Version

2.8

WaveLore

ANGLE VISION UNLIMITED

Interactive Bridge Training Simulation & Environment Suite

User Manual

ANGLE VISION UNLIMITED

WAVELORE

7406 Alban Station Court
Suite A112
Springfield, VA 22150
Toll-free 1.800.866.6402
Phone 703.866.0060 • Fax 703.866.0063

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Chapter 1

Overview

WaveLore is a multi-user interactive bridge team training simulation and environment suite developed by ANGLE Incorporated. WaveLore combines a stunning visual presentation with high-resolution content, a physics-based dynamic ocean, and enveloping acoustics. WaveLore creates an exceptional virtual training environment for Sea Warrior education, experimentation, and qualification. WaveLore uses either local area or wide area networking and is designed to accommodate multi-team network setups. The WaveLore Suite consists of six computers each with the ability to play one of six first-person interactive roles—Instructor, Radar Operator, Helmsman, Bearing Taker/Lookout, Navigator, or Conning Officer—and participate cooperatively in the operation of an Arleigh Burke class destroyer.

Software Features

WaveLore is a Windows OS-based training simulation. Each asset in the WaveLore Bridge Team Trainer is created from multiple sources in order to provide the user with a visually stunning environment customized specifically to their training needs. Included features are:

- ***Accessible for a Team of Users***
  The WaveLore Suite has 6 possible roles including an Instructor, Conning Officer, Helmsman, Navigator, Radar Operator, and Bearing Taker/Lookout.
- ***Flexible Control of Ships***
  The course and speed of all vessels can be controlled by the Instructor. However, when the Helmsman is connected to the Server the Instructor is unable to adjust the course and speed of the DDG.
- ***Multiple Custom Ship Models***
  All ship models are created from a variety of sources including analysis models, drawings, and photo reference to create detailed and accurate models. For more information on purchasing additional customized ship models please contact us at 1-800-866-6402 or email us at support@angleinc.com

- ***Physics-based Ocean Surface and Ship Models***
  In-house developed algorithms replicate the actual physics relationships between the ocean and the DDG.
- ***Multiple Sea States/Wind Control***
  As the ocean surface changes due to increased wind, the ships show increased pitch and roll.
- ***Navigation***
  The harbor allows users to become familiar with ingress and egress from a commercial harbor, and to develop their piloting skills, along with practicing navigation using GPS, compass, and charts.
- ***Custom Harbor Model***
  Special attention is paid to navigation points, channel markers, and docks to ensure the virtual environment closely matches the real world. For more information on purchasing additional specific or customized harbors please contact us at 1-800-866-6402 or email us at support@angleinc.com
- ***Day/Night Modes***
  WaveLore has both day and night modes which can make the same scenario a completely new learning experience. With high-quality assets, accurate harbors and navigation, and a visually stunning world, the user is able to gain valuable experience in a safe group training environment.
- ***Multi-team Network Setup***
  This version of WaveLore introduces the Multi-suite networking feature. This feature allows one (1) WaveLore Suite to participate in the same network with other WaveLore Suites.

Hardware Features

WaveLore is built around commercial-off-the-shelf hardware and simulation technology using modular design approaches to provide functional components to match customer requirements. Here are some of the hardware features for a baseline WaveLore Suite:

- 4 PCs with Intel® Core™ 2 Duo CPU(s), 500 GB HDD, 4 GB RAM, NVIDIA® GeForce 200-series video card or better
- 2 PCs with Intel Core i7 CPU(s), 500 GB HDD, 4 GB RAM, NVIDIA GeForce 200-series video card or better.
- 1 PCs with Intel Core i7 CPU(s), 500 GB HDD, 4 GB RAM, NVIDIA GeForce 470 video card or better.
- 5 keyboards and mice, 3 Xbox® 360 controllers
- Logitech® G25 Racing Wheel
- Networking and power supply peripherals
- 1 touch screen computer monitor with peripherals
- 4 wide-screen computer monitors[1]
- 3 wide-screen TV displays with peripherals[1 2]

[1]These items can be purchased separately.
[2]Three (3) wide-screen monitors or TV displays must be compatible with Matrox® TripleHead2Go™ graphics expansion module.

Look and Feel

WaveLore is a fully customized training environment. The pilot house of the Arleigh Burke presented here is an accurate representation of a real DDG. All models have been constructed and textured to a standardized level of detail that balances realism with the processing power of current video card technology.

For more information on purchasing custom harbor models or additional ship models please contact us at 1-800-866-6402 or email us at support@angleinc.com

Chapter

2

Installing Updates

WaveLore software requires updates for the latest video card, and hardware drivers, and any new content that is created by Angle Vision Unlimited. Detailed instructions are provided with your update discs to help you quickly and easily update your system.

Basic instructions are as follows for any WaveLore updates:

Step 1: Install all video card and hardware driver updates.
These drivers can be found on the disc labeled "WaveLore Software Drivers".

The following are regularly updated drivers to be installed on all computers:

- Microsoft DirectX®
- NVIDIA video card drivers
- NVIDIA PhysX®

The following are regularly updated on specific computers:

- Helmsman (where the wheel is attached) – Logitech® wheel driver
- Conning Officer – The device that connects the 3 screen displays, Matrox® drivers for the TripleHead2Go™ expansion module

Step 2: Install WaveLore updates.
These updates can be found on the disc labeled "WaveLore Software Installation".

Step 3: Restart your computers

Step 4: Bring all computers online and test connectivity

Once the computers have successfully been updated WaveLore is ready for classroom use.

Chapter

3

Display Settings

Display settings for WaveLore can be configured quickly with two steps. The first step is through the Ogre "ResTool.exe" and the second is in WaveLore's display settings.

Ogre Display Settings

The System Administrator or Instructor will need to check the settings for each role every time WaveLore is updated or installed.

The display setting list can be scrolled through, and when selected, it provides options to change the settings in the drop down menu at the bottom of the window. See Figure 2, Figure 3, and Figure 4 below for examples of what to change.

To change settings in Ogre go through the following steps:

1. Go to where WaveLore is installed on your computer.
2. Navigate to the /WaveLore/bin folder.
3. Double-click "ResTool.exe" and a window for Ogre Display Settings will appear. See Figure 1 below for an example of the Ogre Display Settings window.
4. Select "Full Screen: Yes" for all roles except the Server. Toggle Yes or No by using the drop-down menu at the bottom of the window.
5. Select "VSync: Yes" for all roles. Toggle Yes or No by using the drop-down menu in at the bottom of the window. This maintains visual synching between all the different roles.
6. Set the resolution "Video Mode:" by using the drop-down menu to select the correct resolution of the display you are using. Use the "Quick Reference Display Settings" found in Table 1 to find the settings for each role.
7. Press "Ok" to accept the settings
8. Launch WaveLore.exe

Figure 1: Ogre Display Setting menu launched from the "ResTool.exe"

