PLEASE!
PAY TO PLAY, OR EVERYONE LOSES!
Developers of computer simulations use the money they make from the sale of their products to stay in business. If potential customers steal their goods and services, prices must be raised to compensate for the losses. Soon legitimate customers can't afford to pay the higher prices, and everyone loses.

SSN-21 Seawolf ™ was produced for your enjoyment through the combined efforts of a dedicated team at Electronic Arts. We—designers, artists, programmers, and other committed professionals—depend on you to pay a fair price for our software so we can afford to create and develop new and better games. We encourage you to play and enjoy *Seawolf* with your friends, but please don't make illegal copies of the program for them.

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THE MAIN MENU: Mission Selection

Choose a player mode from the Main Menu, view the credits and the logbook, or quit to DOS.

Campaign Mode: Embark on a full-scale, multiple-mission campaign in effort to defeat the Soviet Fleet.

Any Mission: Take the enemy on one mission at a time. Performances are not cumulative.

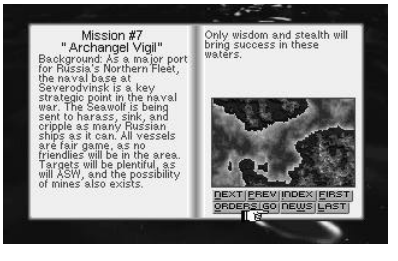
Two Player Missions: Take on an on-line opponent. For more information on Two Player missions, turn to page 38.

Credits: See who made all of this happen.

Logbook: The logbook offers keyboard help, informations on submarines and surface vessels, and information on your performance. For more information, turn to *Logbook* on page 21.

DOS: Exit to DOS.

When you select CAMPAIGN MODE or ANY MISSION, the Mission Selection Screen appears, providing the mission objectives.



- Click on *Orders* to get the lowdown from the Commander-In-Chief.
- Click on *Go* to begin the mission.
- Click on *News* to get an update of the World Situation.

- Click on *Index* to return to the Main Menu.
- Click on *Next* to advance to the next mission.
- Click on *Prev* to return to the previously viewed mission.
- Click on *First* to return to the first mission.
- Click on *Last* to advance to the last mission.

In CAMPAIGN MODE, the *Next* , *Previous*, *First* , and *Last* menu buttons are replaced by the *Skip* and *Erase* buttons.

- Click on *Skip* to go to the next mission.
- Click on *Erase* to erase the entire campaign.

Typing the underlined letter on any menu button also performs the button's command.

★ ★ ★

CHAPTER 1

Photo: Sturgeon class Tunny SSN-682

SYSTEMS OPERATION

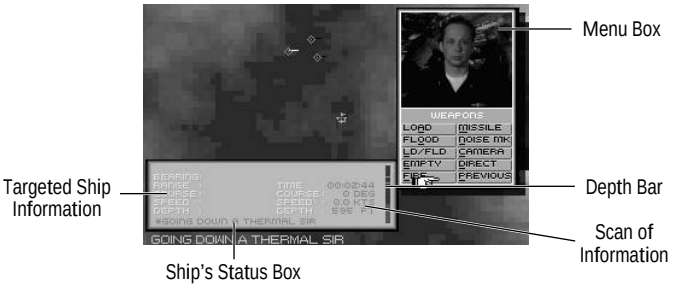
Following are three sections designed to help you become familiar with the SeaWolf. Each covers a specific set of functions you will need to master in order to survive.

- Movement covers movement, including speed, depth, heading and waypoints.
- Sonar Waterfall Display covers identifying vessels with sonar.
- Targeting and Weapons covers targeting and firing on enemies.

The instructions are presented so you can get into a mission and follow along step-by-step. The following instructions to starting a mission apply to any mission.

To Start a Mission:

1. From the Mission Selection Book, choose Any Mission.
2. Select Orders to view the mission objectives.
3. Click OK.
4. From the Any Mission page, select Go to start IVAN MARCHES.



To the right of the screen is the Menu Box. To the left is the Ship's Status box, which provides information about the SeaWolf and the currently targeted vessel (if a vessel is targeted).

MOVEMENT

Positioning is the foundation of tactical superiority. If you're out of position, you won't be able to target an enemy, let alone fire on him.

SET A HEADING

The heading is the direction in which a vessel travels. Setting a heading is simply changing direction.

To set a heading:

1. Type Ctrl-H.
2. Move the cursor to the desired point on the Top-Down map.
3. Click the left mouse button. The SeaWolf begins to rotate and move toward the new heading at 3.5 knots.

(If you're experimenting, set a heading at about two o'clock.)

From the Contour Map (F8) and the Periscope view (F9):

> Note: You must remove the menu box by pressing ESC.

1. Press the left or right mouse buttons until you are looking in the direction you wish to move.
2. Type Ctrl-H.

SET DEPTH

There are several ways to set a depth:

- Through the SCP menu, then the depth menu
- Ctrl-J, then enter numerically a depth
- Ctrl-U (up a thermal)
- Ctrl-D (down a thermal)
- F9 (periscope depth), then press E

Try rising to periscope depth, then diving.

1. Press F9, then click on PERISCP or press E when the SCP-Depth menu appears.

Note the Depth Bar on the right side of the Ship's Status box. The green marker represents the SeaWolf's depth.

2. Once the SeaWolf has reached periscope depth, press the < and > keys to rotate the periscope.

3. After you look around, press F6 to return to the Top-Down map, then press Ctrl-D to drop down one thermal.

PROPULSION

Two sources of power, diesel-electric and nuclear, have proven effective for submarine propulsion.

Conventional Submarines

Conventional submarines use diesel engines and electric batteries for power. On the surface, the submarine can run on diesel power — a very noisy powerplant, but one that is cheap and easy to maintain. Once submerged, the ship can operate silently on batteries for a number of hours, after which it must recharge its battery complement by running the diesel engines. This is accomplished either by returning to the surface or by a snorkel tube that can be raised above the surface to draw oxygen and expel exhaust.

