSP PC	
Options:	See "13. APPENDIX A - Part Numbers" on page 64 of the Installation Manual for a full list.

Specifications subject to change without notice.

WASSP Ltd.

65 Gaunt Street
Westhaven
Auckland 1010
New Zealand

Phone: +64 9 373 5595
Fax: +64 9 379 5655
Email: wassp@WASSP.com
Web: www.wassp.com

PO Box 5849
Auckland 1141



WASSP Ltd. reserve the right to change this manual without notice.

The information in this manual may not, in whole or in part, be copied, reproduced, photocopied, translated, or reduced to any electronic medium or machine readable form without the prior written consent of WASSP Ltd.

Copyright© 2013 WASSP Ltd. All Rights Reserved.