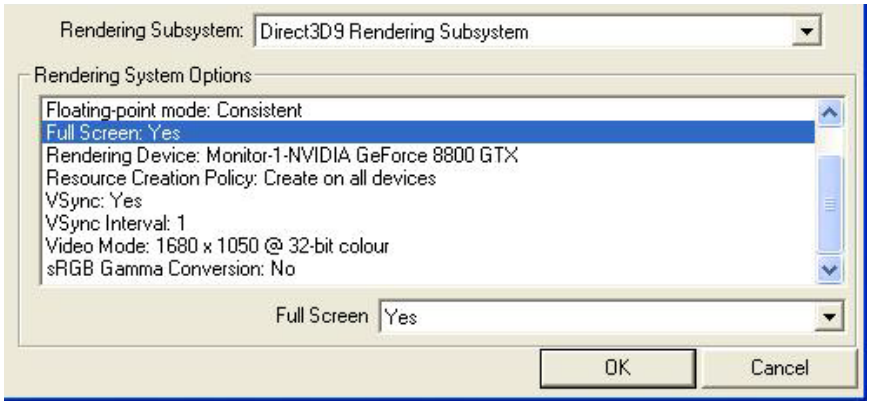

Figure 2: Menu showing the selection for Full Screen

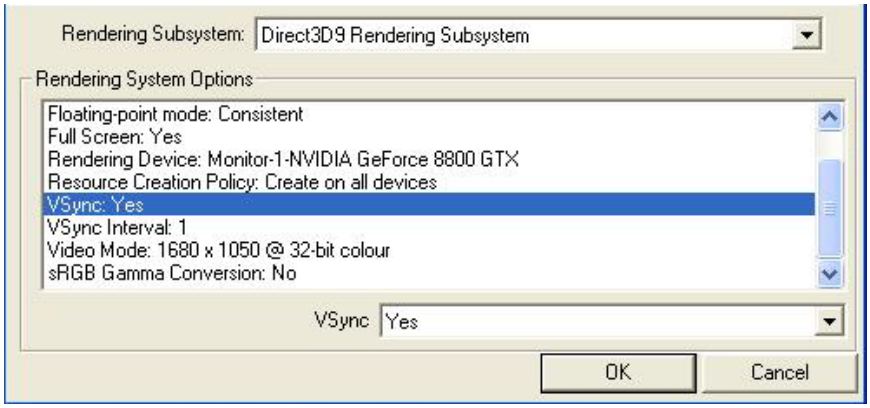

Figure 3: Menu showing the selection for synching the views in all the roles

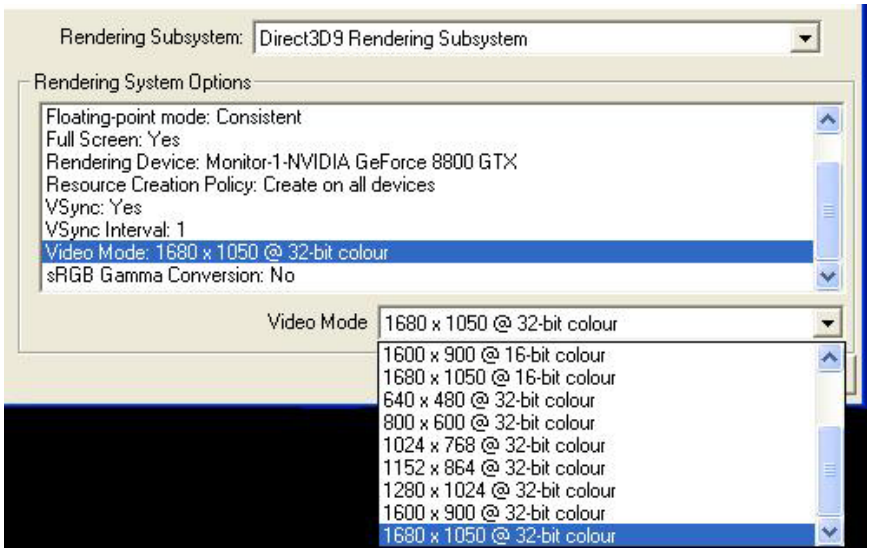

Figure 4: Menu showing the resolution selections possible on a particular computer.

WaveLore Display Settings

Aspect ratio can be adjusted in WaveLore while at the Initialize Menu. See Figure 5 below, for an example of the menu.

To access these settings:

1. Press Alt + O
2. Select the appropriate aspect ratio:
    a. Default – is the previously selected aspect ratio
    b. 4:3 – Standard TV/non-widescreen monitor
    c. 16:9 – Standard Widescreen TV
    d. 16:10 – Standard Widescreen Computer Monitor
3. 16:9 and 16:10 are for the three-screen setup on the Conning Officer role, and any widescreen monitors.
4. 4:3 is for standard non-wide screen TV/Computer aspect ratio.
5. Continue launching WaveLore

Figure 5: WaveLore Display Settings Menu

Quick Reference Display Settings

Note that on computers with better quality video cards there will be higher resolution selections.

Here are suggested display settings for each role:

Table 1: Resolution settings for each role

Role	Full Screen	VSync	Resolution
Server	No	Yes	800x600 or 1024x768
Instructor	Yes	Yes	1360x768
Conning Officer	Yes	Yes	3840x1024
Helmsman	Yes	Yes	1024x768
Radar Operator	Yes	Yes	1680x1050
Bearing Taker/Lookout	Yes	Yes	1680x1050
Navigator	n/a	n/a	The resolution should be set to the suggested resolution required for RayMarine® RayTech Navigation Software

Chapter

4

Starting WaveLore

A WaveLore Suite consists of multiple computers networked together with a main server controlling the network traffic and keeping the simulation synched.

All WaveLore computers have an initialize menu that consists of two fields: (1) The IP address of your server, and (2) the Port Numbers available on your server. See Figure 6 below for a look at what an Initialize Menu looks like:

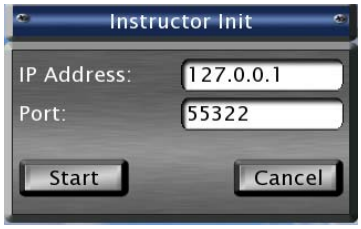

Figure 6: Screen capture of the Instructor Initialize Menu

The Server Initialize Menu (*Figure 7*, below) is unique in that it allows the server computer to either be a host server, or connect to another server. The connect function is for joining two WaveLore Suites together that are located on different networks. More about this is covered in the Networking Chapter.

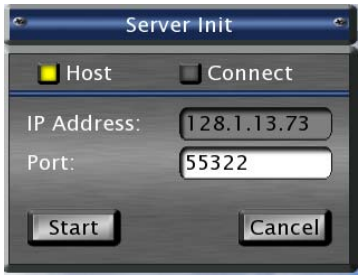

Figure 7: Screen capture of the Server Initialize Menu

Finding Your IP Address

Start up the computer, run WaveLore, select the server in the role menu. Once the server in WaveLore is running it will display the computer's IP address.

Alternatively, IP addresses for any computer can be found with the following steps:

Step 1—Go to Start/Programs/Accessories/Command Prompt

Step 2—Type in "ipconfig" in the command prompt and press Enter.

See *Figure 8* below for where to look for your IP address:

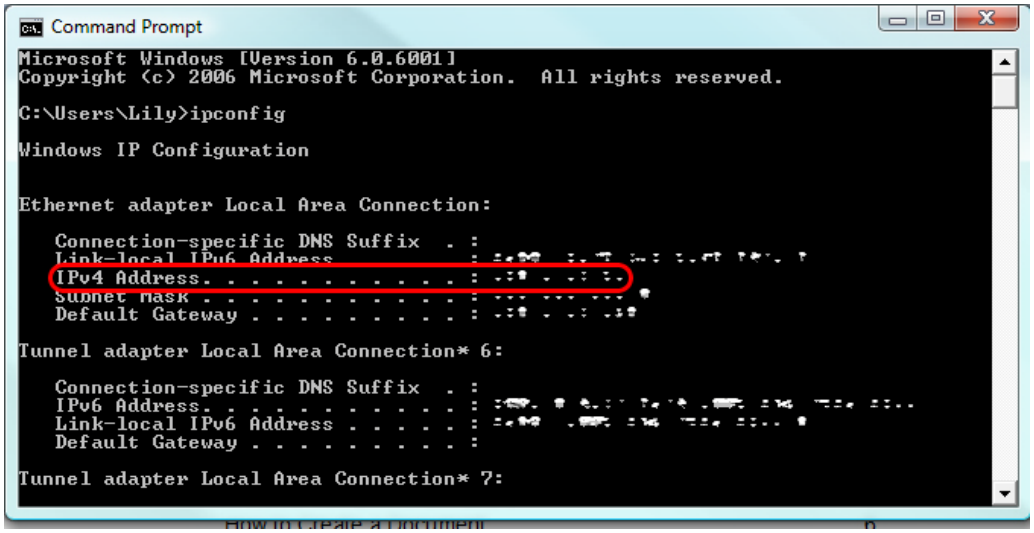

Figure 8: Command Prompt showing where to find your IP address. IP address is circled in red.

Finding Your Port Number

The Port Number allows other computers in your WaveLore Suite to send and receive data from the server. The server will have certain ports that you can select from the menu. It is important to note which port number you have selected so that the correct port number is entered or selected on each machine connecting to the server.

Computer Start Sequence

Here is the sequence for starting up the various computers that are part of your WaveLore Suite.

1. First start the server
2. Then start the Instructor seat
3. Connect the Instructor seat to the server by using the server's IP address and port number in the initialize menu.

i. ****Note:** The Instructor or System Administrator will need to ensure that all the computers connecting to the server use the server's IP address and port number

4. Next, start up the Helmsman seat and connect it to the server
5. Finally, bring the remaining computers up and connect them to the server (Conning Officer, Bearing Taker/Lookout, Radar Operator, and Navigator).

Screen Saver, Sleep Mode and Time outs

System Administrators and/or Instructors should check all computers that are part of the WaveLore suite to ensure the following:

1. Screen savers are disabled
2. Sleep and hibernation mode are disabled

If computers are setup with screen savers, and/or sleep/hibernation mode this can lead to server disconnection or time outs of other roles.