Conventional submarines have the advantage of being virtually silent when operating on battery power. Unfortunately, the time they can spend submerged is very limited, and the hours they must spend on the surface make them even more vulnerable to attack. Despite these disadvantages, conventional submarines are inexpensive to both buy and operate, making them popular among the majority of the world's navies.

NUCLEAR SUBMARINES

Nuclear submarines use one or more nuclear reactors to heat water, which in turn drives a turbine connected to the propellor shaft. Reactor types vary according to the coolant used to transfer energy from the reactor to the turbine. The most common design uses pressurized water to control the power output of the reactor. These large systems allow the water coolant to circulate by natural convection, thus avoiding the noisy water pumps. Less common are liquid metal-cooled reactors, which require pumps to drive their secondary water systems. While experiments such as the Soviet Alfa class SSN have proven that liquid metal-cooled systems are inherently louder, they have the advantage of being smaller and more powerful.

Nuclear submarines have many advantages over conventional submarines. With no need to recharge batteries, nuclear submarines can spend months or even years at sea without surfacing. Their major drawback is strictly financial — nuclear submarines are very expensive both to build and operate, such that only the most affluent countries can maintain nuclear fleets. Aside from their cost, the only other disadvantage to these submarines is that they're larger and noisier than conventional submarines. This is, however, an acceptable trade for the unlimited range and length of tour provided by nuclear power.

SET SPEED

There are five speed settings with hot keys:
0=full engine stop
1=1/4 of full engine speed
2=1/2 of full engine speed
3=3/4 of full engine speed
4=full engine speed
5=flank (emergency) speed

To Set the SeaWolf's speed: Press the 1-5 keys at any time.

Keep in mind, the faster the SeaWolf is moving, the more visible she is to other vessels' sonar. In combat the SeaWolf moves at low speeds. Flank, full engine and 3/4 full engine are used for emergency situations and for transiting to other patrol sectors. The SeaWolf cannot operate above 1/2 speed when the Towed Array is deployed.

SET WAYPOINTS

A waypoint is a destination you set for the SeaWolf. Once you set a waypoint, the ship's autopilot guides the ship to the destination. You can set up to nine destinations for the SeaWolf so you can tend to other business, such as reading the Waterfall Display or loading torpedoes. The SeaWolf goes to waypoints in the order in which they are set.

To set a Waypoint:

1. Type Ctrl-W.
2. Move the cursor to the desired point on the Top-Down map.
3. Click the left mouse button (or press ENTER). The number 1 appears, and the SeaWolf begins to rotate and move toward the new waypoint.

To set additional waypoints:

1. Type Ctrl-W.
2. Move the cursor to the desired point on the Top-Down map.
3. Click the left mouse button (or press ENTER). The number 2 appears. After the SeaWolf reaches the first waypoint, it begins to move toward the new waypoint.

To clear a waypoint: press the DELETE key. Waypoints are cleared in reverse order.

Try to set a waypoint ninety degrees (at three o'clock) from your ship's heading. Then set another waypoint just above and to the left of the first. Set a total of three waypoints. When the SeaWolf has reached the last waypoint, it continues moving at the same heading, speed and depth.

CLEAR THE BAFFLES

(Turn around and see what's behind the SeaWolf) After the SeaWolf has completed its circuit, type Ctrl-B. The submarine begins a 180 degree turn. Submarines clear their baffles every half hour or so as a routine.

Note: If the Towed Array is deployed when you give the command to clear the baffles, it is automatically retrieved. You must type Ctrl-A after the baffles have been cleared if you wish to deploy it again.

THE SONAR WATERFALL DISPLAY

While the Top-Down map displays information your sonar officer has processed, the Sonar Waterfall Display shows the raw sonar data as it is received. Mastering the Waterfall Display allows you to confirm the location and identity of vessels much more quickly.

To deploy the towed array: type Ctrl-A.

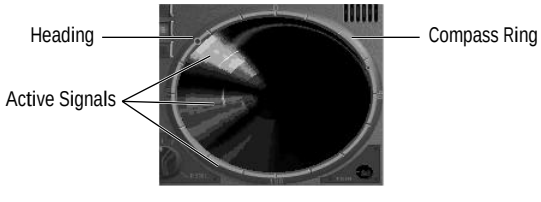
To access the Sonar Waterfall Display: type Ctrl-F.

The Waterfall features four sonar displays:

- Main Circular Display
- Signal Analyzer Display
- Bearing Display

MAIN CIRCULAR DISPLAY

The Main Circular Display shows a time-history of sonar contacts and their locations relative to the SeaWolf.



SENSORS

Below the ocean surface the submarine is blind in the most literal sense. Her crew can, of course, sense the world above via the periscope, a long optical tube that reflects light and allows the captain to target and identify surface ships. The periscope provides instantaneous information concerning surface targets and airborne threats. This information has a price — the periscope mast can be detected both visually and by radar, thus giving away the submarine's presence to its prey and alerting enemy antisubmarine warfare (ASW) forces.

In any case, the periscope provides no information on enemy vessels operating below the surface. To detect these threats, the submarine must rely totally on sound transmissions or sonar. Sonar stands for Sound Navigation Ranging and works on the principle that all objects in the water are subject to detection — either because they produce sound waves or because they reflect them.

SENSORS (cont.)

There are two types of sonar: active and passive. Passive sonar uses arrays of sensitive listening devices known as hydrophones to pick up sound waves . These are located on various surfaces of the submarine — typically in the bow, midship, and aft — providing nearly 270° sonar detection capabilities. The highest concentration of arrays is in the bow of the ship, thus providing excellent forward detection.

The hydrophone arrays transmit sound to a sonar operator, who sifts through the noise for familiar patterns created by natural and man-made sources: everything from dolphins, whales, and shrimp to ships and submarines. Detecting and analyzing patterns in the cacophony of the sea is as much an art as it is a science. Naturally, modern submarines contain a vast number of technological wonders to aid the sonarman in his search for the enemy, all of them taking advantage of the great strides made in computer processing.

One such wonder is the towed array, a long, tapered cable with hundreds of hydrophones on it. Towed arrays provide the submarine with greater detection — especially in the vulnerable aft quarters — though they cannot completely overcome the disruptive turbulence created by the propellor.

Reading Active Signals

Think of the circumference of the Main Circular Display as a compass. As the SeaWolf's sonar picks up a signal, the signal is represented by a wash of color which first appears along the circumference of the Display. As time progresses, the wash of color bleeds in toward the center of the Display. When the signal fades, the color abruptly stops bleeding from the circumference of the Display.

There are several types of signals, each represented by a color:

- Surface contacts (ships) — Green
- Submerged contact (submarines and biologicals) — Blue
- Fast-moving submerged contacts (torpedoes) — Red
- Above-surface contacts (helicopters) — Purple
- Active sonar pings — White
- The SeaWolf's cavitation — Gray

Analyze Contacts

The SeaWolf's sonar is located in her bow. In this game, however, you can focus on and analyze a signal coming from any direction.

To Analyze a contact:

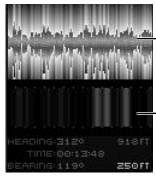
Press and hold the left or right mouse button (or press the left/right arrow keys). The red dot moves along the circumference of the Circular Display, indicating the direction in which the sonar is focused. For optimum reception, position the red dot at the strongest part of the signal.

The signal appears on the Main Circular Display and on the Contact Bearing Display, and the signature of the signal you are analyzing appears on the sonar Signal Analyzer (permitting the signal is strong enough).

You can also steer the SeaWolf into the sound to pick up a stronger signal.

SIGNAL ANALYZER

The upper portion of the Sonar Signal Analyzer indicates the strength of a signal, while the lower portion displays the computer's spectrum analysis of the signal.



Each vessel type has its own identifiable sonar signature, which can be seen and heard.

To Read the analysis:

Match the signature on the Signal Analyzer screen to one of the codes on the Reference Card. Once you have matched codes, you can identify the vessel as described in *Identify A Target* on page 15.

If you don't attempt to identify a signature, your sonar man identifies the target once the signal gains strength and he has spent enough time studying it. The sonar man is one hundred percent accurate in identifying targets, but he takes longer to analyze a signal.

Note: The estimated depth of the target contact is shown to the right of "Time:" only when the signal is strong enough.

Signal Strength

Signal strength is dependent on four variables: the SeaWolf's distance from the target, the speed at which the SeaWolf is traveling, the relative depth of the SeaWolf and her target, and the amount of noise the target makes.

The higher the SeaWolf's speed, the greater cavitation from the screw, and the more noise the sub makes. Not only does this noise make it easier for other vessels to detect the SeaWolf, it corrupts the SeaWolf's sonar. Cavitation is represented on the circular display by a gray haze. All things equal, signals from other vessels are clearer when the SeaWolf's engines are shut down.

To illustrate this point, try a simple experiement:

To see the effect of high-speed cavitation:

1. Press the F4 key to, then select TOW IN to retrieve the Towed Array.
2. When the Towed Array has been retrieved, type the 5 key to take the submarine to flank speed, then type Ctrl-F to return to the Waterfall Display. Note the gray haze that signifies screw cavitation. Press 0 to stop the SeaWolf.

The second variable is the distance between the SeaWolf and a target. Naturally, the SeaWolf's sonar is effective only to a certain range. That range is dependent on the other two variables.

The third variable is depth, more specifically, thermal layers. The SeaWolf's sonar is significantly more effective in tracking targets in the same thermal layer as the SeaWolf. (To learn more about thermal layers, turn to the sidebar on page 15.) It is best to dive a thermal layer or two to see if you can pick up stronger signals. When you get a good reading, maintain the same depth as your target.

If you can't make a match and the signal code in the display appears unusually complex, you may be listening to more than one signal. (That is, signals may be overlapping.) Set a different heading to try to separate the signals.

SENSORS (cont.)

While a towed array helps correctly detect and target enemy vessels, it limits the submarine's speed and maneuverability. Towed arrays are not effective in hard turns, and the fact that they oscillate at high speeds — thereby creating a substantial amount of noise — limits the overall speed of the submarine.

Active sonar is created by a sonar transducer in the bow of the ship that emits sound waves — the legendary "sonar ping." These transmissions are then reflected back by objects in the water and processed in the same way as passive transmissions. When an object isn't creating enough noise to allow the sonar operator to target and identify it, active sonar can provide the necessary sonar information. The only major drawback to actively targeting an object is the ping that gives away your submarine's position and clearly warns any opponents that your intentions are hostile.

SENSORS (cont.)

Sonar is an effective means of detection, but every vessel relying on it has a blind spot. Both a ship's propellor and the wake left by its hull create turbulence, and this in turn disrupts sonar reception in the aft quarter. Known as the baffles, this area directly astern the ship is the Achilles Heel of all propellor-driven warships. Both surface ships and submarines sense very little in their baffles.

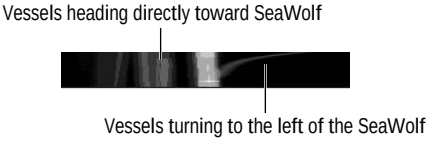
When on patrol, you should occasionally "clear baffles" — a term for making sure that no one is following you. Clearing baffles consists of stopping, making a 180° turn, and pausing to listen at what was behind you. This can be done manually or automatically (press Ctrl-B).

An Active Ping is a signal you send. It bounces off of other objects and back to your sonar, thus revealing the location of potential targets.

To send an active ping: Type Ctrl-P. Active pings reveal sonar information. You may get the Game Over screen after sending an active ping. Just press R to go back to the scenario.

CONTACT BEARING DISPLAY

The Contact Bearing Display shows the same contacts as the Main Circular Display.



The center is the SeaWolf's bow; thus, if a signal is in dead center, the SeaWolf is heading right for the source. The areas to the extreme left and right of the center represent the area 180° behind the SeaWolf. The screen scrolls from top to bottom as time passes. The signal of a vessel to the left of center indicates the vessel is to the left of the SeaWolf. The signals on the Contact Bearing Display show other vessels' heading changes in relation to the SeaWolf.