Turning Off Screen Savers and Sleep Mode

Screen Savers

1. To disable Screen Savers, right click on your desktop and select "Personalize"
2. Select, "Screen Saver"
3. Select (None) from the drop down menu
4. Click "Apply"

Sleep Mode

1. To disable Sleep Mode, go to Start Menu/Settings/Control Panel
2. Select, "Power Options"
3. On Windows Vista, in the menu at left, select "Change when the computer sleeps"
4. Use the drop down menu for "Turn off the display" and select "Never"
5. Use the drop down menu for "Put the computer to sleep" and select "Never"

Chapter

5

Roles in WaveLore

Six (6) first-person interactive roles are available in WaveLore: Instructor, Radar Operator, Helmsman, Bearing Taker/Lookout, Conning Officer, and Navigator. This chapter highlights what each role can do. Note that some roles have similar capabilities. For example, some of the tools in the Conning Officer role are the same as the Bearing Taker/Lookout role.

Server
The Server while not technically a role is available as a selection in the role menu, allows the Instructor to connect all the other roles together so that multiple users can cooperatively experience the WaveLore bridge team training simulation. The server also helps the Instructor keep track of what roles and contacts have joined or not joined the simulation. In the multi-team network setup, the server can be a Host Server that the servers of other WaveLore teams can connect to.

Instructor
The Instructor role is able to control the main DDG's course and speed, place/remove contacts in the WaveLore environment, control the course and speed of contacts, control wind speed and direction, change to day or night mode, and/or run a man-overboard scenario. Instructors also have the ability to save scenarios and load saved scenarios for other students to work through.

Radar Operator
The Radar Operator role will be able to track contacts and find bearings of contacts that appear on the radar display. Contacts appear as blips in their relative locations.

Helmsman
The Helmsman role will use a touch-screen and wheel to control the course and speed of the DDG. Once the Helmsman is in control of the ship, the Instructor will no longer be able to edit the course and speed of the DDG. The Instructor may however drag the DDG around while in the Scene Map View.

Bearing Taker/Lookout
The Bearing Taker/Lookout's role can be run on one (1) computer with the ability to toggle from each bridge wing, or two (2) computers allowing for two students to engage as Bearing Taker/Lookouts for each bridge wing. This role is stationed on the bridge wings only and allows users the ability to provide bearings using alidades; and view other ships and landmasses using binoculars.

Conning Officer
The Conning Officer role will be able to move freely throughout the pilothouse of the DDG and out to either bridge wing. The Conning Officer is responsible for coordinating the crew. He/she has the option of using alidades at port, center, and starboard; as well as the binoculars to observe other ships. The Conning Officer must also deploy a smoke and life ring into the water when a man-overboard event occurs.

Navigator
The Navigator role does not take place in WaveLore's simulation software. The WaveLore Server and the computer running the Raymarine RayTech navigation software will be connected allowing the WaveLore server to transmit simulation coordinates into real world coordinates that can be tracked on the Raymarine RayTech GPS navigation software.

Recorder
Like the server, the recorder is not technically a role but is available as a selection in the role menu. The Recorder allows the Instructor to create a recording of a simulation for later playback and review. The use of the Recorder is covered in more detail in the Record and Playback Chapter.

Role Selection

Figure 9 shows the Role Selection menu that appears after WaveLore loads. This menu gives you the option of choosing the role of Instructor, Radar Operator, Helmsman, Conning Officer, Bearing Taker/Lookout, Recorder, or Host Server.

The Navigator client is restricted to the machine on which the Raymarine RayTech GPS navigation software is installed, so that role does not appear in this menu.

The host server machine must be running in order for networking to be enabled.

Figure 9: Screen capture of the Role Selection menu.

Chapter

6

WaveLore Controls

This chapter will introduce and explain the controls available for each role. Some roles have limited controls and others have multiple menus to interact with.

Server Controls

The server has one menu for interaction which gives Instructors the option to run a server or connect to Host Server. The Instructor simply makes a selection of either "Host" or "Connect". See *Figure 10* below for an example of the menu.

**Note: On the keyboard the Server can reset the DDG by pressing the T key.

Figure 10: Server Initialize menus for starting a host server or connecting to a host server.

Instructor Controls

The instructor is responsible for setting scenarios in WaveLore. Once the Instructor role has been selected, the **Instructor Menu Bar** will appear at the top of the screen.

The Instructor menu bar consists of seven menus (*Figure 11*, *Figure 12*). The menu bar allows the Instructor to add/edit contacts, adjust the sea state using the wind controls, and change from day to night using the time control menu.

Figure 11: Screen capture of the Instructor's Menu.

When clicked, each menu drops down to reveal selections and fields to add variables (*Figure 12*).

Figure 12: Menus in the Instructor's Menu Bar.

DDG Menu

The DDG Menu allows the Instructor to change the course of the DDG immediately or over time, and the speed of the DDG immediately or over time.

Adjusting the course and speed of the DDG

1. While in the DDG Menu, enter the new course and speed
2. Enter the time, in seconds to reach the specified course and/or speed
3. Click apply

Buttons in the DDG Menu

Go To — Clicking on this button will lock the Instructor's view to a camera on the ship's bridge.

Leave — Once "Go To" a ship has been selected; the "Go To" button becomes the "Leave" button. When you click on it, the ship will move on without the Instructor. The Instructor's view is no longer locked to the DDG's pilothouse.

Apply — This button applies the values entered in the fields.

Moving in Standard/Normal View

The Instructor can move around the scenario using an Xbox360 Controller or by using a keyboard and mouse. See Figure 13 for a visual detail of the Instructor movement controls on the keyboard/mouse and Xbox controller.

Keyboard/Mouse Controls— Change the viewing perspective by holding down the Right-mouse button while using the W, A, S, D keys to respectively move up, left, back, right.

Xbox 360 Controls— Change the viewing perspective using the right joystick while using the left joystick to move up, left, back, right.

****Note:** When using the Xbox 360 controller, hold the right trigger button then use the left joystick to move forward to boost movement speed.

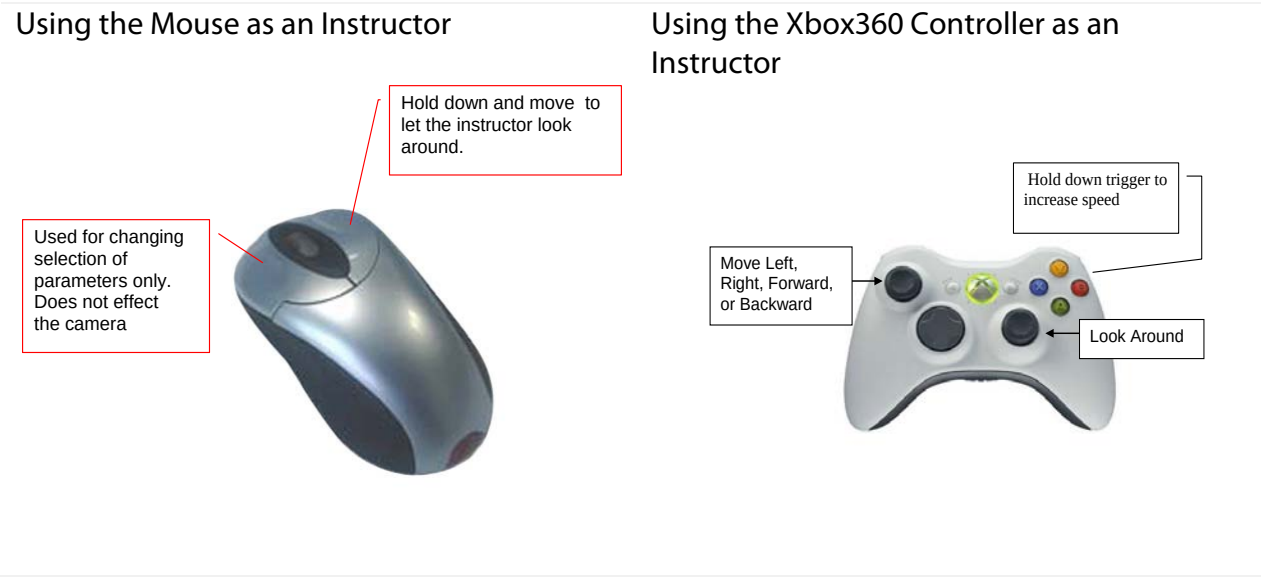

Figure 13: Illustration of the mouse and Xbox 360 controls.

Contacts Menu

All contacts that are added into a WaveLore scenario appear here in a list. When more than three (3) contacts are added a scrollbar is available to access other contacts. Each contact can have its course changed immediately or over time, and speed changed immediately or over time.

Adjusting the course and speed of a contact

1. Select a contact that you wish to adjust the course and speed for
2. Enter the new course and speed
3. Click apply

Buttons in the Contacts Menu

Go To — Clicking on this button will lock the Instructor's view to a camera on the ship's bridge.

Leave — Once "Go To" a ship has been selected; the "Go To" button becomes the "Leave" button. When you click on it, the ship will move on without the Instructor.

Remove — This button removes the selected contact from the environment.

Apply — This button applies the values entered in the fields.

Man Overboard Menu

For simulating a man-over-board scenario this menu provides the Instructor with the option of randomly inserting a sailor into ocean on either the port or starboard side of the DDG. The bridge team will have to react accordingly to rescue the sailor.

Placing a Man Overboard

1. Use the Man Overboard menu and select either port or starboard side to drop a sailor overboard.
2. Zoom in to where, Oscar, the Man Overboard Avatar is positioned in the sea then click and drag him to reposition.
3. Direct students to react accordingly to rescue Oscar
4. The cancel button will appear which allows the Instructor to end the scenario at any time.

****Note:** After a smoke and a float have been dropped by the Conning Officer they cannot be dropped again until the Instructor cancels the MOB scenario and places Oscar overboard again.

Scenario Control Menu

This menu allows the Instructor to save the current settings and attributes of your scenario. The scenario can then be loaded and replayed. This is particularly helpful if an entire class is given the chance to work through the same problem in different groups.

Save a Scenario

1. Use the Scenario Control menu and enter a name for the scenario to be saved.
2. Click "Save"

Load a Scenario

1. Use the Scenario Control menu and select the name of the scenario to be loaded.
2. Click "Load"

****Note:** This currently saves all ship orientation, velocity, position, time of day, and wind settings for the DDG and all contacts within the scenario.

Add Contacts Menu

When this menu is activated, the screen changes to a top down view of the WaveLore environment. The Instructor can then add contacts to a scenario.

Adding Contacts to a Scenario

1. Click on the "Add Contact" menu while in Scene Map View.
2. Select a contact to drop into the scene.

3. Use the small green dot which appears near the beginning of each contact title to drag the cursor/contact to desired location on scene.
4. Click to drop the contact into the scene.

Available Types of Vessels

The current available contacts include: additional DDGs, a naval supply ship, a civilian tanker, a civilian Freighter, a Chinese Destroyer (051B Destroyer, Shenzhen), and a Tugboat.

For more information on purchasing additional custom ship models please contact us at 1-800-866-6402 or email us at support@angleinc.com

Turning Scene Map View On/Off

1. Press the Tab key to toggle between the Standard View and Scene Map View. See *Figure 14* below for the difference between the two views.

Standard View

Scene Map View

Figure 14: Screen captures of the Standard/Normal View and the Scene Map View in WaveLore

Moving in Scene Map View

- While in Scene Map View, change the view by holding Ctrl and left clicking on the desired location on the scene map. This will instantly transport the Instructor's view to the cursor location.
- Use the W, A, S, D keys to respectively pan up, left, down, right while in Scene Map View.

Zoom In/Out in Scene Map View

1. Right clicking on the ocean scene will allow you to zoom in to a view of 40X40 nautical miles of ocean, centered at the location of the cursor.
2. Right click a second time to zoom in to a view of 4X4 nautical miles.
3. A third right click will give you back the original scene map. The dimensions of the original scene map are 250 X 250 nautical miles.

Turning the Grid on in Scene Map View

1. Press the *G* key

2. A grid will appear along the edges to indicate the range of the scene map. This grid is intended to simplify the contact insertion process.

Wind Control Menu
Using this menu you can control wind speed and wind direction. This will affect the ocean surface and in turn the pitch and roll of ships you have placed in your scenario.

**Note: The wind direction is a "to" direction not a "from" direction.

Harbor Control Menu
This menu allows the Instructor to select harbors to train in and to toggle from day to night.

Recorder Control Menu
This menu allows the Instructor to control the recorder. The use of the Recorder is covered in detail in the Record and Playback Chapter.

Screen Capture

1. Press F12 and a screen capture will be saved in jpeg format to the*WaveLore2**WaveLore 2.0**screenshot* directory.
2. This will help Instructors save images that highlight teaching points to bring up later for class-wide discussion.

Scenario Changes While WaveLore is Running
WaveLore has to dedicate some memory to loading the new vessels, or sea state changes. This will cause a small but visible pause during the simulation.

WaveLore Memory Management
Prior to running a scenario, the Instructor should do the following steps to limit the amount of data that WaveLore has to load:

1. Add all the contacts to be used in the scene
2. Delete all the contacts from the scene that are not immediately needed.
    a. Now that the contacts have been loaded into memory, any contacts that were previously added can be added during the scenario without causing a long pause.
3. Toggle the day and night mode on and off. Then set the mode that you wish to start with.
4. Run the scenario.

Quitting/Exiting WaveLore
1. To exit WaveLore hold down the ALT button on the keyboard and press the F4 key.
2. In order to switch roles within the simulation you must first exit the program then rejoin the server.

Conning Officer Controls

The Conning Officer role can be used on either a single screen display or with three-screens.

Using a Keyboard and Mouse

Here are the different controls possible for the Conning Officer using a keyboard and mouse.

Movement

1. Press the W or Up Arrow key to move forward
2. Press the A or Left Arrow key to move left
3. Press the S or Down Arrow key to move backward
4. Press the D or Right Arrow key to move right
5. Change the viewing perspective by holding down the Right-mouse button while using the W, A, S, D keys to respectively move up, left, back, right.

Binocular Mode

1. Press the F5 key to toggle on **Binocular Mode**.
2. While in this mode, the binoculars can be zoomed in and out with + and - keys.
3. Turn the binocular mode off to select Alidade Mode

Alidade Mode

1. Use the F2, F3, and F4 keys to switch alidade views on the port side, bridge, and starboard side respectively.
2. Press the F1 key to return to normal view.

Laser Range Finder

1. Press and hold the Tab key to activate the laser range finder.
2. Use the mouse to aim at other vessels.
3. Press the Q key to toggle between the port and starboard side laser range finder.

Man Overboard

1. Press the Insert key to drop a smoke and float over the port side.
2. Press the Page Up key to drop a smoke and float over the stbd side.

Using an Xbox Controller

Here are the different controls possible and what they do using an Xbox controller.

Figure 15: Controls on the Xbox controller

Movement

1. Use the left and right joysticks as in *Figure 15*
2. The left joystick is for moving around in space
3. The right joystick controls where the current view

Binocular Mode

1. Use the Y button to toggle on Binocular Mode.
2. Zoom with Left (LB) and Right (RB) shoulder buttons.

Alidade Mode

1. Use the D-pad Up Arrow for the Central alidade view
2. Use the D-pad Left Arrow for the Port alidade view
3. Use the D-pad Right Arrow for the Starboard alidade view
4. Use the D-pad Down Arrow to exit alidade view

Laser Range Finder

1. Use the Back button to activate the laser range finder
2. Use the right joystick to aim at other vessels
3. Press the Start button to toggle between the port and starboard side laser range finder

Man Overboard

1. Press the B button to drop a smoke on the starboard side
2. Press the X button to drop a smoke on the port side

Conning Officer Xbox Controller Quick Reference

Xbox Button		Action
	A	-n/a
	B	Drop Smoke Starboard
	X	Drop Smoke Port
	Y	Toggle Binocular Mode
	Up	Center Alidade view
	Left	Port Alidade View
	Right	Starboard Alidade View
	Down	Exit Alidade View
	LB	Binocular Mode Zoom In
	RB	Binocular Mode Zoom out
	Back	Activate laser range finder
	Start	Toggle port side and starboard side laser range finder display

Mooring the ship

The Conning Officer can command the mooring lines while at dock. Clicking the Mooring button on the screen will open the interface to give commands. (In order for the mooring system to function, the Helmsman's station must be up and running on the network).

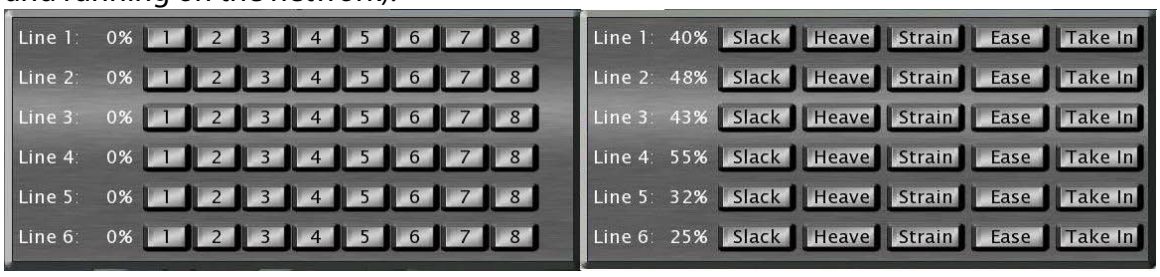

Figure 16 : Mooring GUI. Left: Lines all in. Right: Lines all out.