Change The SeaWolf's Heading

To change the SeaWolf's heading from the Waterfall Display:

1. Press the left or right mouse buttons to position the red dot at the desired heading.

2. Type Ctrl-H.

TARGETING AND WEAPONS

Targeting and firing on enemy vessels with speed is essential to survival. The following instructions may be best understood as you execute them in an actual mission.

SELECT A TARGET

You can select a target from the Top-Down Map (F6) or the Contour Map (F8).

1. Once you have entered the mission, type Ctrl-A to deploy the Towed Array, then type 0 to set your engine speed to zero.
2. Once the Towed Array has been deployed, unidentified targets appear on the screen.
3. Select a target by typing Ctrl-T, then by clicking on the target of your choice.

Once you have selected the target, you can press the " key to bring up target information on the vessel. You can also type Ctrl-L to access the logbook once the target has been identified and view general information about each vessel.

Note: You can select targets directly from the Top-Down and Contour Views.

IDENTIFY A TARGET

1. Type Ctrl-F to go to the Waterfall Display.
2. Click the right/left mouse buttons to center the red dot on the circumference of the Main Circular Display in the heart of a signal.
3. Match the signal code on the Signal Analyzer screen to one of the codes in the Reference Card.
4. Once you have matched the code and vessel, type Ctrl-I. The Overhead map appears, as does the Target Code Identification Box (unless the target's identity has already been confirmed).
5. Enter the number corresponding to the vessel that matches the target code, then press the ENTER key.

LOAD, FLOOD AND FIRE TORPEDOES

To Load and Flood a torpedo:

1. Press F3 to bring up the WEAPONS Menu.
2. Click on LOAD. The SELECT TORPEDO MENU appears.

3. Click on LONG RANGE. The torpedo is loaded into the tube. The SeaWolf has six torpedo tubes, so six torpeodes can be held at the ready.
4. Click FLOOD.
5. When the TUBE SELECT Menu appears, click 1. TUBE #1. The tube is flooded. You have only five minutes to fire the torpedo, so it's a good idea to flood no more than a few at a time.

Note: You can load and flood simultaneously by selecting LD/FLD from the WEAPONS Menu.

SONAR & THE OCEAN ENVIRONMENT

Several factors affect the transmission of sound through the ocean, but the most important is water density. Sound waves bend according to the density of the water they're moving through — that is, they bend toward areas with decreased density and away from areas with increased density. This would be a trivial fact if the ocean had a uniform density like that, say, of a swimming pool. In such an "ideal" environment, sound waves would radiate evenly, uninhibited by sharp contrasts in water density. Detecting a submarine would be only a matter of separating the sound of the sub from the multitude of noises produced by marine life.

Water density, however, varies greatly in the ocean. One major factor is pressure. Water pressure increases with depth. As water pressure increases, so does water density, with the result that sound waves bend upward the deeper they travel.

SONAR & THE OCEAN ENVIRONMENT (Cont.)

Another major factor affecting water density is temperature. Cold water is more dense than warm water; the ocean, heated by sunlight, tends to be warmer (less dense) near the surface and colder (more dense) at the bottom. However, the rate at which the temperature decreases is not as gradual as might initially be expected. In the ocean, temperature falls in distinct stages, with the result that the sea is made up of numerous layers with sharply contrasting temperatures. Such stages are collectively known as thermal layers.

The warm water that makes up the top layer is known as the surface duct, which can be tens to hundreds of feet deep, depending on the geographical location. Below the surface duct, the temperature falls in a series of layers of varying thickness until it reaches the thermocline. Below the thermocline, the temperature falls at an even rate all the way to the ocean floor.

To Fire a torpedo:

1. Select FIRE from the WEAPONS Menu. The TUBE SELECT screen appears.
2. Select 1. TUBE #1. The torpedo is fired.

GUIDE TORPEDOES

Once a torpedo has been fired, it can be directed to search out surface vessels and submarines. This option is valuable if you have not confirmed a target's identity but suspect the target is hostile.

To Direct a torpedo:

1. After a torpedo has been launched toward a target or a waypoint, type Ctrl-T.
2. Click on the torpedo you wish to direct.
3. Click on DIRECT in the WEAPONS menu. The DIRECT Menu appears.

4. Click on the option of your choice. (To learn more about the options, turn to *DIRECT* on page 27.)

LAUNCH MISSILES

Missiles can be launched from no deeper than Attack Depth and from a distance to the target no closer than two miles. There are three types of missiles: Harpoon, Tomahawk, and Sea Lance.

To Fire a missile:

1. Type Ctrl-T to select a confirmed target.
2. Click on the target of your choice.
3. Click on MISSILE from the WEAPONS Menu. The SELECT MISSILE screen appears.

4. Click on the missile of your choice.

Note: If you want to see your missile hit its target, press F9, then E, to go to Periscope Depth.

SONAR & THE OCEAN ENVIRONMENT (Cont.)

The effects of thermal layers on sound transmission have important consequences for sonar operators. Thermal layers act as "screens" or "curtains" against sonar, reflecting sound waves and creating what are essentially narrow sound channels. For a submarine avoiding detection, the reflecting qualities of thermal layers provide a tactical advantage of the highest order. When facing opponents such as destroyers and helicopters, a submarine can dip below one or more thermal layers and greatly increase its chances of evasion. For this reason, SSBNs prefer to travel deep, where numerous layers shield them from the "gaze" of enemy surface vessels.

ASW forces, however, are not the only danger faced by submarines. Experienced officers know that the biggest threat to any submarine is, of course, another submarine. Free of the limitation of surface travel, attack submarines can follow their submerged prey below any thermal.

CHAPTER 2

Photo: Sturgeon class Seahorse SSN-669

AVOIDING DETECTION

Submarines are effective only as long as they maintain the element of surprise. In peace as well as in war, a submarine's first and most important objective is to avoid detection.

Avoid High Speeds

When spending any amount of time in the surface duct — for example, when targeting enemy surface vessels — your ship should travel no faster than a standard "clear baffles" maneuvering speed of 3.9 kts. The optimal speed for near-surface operations is, of course, FULL STOP, or 0 kts. Pushing the throttle up to 1/4 speed or higher in the surface duct is extremely dangerous — you run a very high risk of drawing the attention of patrolling warships or antisubmarine warfare (ASW) helicopters.

In the thermal layers below the surface duct, the SeaWolf *can travel at 1/4 or 1/2 power and still maintain a reasonable level of silence. However, at 3/4, FULL or FLANK power, a combination of increased noise from the ship and water rushing over the hull produces dangerous noise levels. This is true regardless of how deep you're traveling. As a rule, higher speeds should be avoided except in emergency situations.*

MENUS

There are five primary menus to access during play. Each menu has submenus that appear when you give a command.

Each menu has a PREVIOUS and a CLOSE button. PREVIOUS takes you to the menu that was previously on screen. CLOSE hides the menu window. The ESC key brings the menu up again.

Following is a list of primary menus and their hotkeys:

CONN

F1

The CONN Menu is where you set preferences, check your weapons inventory, get keyboard help, view allied and enemy water craft, pause the game and quit to DOS.

PREFS

The Preferences Menu is where you set up the following play conditions:

- MUS ON: Turn the music ON
- MUS OFF: Turn the music OFF
- MUS VOL: Adust the volume of the music
- FLTR OFF: Turn off the filter described below
- FLTR ON: Filter out "Chat" language potentially objectionable by the Federal Communications Commission

STATUS

The Status Menu is where you view the SeaWolf's weapons inventory.

Select Quit to return to the menus.

LOGBOOK

The Captain's Logbook contains much useful information.

- KEYBOARD HELP: View a list of hotkeys.
- MISSION HISTORY: Review the failures and successes of a campaign's previous missions.
- CURRENT MISSION: After completing a mission, view the blow-by-blow record of the battle.
- SURFACE VESSELS: View the allied and enemy ships you may encounter during the crisis.
- SUBMARINES: View the allied and enemy submarines you may encounter during the crisis.
- CLOSE LOGBOOK: Return to the previous screen.

PAUSE

Ctrl-G
Take a break from the action. Press ENTER to get back into it.

QUIT

Go to the YOU QUIT screen, where you can choose another mission, replay the previous mission, and exit to DOS.

SCP

F2
The Ship's Control Panel is where you perform the following functions:

DISPLAY

Choose the point of view:

- TOP DWN: An overhead view.
- HI RES: The overhead view in high resolution.
- PERISCP: A look through the periscope.
- 3D Map: A look at the underwater terrain.
- CAMERA: A look through an underwater television camera. (You must deploy one or two remote cameras from the WEAPONS menu.)

AVOIDING DETECTION (cont.)

Avoid High Cavitation Levels

When a ship's propellor moves so fast that the water around it can't fill the cavity created by its motion, partial vacuums form around the blades. This phenomenon — known as cavitation — is particularly noisy. A high level of cavitation can advertise a submarine's presence as surely as surfacing.

One important factor in the creation of cavitation is acceleration. Normal submarine acceleration is achieved in increments. For example, to reach 1/2 power, the submarine goes from FULL STOP to 1/4 setting; when 1/4 power is achieved, the throttle is set to 1/2. Incremental acceleration allows for a gradual build-up of waterflow over the propellor blades, keeping the level of cavitation to a minimum. By contrast, sudden acceleration — for instance, going from 1/4 speed to FULL speed in one swoop — produces extreme cavitation. Such drastic maneuvers should be avoided except in emergency situations where the submarine's presence is already known and a high speed dash is required.

AVOIDING DETECTION (cont.)
Another major factor affecting cavitation is the submarine's depth. Water pressure increases with depth and reduces cavitation, such that the deeper a submarine travels, the less cavitation its screw produces. In shallow waters, the lack of water pressure can create high levels of cavitation at 1/2 or even 1/4 engine power. In general, avoid running the engine in the surface duct when enemy warships and/or helicopters are operating in the area.

- VIEW: Alter the view.
  - PORT: A view to the port side (available only in 3D and periscope views)
  - STARBRD: A view to the starboard side (available only in 3D and periscope views)
  - FORE: A view to the front (available only in 3D and periscope views)
  - AFT: A view to the rear (available only in 3D and periscope views)
  - IN: Zoom in (Top-Down map only)
  - OUT: Zoom out (Top-Down map only)
  - GRID: Change the Top-Down with depth perception to a Top-Down view with gridded sectors
  - TIMES: See how much time you have between your last contact with a target and when the target disappears. When you lose a contact, the target remains on the screen for three minutes. If the contact isn't renewed, the target disappears.

Note: If you choose Periscope and you are not at periscope depth, the Depth menu appears, and you must press E to direct the ship to periscope depth. (See *Depth* on page 24.)

- WEAPON: Bring up the weapons status menu.

WAYPNT

The Waypoint Menu is where you set predetermined headings for the submarine and torpedoes.

- SET WAY: Set a waypoint.
- CLR WAY: Clear waypoints in the reverse order in which they were set.
- SECOND: Set secondary waypoints. (For more information, see *Secondary Waypoints* below.)

SECONDARY WAYPOINTS

Secondary waypoints are used to direct torpedoes toward a predetermined location rather than toward an identified target. For more information on directing torpedoes, see the *DIRECT* command in the WEAPONS menu on page 27.

- KILL ALL: Clear all waypoints.

To set a secondary waypoint:

1. Press Ctrl-Z or Select SECOND from the WAYPOINT menu.

2. Place the arrow cursor on the point of the map where you want to set the waypoint, then click the mouse button or press ENTER. The waypoint is marked with a white 'X'.

AVOIDING DETECTION (cont.)