In the Figure 16, the image on the left shows the line commands when the lines are not in use. The buttons to the right of each line represent the eight mooring bitts on the dock to which the line can be attached. Once the ship is alongside the pier, the lines can be thrown to each bitt. The image on the right shows the

line commands when the line is connected with the pier's mooring bits. The percentage number represents how tense the line is. Below 100%, the line is slacked and not holding or pulling on the ship. At 100%, the line is taut and will hold the ship from moving away. Above 100%, the line has strained and will pull the ship against the pier.

Figure 17 shows the how the mooring lines are depicted in WaveLore. The lines shown do not represent how loose or tense the line is, rather simply indicate which connections are made between the ship and the pier.

To send out a line, select the number on the interface that corresponds to the mooring bit on the pier you wish to connect to. Each useable mooring is labeled on the pier by number.
Once attached, the Conning Officer can command the lines to be pulled in or let out.
Slack (away): pay out the line to give room for the ship to move away from pier.
Heave (in): pulls in the line until it is taut.
Strain: tenses the line to pull the ship into the pier (max 120%).
Ease (away): pay out enough to remove most of the strain.
Take In: removes the line from the pier.

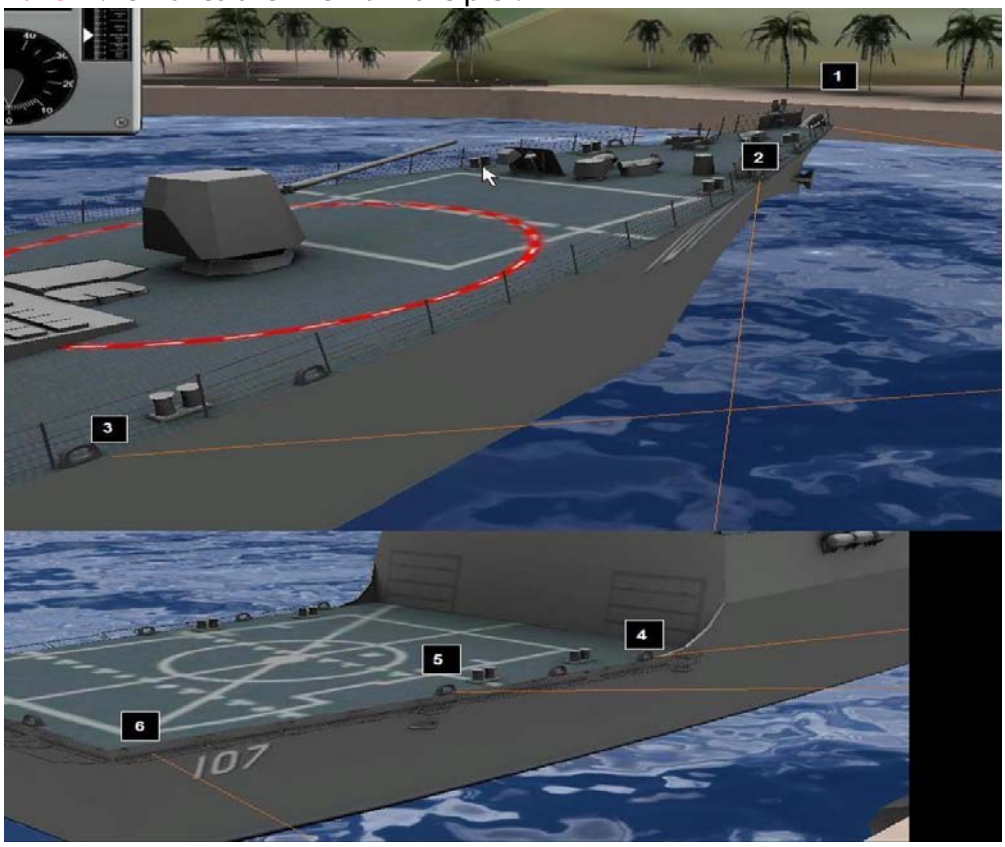

Figure 17 : Positions of the lines on the DDG

Radar Operator Controls

The Radar Operator role allows the bridge team to track contacts and monitor position from land. Any contacts within the maximum range of the radar display will be shown on the radar as blips in their relative locations. See *Figure 16* below for an example of the Radar Operator display.

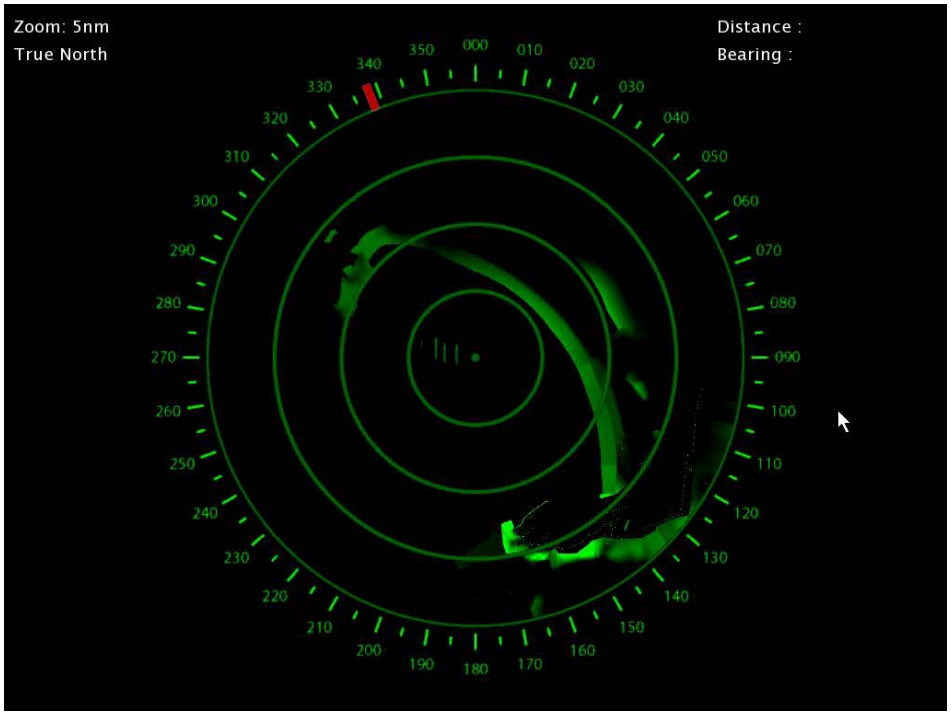

Figure 18: Radar Operator view

Changing the Range of View

1. Press the Up and Down Arrow Keys on the keyboard to change the maximum range of the radar display between 1, 2, 5, 10, 20, and 40 Nautical Miles.
2. The user can also use the mouse and left click the zoom level display (upper left corner) with the mouse to change the range.
3. The current range of view can be seen in the upper left corner.

Toggling between Ships Head Up and True North Modes

Two different radar modes can be toggled by pressing the Spacebar or by clicking the mode display:

Ships Head Up Mode **–** 000 at the top of the radar indicates the direction the ship is moving.
True North Mode **–** 000 indicates North.

1. The red marker on the degree scale indicates the heading of the student's ship.
2. The radar mode selected can be seen in the upper left corner.

Finding Contact Bearings

1. Left click the radar display to create a temporary marker of a contact.
2. View the contact's bearing and distance from the ship in the upper right corner of the screen.

Helmsman Controls

Helmsman controls consist of the touch screen and wheel. The touch screen displays the throttle controls for the DDG which consist of a rudder indicator, a compass, speed gauge, and pitch and bells. The wheel features a button for the DDG's horn.

Setting up the Touch Screen

When the touch screen is first connected it must be configured to operate accurately. Here are the steps for setting up the touch screen:

1. Run the Touch Configuration Application from the software that came with the monitor.
2. Navigate to the calibration menu and calibrate the screen for 25 points.
3. Push on the center of each circle for a couple of seconds and then release.
4. Once it is recognized it will display the next circle to touch until all 25 points have been recorded.

****Note:** The touch screen display must be set to 1024x768 using the Configuration. This is to ensure that the controls display properly and do not appear cut-off.

Wheel and Touch Screen Throttle

The wheel and throttle controls on displayed on the touch screen (*Figure 17*) are the Helmsman controls for the DDG.

Figure 19: Helmsman's wheel and touch screen display

Rudder Indicator

On the bottom left side of the Helmsman's screen is the rudder indicator. It gives you the angle of the rudder in degrees.