Use Thermal Layers

If you're trying to avoid detection, put as many thermal layers between yourself and the enemy as possible. Thermal layers are your most effective means of lowering your sonar signature. *This is true whatever the threat you're facing: surface ships, helicopters, submarines, or torpedoes.*

Naturally, thermal layers also inhibit your own ability to track an enemy vessel, and you'll often lose contact with your enemy as you cross a second or third layer. Nonetheless, dropping thermals remains a useful tactic, especially when closing the range between your submarine and a distant opponent. A good method is to set a waypoint somewhere on the enemy's course (your most likely point of interception), cross two or more thermals, and set the throttle on 1/4 or 1/2 power. Once you reach the waypoint, cut your engines and drift while you return to your opponent's thermal. Check your Waterfall Display for the enemy contact and re-target.

Now you can fire a torpedo at the secondary waypoint and direct it to an unidentified target. (See *WEAPONS* on page 26.)

TARGET

Ctrl-T

You must select a target when you want to identify it or fire at it or direct one of your own torpedoes to a target. Once identified, targets are coded by shape and color. The Top-Down map features symbols distinguishing friendly and enemy submarines, surface vessels, torpedoes and helicopters. The target symbols are available for viewing in the Logbook.

To select a target:

1. Type Ctrl-T or select TARGET from the SCP Menu.

An unidentified target visible to the SeaWolf's sensors is gray. Once a target is identified, it assumes the appropriate color.

2. Place the arrow cursor over the target you wish to select, then click the mouse button.

Note: Use the TAB key to cycle through on-screen targets when the targets are too close together to select with the mouse.

For more information on how to identify a target, turn to *IDENTIFY* in the SONAR menu on page 29.

DEPTH

Ctrl-J

The DEPTH menu is where you adust the depth of the SeaWolf.

- HOLD
  Select Hold to maintain your current depth. This command is especially useful if you just dove to test depth or crush depth in an emergency and want to pull up short.

- ATTACK
  Attack depth is preset at 150 feet. You can launch torpedoes from any depth, but you can't launch missiles if your depth is greater than 150 feet.

- UP THRM
  Ctrl-U
  Move the SeaWolf above an ocean thermal. To learn more about thermals, turn to the sidebar on page 15.

- DN THRM

CtrI-D
Move the SeaWolf below an ocean thermal.

- PERISCP

F9
Move the SeaWolf to periscope depth (25 feet). Rotate the periscope view with the < or > keys or with the mouse buttons.

- SURFACE
  Rise to the surface. Since the SeaWolf is vulnerable traveling on the surface, this command is typically used only in emergencies.

- CRUSH
  Descend rapidly to the SeaWolf's maximum depth of 1500 feet. The SeaWolf can operate at crush depth for about three minutes without risking hull damage or implosion.

- TEST
  Move the SeaWolf to 1400 feet. The submarine can operate at this depth indefinitely.

HEADING

This is where you control the direction of the SeaWolf.

- AUTO ON
  Use the autopilot to automatically travel from one waypoint to the next. For information on waypoints, turn to *WAYPNT* on page 22.
- AUTO OFF
  Turn the autopilot off and select a new heading.

- BAFFLES
  Turn the SeaWolf 180 degrees to get a better listen at what's behind you.

- HEADING

CtrI-H
Set a heading. Select HEADING, then place the move the arrow cursor to the desired heading and click the mouse button.

SPEED

This is where you set the SeaWolf's speed. There are six speeds (hotkeys in parentheses):

- STOP 00.0 knots(0)
- 1/4 11.4 knots(1)
- 1/2 22.8 knots(2)
- 3/4 34.2 knots(3)
- FULL 45.7 knots(4)
- FLANK 57.1 knots(5)

AVOIDING DETECTION (cont.)

Exploit Bottom Contours

The ocean bottom is made up of mountainous peaks and deep valleys. The greater portion of the ocean terrain lies beyond the maximum depth of an attack submarine and is, consequently, of little interest to the submarine commander. However, the relatively shallow areas surrounding land have a tactical use. Sound transmissions cannot travel through underwater mountains. Assuming that you have a rough idea of where your enemy is, a deep valley can provide you with numerous sonar shadows — areas which cannot be penetrated by your opponent's sonar.

AVOIDING DETECTION (cont.)

Use Discretion In Launching Weapons

There is always the risk that launching a weapon will give away not only your presence but your position, too. A submarine's weapons are not subtle. The propellor on a torpedo rotates at a very high speed, alerting enemies to your presence almost as soon as it's expelled from the tube. Missiles — launched at shallow depths and erupting from the surface seconds later — are even more revealing of your submarine's presence and position.

The competent submarine commander uses discretion when launching weapons. If possible, torpedo attacks should be made from positions which help reduce your chances of being detected — from across a thermal layer or within the target's baffles. Likewise, a missile attack should never be made when enemy surface ships are in the area — unless you have enough missiles to deal with all of the ships at once.

MSG REV

The Message Review feature displays all crew reports and commands as they occur. Click the button to turn the feature on; click it again to turn the feature off.

TRACKS

Ctrl-K

The Tracks option displays (or removes) the "wake" of each vessel on the Top-Down map. It is useful in determining a vessel's direction and speed (The faster the vessel is moving, the farther apart the dots.). Click the button to turn the feature on; click it again to turn the feature off.

WEAPON

F3

The Weapons Menu is where you direct hostile actions against the enemy. There are three steps to firing a torpedo: load, flood and fire. Once you flood a torpedo tube, you have approximately five minutes of game time to fire it.

LOAD

Loads a torpedo without flooding the torpedo tube. Torpedoes may remain in unflooded tubes indefinately, but the risk of a "hot run" exists. A hot run is when a torpedo's propeller begins to run, thus filling the tube with exhaust and rendering the torpedo useless. After selecting *LOAD*, you can select one of four types of torpedoes or you can cancel.

FLOOD

Initiates a flooding of the torpedo tube with water. It can be carried out only after a torpedo has been loaded.

LD/FLD

Combines the Load and Flood commands into one step.

EMPTY

Empties a torpedo tube. If a tube is loaded and flooded for too long, it is automatically emptied.

FIRE

Fires a torpedo.

MISSILE

Fires one of three types of missiles at a surface vessel. Only Sea Lances can be fired at submarines.

NOISE MK

Deploys a noisemaking device that can distract enemy torpedoes.