Nautical Compass and Speed Gage

The large black dial at the top left is a nautical compass; it gives you the direction the ship is heading. The rectangular box below the compass is a speed gauge and provides the ship's speed in knots.

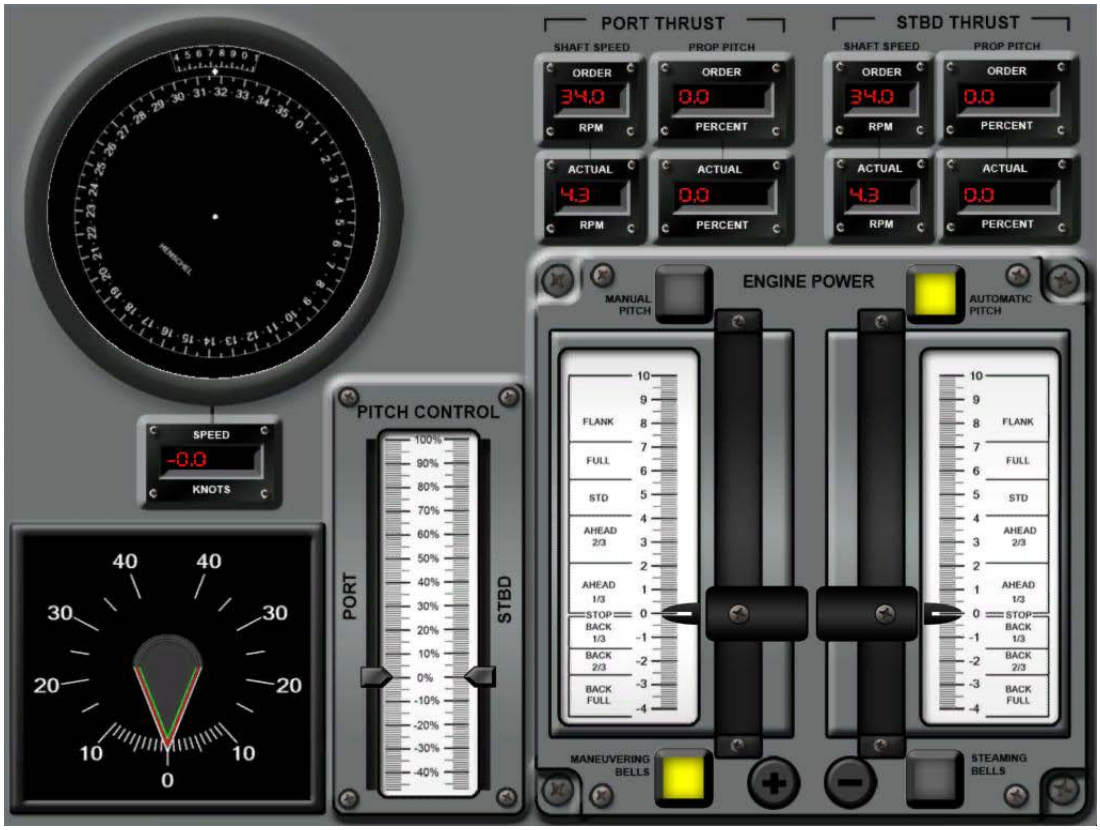

Figure 20: Large view of the touch screen throttle controls

Pitch

While the pitch is set to ***Automatic***, the pitch will be set based on the Bell set for each engine. In ***Manual Pitch*** mode, the Helmsman can change the pitch by dragging the indicator.

Bells

While the ***Maneuvering Bells*** mode is selected, the Helmsman can modify each engine separately. The engines can only be set from one bell to the next.

While in ***Steaming Bells***, the engines are set to the same power. The engines must be at the same Bell for steaming bells to be activated. The

Helmsman can drag the throttles to the desired power or use the + and – icons to increase the engines by a single mark.

Ship Horn

Using the small red button on the left side of the steering wheel the Helmsman can activate the DDG's horn.

Bearing Taker/Lookout Controls

View Movement

1. Change the viewing perspective by holding down the Right-mouse button to move left and right.

Binocular Mode

1. Press the F3 or Right Arrow key to toggle on **Binocular Mode**.
2. While in this mode, the binoculars can be zoomed in and out with + and - keys.
3. Press the Left Arrow key to switch to normal view.

Alidade Mode

1. Use the F2 or Up Arrow key to switch to alidade view.
2. Press the Spacebar key to return to toggle port and stbd alidades.
3. Press the F1 key to switch to normal view.

Navigator Controls

The Navigator role must be on a computer connected to the server station via a null modem cable.

1. Start the server and select a com port
2. Launch the Raymarine RayTech software
3. Make sure the appropriate charts are loaded. Check the Navionics CF card and ensure it is the Navionics XL9 - Mid America and Caribbean - CF Card Unit.
4. The Raymarine RayTech software will auto-detect a signal coming from the server computer.
5. The server will transmit the ship position from the simulation into real world coordinates reflected on the Raymarine RayTech software.
6. The student in the Navigator role will then be able to track the ship in space and work with the maneuvering board team to determine course corrections/changes for the DDG.

Chapter

7

Scenarios

This chapter will provide a quick reference for the steps Instructors should go through when setting up a scenario.

1. Start the Server and identify the Server IP address and port number.
2. Start the Instructor and connect to the Server using the Server's IP address and port number. Check the Server to see that the Instructor has connected.
3. Use the Server IP address and port number when starting up and connect the remaining roles to the server except the Helmsman. Monitor the Server to see that each role has joined.
    a. Note: If the Helmsman is connected to the server before the Instructor has finished setting up the scenario he/she will be unable to change the settings of the DDG.
4. At the Instructor's seat
    a. Use the DDG menu to setup the course and speed of the DDG.
    b. Use the "Add Contacts" menu to add contacts to the scenario.
    c. Use the "Contacts" menu to adjust the course and speed of the contacts in the list above.
    d. Use the "Wind Controls" menu to adjust the sea state.
    e. User the "Time Controls" to change to day or night.
    f. Save the scenario if desired.
5. Allow Helmsman to join the server to take control of the DDG and proceed through scenario.

Chapter

8

Current Editor

The ocean current editor allows the user to modify currents that affect the DDG in WaveLore. The editor can be opened by starting Ocean Current Editor application in the WaveLore folder.

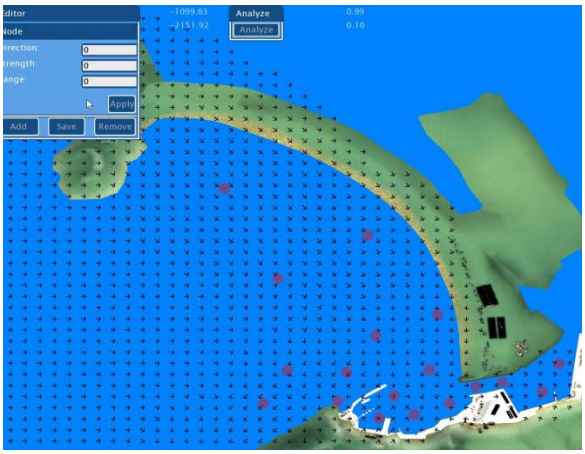

Figure 21: Current Editor

The arrows represent the direction of ocean currents at that spot. The red dots represent a **current node**, central point of influence on the current directions around it. By placing nodes into the scene and setting their values, you will influence the direction of the currents. The arrows in the current editor represent the direction of ocean currents at that spot. The red dots represent a **current node**, central point of influence on the current directions around it. By placing nodes into the scene and setting their values, you will influence the direction of the currents. The user will set the properties of each current node using the *editor* menu in the upper left corner of the Current Editor. The fields of the editor menu are:

Direction
Direction is the direction this node will influence the currents to travel in. specified in degrees from North in the first field of the editor menu.

Strength
Strength is a modifier to create a greater effect on currents than other surrounding nodes. The strength is specified relatively, the default value is zero and there is no maximum strength value, the bigger the number the more influence the node will have.

Range
Range is the radius around the node that it will have an effect. The further a point on the grid is away a node, the less influence it will have, up to its range.

Figure 22. Current Editor menu

Click "Add" to enable dropping a new node into the scene. Once in the scene, a node can be moved by clicking and dragging it to a new location. Click "Apply" to set those values into the node.

Click "Remove" while a node is selected to remove it.

Click "Save" to save the current settings of the scene. This will generate a file with the settings and can be located in the *WaveloreCurrentEditor\configs\release* folder. This file must be copied & pasted into WaveLore's *configs\release* folder for all WaveLore computers.

The - and + keys will allow the user to zoom in and out of the scene. Zoom in closer to get a more precise look at how the currents are flowing.

Select different harbors to edit in the harbor list.

Chapter

9

Networking

This version of WaveLore introduces the multi-suite networking feature. This feature allows one (1) WaveLore Suite to participate in the same network with other WaveLore Suites. For ease of understanding, WaveLore suites will be referred to as teams.

****Important note:** When connecting a multi-suite network setup, the team B Instructor role cannot change simulation settings. It can only observe.

Setting up the Host Server
Here are the steps to setup a host server for multi-suite networking:

1. Start team A's WaveLore server normally. Team A's server will be the Host Server.
2. Be sure team A's server is connected to the internet and that the router is forwarding the port number to the Host Server.
3. Provide team A's Host Server IP address and port number to any teams wishing to connect.
4. Have all team A's other roles connect to the team A Host Server.

Connecting Other Servers to the Host Server
Here are the steps to connect multiple WaveLore teams together:

1. Connect team B's server to another network by clicking "Connect" on the host server startup menu.
2. Enter the IP address and port number for team A's Host Server into the new fields.
3. Now team B's server is running and connected to team A's Host Server.
4. Have all team B's remaining roles connect to the team B server.

Chapter 10

Record and Playback

Version 2.8.0 of WaveLore introduces the Record and Playback feature. This feature allows a recording to be made of all environmental conditions, contacts and crew actions during a simulation for playback and review at a later time.

**Note: Record and Playback for multi-suite networking is not supported as of version 2.8.0.

**Note: The desired harbor should be selected before beginning a recording and should not be changed during a recording.

The Recorder Role

The recorder role, unlike other roles, can be used while minimized. Therefore, it can run on the same computer as another role or the Raymarine RayTech navigation software. The Radar Operator station is the recommended location to run the recorder role.

Launch Wavelore and select Recorder from the Role Selection menu. Once it has started, minimize Wavelore and launch another instance from the Start menu or desktop icon and proceed as normal.

Controls

The Record and Playback functions are controlled from the Instructor Station. The button for Recorder Control will be disabled (grayed out) if the Recorder Role is not connected.

Figure 23. The instructor's menubar showing the Recorder Control option disabled (top) and enabled (bottom).

The Recorder Control menu can be displayed in a compact or expanded state. The compact state appears by default. The expanded state can be seen by pressing the

More button. The More button then becomes a Less button that can be used to return to the compact state.

Figure 24. The Recorder Control Menu in the Compact state.

Figure 25. The Recorder Control Menu in the Expanded state.

The controls and fields on the Recorder Control Menu are described in detail in the Figure and list on the next page.

Figure 26. Large view of the Recorder Control Menu with the controls numbered according to the descriptions below.

1. **Bookmark** – click to add a bookmark at the current position on the progress bar.

2. **Elapsed Time** – the time that has passed in the current recording or playback.

3. **Progress Bar** – graphical representation of the time elapsed and remaining in the current recording session or playback.

4. **Remaining Time** – The time remaining in the current playback, or time left until recording will stop.

5. **Bookmark ticks** – indicated location of bookmarks in the current recording. Clicking on a bookmark tick will remove that bookmark.

6. **Record** – begin recording the simulation.

7. **Previous** – jump to the last bookmarked time before the current elapsed time in the recording, only available during playback.

8. **Rewind** – move quickly backwards through the recording, only available during playback.

9. **Stop** – stop recording or playback.

10. **Play** – begin playback of the recording indicated in the current file field.

11. **Pause** – pause the playback, the instructor can still move his camera, the Conning Officer can move around the bridge and use the binoculars, alidades and laser range finder.

12. **Fast Forward** – move quickly forward through the recording, only available during playback.

13. **Next** – jump to the first bookmarked time after the current elapsed time in the recording, only available during playback.

14. **Max. Record Time** – select the maximum record time for recording. Recording can be ended earlier with the Stop button.

15. **+30** – add thirty minutes to the maximum record time.

16. **List of Recordings** – list of recordings currently available for playback.

17. **Current File** – displays the name of the current recording file.

18. **Create** – create a recording file with the name entered in the Current File field. If no name has been entered, a default name will be used.

19. **Load** – load the file selected in list of recordings

20. **Notes** – up to 10,000 characters can be entered to describe the recorded simulation.

Recording

Before beginning a recording, the instructor has the option to create a name for the recording by typing it into the Current File box then pressing the Create button. If the Create button or record button is pressed without a name in the Current File box, a default name will be assigned. The default name consists of the name of the harbor, the current date, and the current time. If a recording with the selected name already exists, a "-1" will be appended to the end of the name.

The instructor also has the option of selecting a maximum record time from a list. The default value is 60 minutes. The recording will stop when this time has elapsed but the simulation will continue unaffected. If more record time is desired, the +30 button can be pressed to add an additional 30 minutes. This can be done before or during the recording.

Press the red Record button to begin the recording. The recording can be stopped at anytime with the Stop button.

Bookmarks and Notes can be added during the recording.

Playback

Select the name of a recording from the Recordings list and press the Load button. Press the Play button to begin the playback. If the wrong harbor is current loaded, the correct one will be loaded automatically before the playback begins.

The playback can be paused at anytime using the Pause button. The DDG, ocean and contacts will freeze. However, the instructor's camera can still be moved around, the conning officer can still move around the bridge and use the binoculars, alidades, and laser range finder.

The instructor can use the FastForward and Rewind buttons to move quickly through the playback or the Next and Previous buttons to jump to the next/previous bookmark.

Chapter 11

Advance and Transfer

Below is a table for the advance and transfer of the DDG in WaveLore. The table includes information on the approach speed, rudder angle, how far the DDG advances and transfers in water, and the final speed and turn angle of the DDG.

Table 2: Advance and Transfer table

Approach Speed	Rudder Angle	Advance	Transfer	Final Speed	Turn Angle
10.1331729	10	555.3404273	271.7433873	9.591325781	45
10.1331729	10	724.607792	829.5950452	9.588254504	90
10.1331729	10	454.3624018	1334.445892	9.583725342	135
10.1331729	10.25	-89.81227269	1498.923897	9.580673504	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
10.13284245	15	430.447094	217.017205	9.236593293	45
10.13284245	15	549.3954562	651.3112279	9.219992847	90
10.13284245	15	330.1424426	1035.830605	9.213850293	135
10.13284245	15	-92.25339924	1151.215135	9.207027393	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
10.13218154	20	374.8938319	162.9430615	8.893776582	45
10.13218154	20	489.3882507	540.76883	8.854083243	90
10.13218154	20	320.9620141	854.9252368	8.843139389	135
10.13218154	20	-29.99627352	967.4473765	8.836277612	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
19.95202588	10	581.4137223	236.7134269	18.90281547	45
19.95202588	10	778.2351386	772.6928887	18.88456275	90

19.95202588	10	544.2549309	1276.33835	18.8634137	135
19.95202588	10	36.06284615	1462.234124	18.83604435	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
10.12994612	25	322.3145237	168.8229342	8.55931841	45
10.12994612	25	396.0997667	493.774911	8.492916625	90
10.12994612	25	222.1650388	769.9224329	8.473944686	135
10.12994612	25	-92.6668136	841.3008408	8.464886363	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
19.94872134	15	433.7917339	215.821969	18.21780408	45
19.94872134	15	548.9388569	642.8781999	18.18184292	90
19.94872134	15	333.7763357	1016.819468	18.15707832	135
19.94872134	15	-75.35469869	1126.909782	18.1394282	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
19.95513603	20	369.6795834	184.3439964	17.54095684	45
19.95513603	20	454.3492083	521.7514775	17.36877094	90
19.95513603	20	276.9891085	815.9757556	17.35817698	135
19.95513603	20	-57.14659865	898.5398646	17.35825474	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
19.96427211	25	331.4365146	165.5778119	16.89425866	45
19.96427211	25	399.8407336	457.5878116	16.49853045	90
19.96427211	25	255.2533013	686.8619477	16.15810467	135
19.96427211	25	6.180635631	741.1965477	15.77203738	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
15.02387043	10	560.8313806	272.457264	14.22456089	45
15.02387043	10	726.67706	823.7419536	14.2124896	90
15.02387043	10	459.409503	1320.760878	14.20407275	135
15.02387043	10.25	-72.19024546	1480.244342	14.18628655	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
15.02060477	15	434.5045489	215.8670479	13.7009276	45
15.02060477	15	553.1036272	646.9002276	13.67252801	90
15.02060477	15	337.1291004	1026.496743	13.65625802	135