CAMERA

Deploys an underwater camera that provides a 360 degree view. The camera is unavailable on actual submarines and has been included as a convenience.

DIRECT

Directs a launched torpedo fired at any target or secondary waypoint. A torpedo must be targeted (Ctrl-T) before it can be directed.

- DETONAT
  Detonates a targeted torpedo on the spot.
- SRC SUB
  Directs a targeted torpedo to search and destroy the nearest submarine.
- GO LOC
  Directs a targeted torpedo to a previously existing secondary waypoint (Ctrl-Z).
- MATCH
  Directs a targeted torpedo to match the SeaWolf's depth.
- SURFACE
  Directs a targeted torpedo to the surface.
- SRC SRF
  This command directs a targeted torpedo to rise to the surface and search out the nearest surface vessel.

SONAR

F4

The Sonar Menu is where you conduct all listening and detection operations.

TOW OUT

Ctrl-A

This command deploys a towed array. To learn more about the towed array, turn to the sidebar on page 11.

Note: When a towed array is deployed, the SeaWolf is limited to half power.

TOW IN

This command retrieves a towed array. The device can be deployed again.

CUT TOW

This command cuts and discards the towed array, and is practical only in emergency situations where it is imperative that the SeaWolf reach flank speed as quickly as possible. Once the towed array is cut, it is lost.

AVOIDING DETECTION (cont.)

As a final caution: be especially wary if enemy ASW helicopters are patrolling your sector. ASW helicopters search for submarines using dipping sonar — sonar arrays that are dangled from a cable and dipped into the ocean. These helicopters can detect both torpedo and missile launches. When they do, they immediately hurry to the suspected launch point and begin a thorough search for submarines.

Once a helicopter gets a fix on your position, it will drop light torpedoes into the water. The submarine commander is then caught in a difficult situation. If he increases speed in order to outrun the torpedoes, the helicopters will have an easier time tracking him and will launch more torpedoes in an attempt to overwhelm the submarine's resources. If the commander decides to keep his speed down and attempt to outmaneuver the torpedoes, he runs the risk of taking a hit. Neither scenario is good, and both can be avoided by keeping a low profile when making attack runs.

PING
Ctrl-P
This command sends an active sonar signal which bounces off of objects in the vicinity, thus revealing their location and aiding in their identification.

WATERF
Ctrl-F
This command brings into view the Waterfall or Sonar display. For more information on the Waterfall Display, turn to page 11.

IDENTIFY
Ctrl-I
This command is directed at your sonar man, who attempts to identify a selected target. If the target has yet to be confirmed, you are asked to enter a code. For more information on identifying craft, turn to *Identify Targets* on page 15.

RADIO
F5
The Radio Menu is where you communicate with other combatants in multi-player mode and to get mission information.

CHAT
Send messages to other human combatants in multi-player mode.

SATEL
View the most recent news via satellite.

VOICE
Send sound effects to other combatants in multi-player mode.

FIRST
View the first message sent during the current mission.

LAST
View the most recent message sent during the current mission.

NXT MSG
View the next message sent during the current mission.

PRV MSG
View the message previous to the one you are currently viewing.

ORDERS
View the mission orders.

DETECTING, TARGETING & IDENTIFYING
As a hunter/killer, a SSN must bring the fight to the enemy. This is not simply a matter of launching weapons at bad guys — the submarine must first find the enemy, establish his exact location, and positively identify him as hostile.

Find the Enemy
The sonarman must first listen for a sonar contact. A contact is nothing more than a repetitive sound. When first encountered, the only information that the sonarman can gather is whether the sound is coming from a source on *or* below *the surface. If the source is on the surface, the sonarman can say for certain whether the contact is a surface ship or a low-flying helicopter. If the source is below the surface, the sound could be anything from a harmless group of fish to the slow revolution of a submarine propeller. Of all the things that lurk underwater, only torpedoes are instantly recognizable for what they are — a fact that is comforting to the sonarman who isn't hearing one, and a source of great stress to the one who is.*

DETECTING, TARGETING & IDENTIFYING (cont.)

Target the Contact

When faced by a submerged contact that is obviously not a torpedo, the sonarman must carefully listen for doppler shifts in the transmission until he can establish the contact's range, depth, course, and speed. This is known as targeting the ship.

Targeting can take a number of minutes depending on how quiet the enemy is. You can't force *your sonarman to do his job faster; however, you can help him along by maneuvering so that he's receiving the clearest possible transmissions from the contact.*

There are several tricks for doing this. The first is to increase your overall *detection capabilities — that is, deploy your towed array and maintain a speed no greater than 12.5 kts (1/4 engine power or lower). Remember that traveling slowly with your towed array out provides you with optimal sonar detection.*

Once this is achieved, the trick is to maneuver such that you're receiving the contact's transmissions as clearly as possible. Specifically, this involves changing your heading so that your submarine's bow is pointed directly at the target. Remember that a submarine's best detection is in its forward quarters, where the majority of its sonar arrays are located.

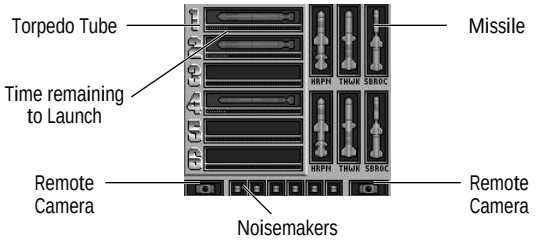
TARGET INFORMATION

"

The Target Information menu provides vital information on targeted vessels.

MISSILE MENU

;



The Missile Menu shows the number and type of missiles that remain in the SeaWolf's arsenal, the number of remote cameras that remain, and the number of noisemakers that remain.

It also displays the torpedo tubes and any loaded torpedoes. When a tube has been loaded and flooded, the indicator beneath the tube, which represents the time remaining before the tube must be emptied, gradually turns red.

END OF MISSION MENU

ANOTHER

This command brings up the mission selection book, from which you can choose another mission.

REPLAY

Play the same mission again.

LOG

View the Captain's Log Book. For more information on the log book, turn to *Logbook* on page 21.