15.02060477	15	-78.63295892	1140.586487	13.6456835	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
15.01957453	20	369.4033859	186.441138	13.19235913	45
15.01957453	20	460.6692152	552.0497752	13.13326621	90
15.01957453	20	270.8349924	868.0827442	13.11089254	135
15.01957453	20	-81.69657356	955.8021903	13.09668302	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
15.01998274	25	329.0912366	167.7564229	12.70208225	45
15.01998274	25	402.8151842	490.3310165	12.59297416	90
15.01998274	25	230.481641	764.8222618	12.56801518	135
15.01998274	25	-80.94859026	835.7850898	12.54906268	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
25.22645808	10	549.0937133	259.0082527	24.00280691	45
25.22645808	10	710.6496737	788.9645003	23.99231014	90
25.22645808	10	458.1003562	1261.307137	23.97151099	135
25.22645808	10	-45.7521206	1414.569747	23.94876799	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
25.22917946	15	425.375279	203.3487612	23.16850814	45
25.22917946	15	530.1285284	581.4902958	23.03107821	90
25.22917946	15	337.2848984	918.475083	23.0299119	135
25.22917946	15	-38.53220124	1020.707547	23.03554906	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
25.22743	20	365.3721508	176.557948	22.36395021	45
25.22743	20	446.4983999	493.7789375	22.0216389	90
25.22743	20	292.4842209	749.7194356	21.74250259	135
25.22743	20	17.29194619	817.0993707	21.41457574	180
Approach Speed	**Rudder Angle**	**Advance**	**Transfer**	**Final Speed**	**Turn Angle**
25.22898508	25	330.6506384	156.8953603	21.59554781	45
25.22898508	25.25	399.4270263	439.3816745	21.12746966	90
25.22898508	25	259.5438762	665.1400322	20.71284727	135
25.22898508	25.25	15.4179973	720.4139813	20.18256603	180

Chapter 12

Speed Table

Below is a speed table for the DDG in WaveLore. The table includes information on the desired speed in knots, propeller pitch, shaft RPMs, and the actual speed in knots of the DDG while going at a particular speed.

Table 3: Speed table.

Desired Speed in kts	Shaft RPMs	Prop. Pitch %	Actual Speed in kts
1	34	2	1.01384
2	34	7.5	2.01148
3	34	16.6	2.99714
4	34	29.6	4.00241
5	34	46.2	4.99919
6	34	66.6	6.00034
7	34	90.7	6.99961
8	37	100	7.99128
9	41.5	100	8.9627
10	46.5	100	10.0393
11	51	100	11.0061
12	55.5	100	11.9689

13	60	100	12.928
14	65	100	13.9887
15	69.5	100	14.938
16	74.5	100	15.9855
17	79.5	100	17.0236
18	84.5	100	18.0502
19	89	100	18.9623
20	94	100	19.9599
21	99.5	100	21.0345
22	104.5	100	21.987
23	110	100	23.0032
24	115.5	100	23.9818
25	121.5	100	25.0009
26	127.5	100	25.9643
27	134.5	100	27.0123
28	141.5	100	27.9748
29	150	100	29.0277
30	159	100	30.0083
31	169.5	100	30.9917

Chapter

13

Radio Communications

This version of WaveLore introduces the multi-suite networking feature. This feature allows one (1) WaveLore Suite to participate in the same network with other WaveLore Suites. For this section each suite will be referred to as a separate team. While two or more teams are connected and collaborating in the same shared environment. Angle uses the Ventrilo™ software to simulate radio communications. For Ventrilo, it is necessary to purchase 3 sets of 2.1 speakers and 3 desktop microphones; one for Bridge-to-Bridge, one for Open TAC, and one for Closed TAC.

Recommended Speakers and Microphone
Angle currently uses the following hardware (available at Best Buy):

- Insignia™ - 2.0 Stereo Computer Speaker System (2-Piece) – Black
- Dynex™ - Voice-Certified PC Desktop Microphone

Where to Setup Speakers and Microphones
It is recommended that 1 set of speakers and 1 microphone be setup on any of the following computers within your WaveLore suite:

- Helmsman
- Radar Operator
- Bearing Taker/Lookout
- Server

Do not install Ventrilo on the following computers which primarily run:

- Conning Officer
  Why: this computer setup may already have speakers which provide sounds for the WaveLore environment. Adding a microphone will cause feedback problems.
- Navigator
  Why: this role is not connected to the internet and may encounter user authentication problems.

Installing Ventrilo Software

Follow these steps to setup the Ventrilo software on each of the three computers above:

1. Go to www.ventrilo.com

2. Select, "Download" from the menu

3. From the "Client programs" select the appropriate link for the computer you are installing this software. (e.g. all your computers have the Windows Vista OS, so select the link which lists Vista)

4. After the download is finished install the Ventrilo software

5. At the end of the install process, read the tutorial if it is the first time you are using Ventrilo.

Setting up Ventrilo User Access

1. **Important:**
   Now, you need to submit a support request ticket to setup your user account on the Angle Ventrilo server. This is for user authentication on the Angle Ventrilo server. Go to the link for submitting Support Requests on the Angle website www.angleinc.com. In the subject put "VENTRILO Registration Request" then enter your name, email address and your organization's name and press submit/send. You will receive your username via email.

2. On each computer where you have installed Ventrilo, open the Ventrilo program by going to Start/Programs/Ventrillo

3. Once Ventrilo is open click on the Add or Edit User Accounts button (see the image below)

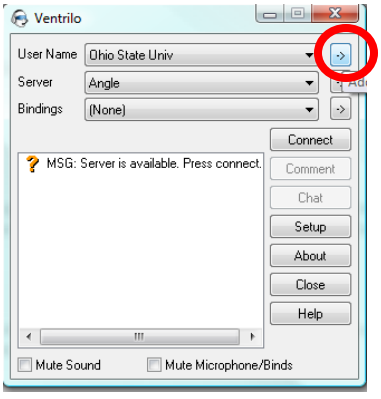

Figure 27: Ventrilo user setup

4. Select the "New" button and enter your username (which you received via email from Angle) into the field and click "Ok".

5. Click "Ok" to close the Setup User window.

6. Click on the Add or Edit Server Connections button (see image below)

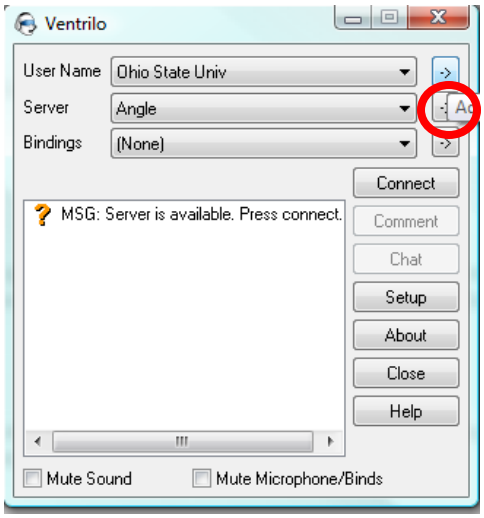

Figure 28: Ventrilo Server Connection Setup

7. Enter the Angle Hostname you received via email with your Ventrilo username. Click "Ok" to close the "Connection Editor" window.

8. Now click "Connect" and your computer will now be connected to Angle's Ventrilo server.

Setting up Push-to-Talk

In order for the push-to-talk functionality to work it is recommended to use the left control key on your keyboard as the push-to-talk hotkey. This key is not used in WaveLore and should not interfere with activities within WaveLore.

1. Click "Setup" in the Ventrilo window (see above)

2. Press the left "CTRL" key on your keyboard. Click "Ok" to close the window.

3. Repeat on the other two computers with Ventrilo.

Sessions on the Angle Ventrilo Server

1. While connected to the Angle Ventrilo Server, select a Session to join. It is recommended that when running multi-networking setups that the Instructors and/or Administrators discuss and agree in advance which session to join.

    a. Keep in mind that sessions are open for other teams to access.

2. Now, each team must connect each of their 3 computers to one of the channels within the session (e.g. Team A and Team B both connect the Ventrilo software running on their Helmsman station to the Bridge-to-Bridge channel, then Team A and Team B both connect their second Ventrilo connection to Open-TAC, and so on).

Unauthorized Usage of the Angle Ventrilo Server

By using WaveLore and the Angle Ventrilo Server all users agree to use the Angle Ventrilo Server specifically for use with WaveLore.

If any users are found abusing the Angle Ventrilo server for other purposes (e.g. piggy-backing, or pirating for use with online games) all accounts under that specific organization will be banned until the unauthorized usage is addressed by the organization responsible for maintaining and running the WaveLore suite.

Repeated offenses will require the Instructor/Administrator to apply for new user accounts and the old accounts will be banned from access. Angle will inform Instructors/Administrators of the need for registering new accounts prior to any account changes.

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