NEWS

View current news reports.

DEBRIEF

View a mission evaluation forwarded from Admiral Grace.

CHAT
Send a message to a combatant in multi-player mode.

DOS
Return to DOS

DETECTING, TARGETING & IDENTIFYING (cont.)

Now check the Waterfall Display. If the contact is a bright shade, head in that direction until your sonarman can target the ship. (Check the Top-Down Map occasionally to see if an "unknown target" symbol has appeared on the map.)

If the contact is not a bright shade, the contact is probably being obscured by thermal layers. In this situation, you should go up or down one thermal and check the Waterfall Display again. If the contact is now displayed in a brighter shade, you changed depth in the right direction. If the contact is dimmer or has been lost altogether, you went the wrong way.

Identify Unknown Targets

Once an "unknown target" symbol appears on the Top-Down Map, you know that your sonarman has established the range, depth, speed, and course of the ship. The captain, however, is not free to launch weapons at the target until the sonarman has established a positive ID.

The easiest way to identify a target is to patiently track it. Your sonarman will begin analyzing the target's unique signature until he can state with certainty the class of ship and whether it's hostile, friendly, or neutral.

The shortcut route is to identify the ship yourself.

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CHAPTER 3

Photo: Sturgeon class Lapon SSN-661

ATTACKING

The purpose of any weapon platform is to engage the enemy. While this demands courage, the real hero is the one who performs his job and keeps his crew alive. Following are effective strategies for performing attack runs.

Attack From the Baffles

As already stated, a propellor-driven vessel is most vulnerable from its rear quarters, where turbulence from the ship's baffles upsets sonar detection. Although a torpedo from any direction is hard to miss, your best chances of slipping in a torpedo undetected is through the enemy's baffles.

Attack From Across Thermals

Occasionally a target is so noisy that you can target and identify it even from across thermals. This is commonly the case with surface vessels, which can't hide from enemy sonar, though a fast-moving submarine fleeing a torpedo may be equally noisy. Such targets need not be engaged in the same thermal, and it's actually to your advantage to make your attack from across a thermal layer if possible. As stated earlier, weapon launches may temporarily reveal your presence for a moment. The enemy will have a harder time detecting a launch if you're hiding behind a thermal layer.

VIEWS

SeaWolf features five views, each of which is strategically useful.

TOP-DOWN MAP

F6

The Top-Down Map is the map you'll most often use. It's a topographical display of the area occupied by the SeaWolf and its adversaries. The darker areas of the map are the deeper waters. Ships and submarines and helicopters picked up by the SeaWolf's sonar are coded by shape and, once identified, color coded as ally, enemy or neutral. *For more information on vessel codes, see the Reference Card.*

After removing the menu box by pressing ESC, you can zoom in by pressing the left mouse button. Zoom out by pressing the right mouse button.

HIGH-RESOLUTION TOP-DOWN MAP

F7

This map shows the same view as the Top-Down Map, but it shows a bit more detail.

CONTOUR MAP OF THE OCEAN FLOOR

F8

The Contour Map is a three-dimensional rendering of the ocean floor as seen from a rotating camera in the SeaWolf's conning tower. This view is especially useful for evasive situations where you shut down the engines and hide the SeaWolf, carefully guiding her up against a ledge that will block enemy sonar. From this view you can perform the same operations you can perform in the Top-Down view.

PERISCOPE VIEW

F9

Periscope View is useful for viewing the ocean surface and for watching the effects of the SeaWolf's torpedoes and missiles. The SeaWolf must be at periscope depth (25 feet or less).

- To reach periscope depth: Press F9, then press E.

REMOTE CAMERA VIEW

F10

When deployed, the Remote Camera rises to the surface, providing a 360-degree view. It is useful for situations where a view of the surface is neccessary and the SeaWolf must remain submerged and undetected. For instance, you can look for surface vessels and you can check to see if helicopters are guarding a convoy.

The SeaWolf has two remote cameras. Once the second is deployed, the view automatically switches to that camera, and the first camera is rendered useless.

ATTACKING (cont.)

Use Secondary Waypoints

Targeting a ship and launching weapons is the direct approach to making an attack. Using a secondary waypoint is the subtle means, and it's this approach that can be used in various ways to fake out the enemy. The clever commander uses secondary waypoints often. *Below are few examples of some proven methods.*

EVASIVE MANEUVERS

The best defense is never to be caught. However, when something goes wrong — an enemy has detected your submarine and launched weapons against you — evasive maneuvers are required.

Torpedo Limitations

Modern torpedoes are intelligent; however, all torpedoes have limitations which a knowledgeable commander can exploit.

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CHAPTER 4

Photo: Los Angeles class Honolulu SSN-718

EVASIVE MANEUVERS (cont.)

Like a submarine, a torpedo relies on sonar to pinpoint its target; however, the torpedo's relatively small size limits the area it can sense. Its cone of vision, or the area it actively scans, is comparatively small — perhaps 20° wide off the tip. If a submarine captain can quickly maneuver his ship out of the torpedo's narrow cone of vision, it will be forced to initiate a search program in order to find him. Search programs are scripted — that is, they are somewhat predictable. A torpedo with no target will typically begin circling, using active sonar to locate a new target. If the torpedo has not acquired a target after executing a 360° turn, it will either rise or dive a couple hundred of feet and begin the process all over.

Bearing must also be taken into account when outrunning a torpedo. For example, if a torpedo is approaching you head on (bearing 000°), you would have to take into account the time you would need to slow down, turn around, and accelerate away.

At medium range, you should increase speed and point your submarine 90° away from the torpedo's course, choosing the shortest path to get there. This will remove you from the torpedo's cone of vision by the quickest means possible, forcing the torpedo to execute a search program and giving you time to slip away.

MULTI-PLAYER INSTRUCTIONS

SeaWolf supports up to four network channels for multi-player battles. Two players can play on each channel at one time. The Multi-Player feature lets you and another player team up against the Soviet fleet or go head-to-head. You can play another player with a null-modem connection, a modem connection, and with a network connection.

MODEM PLAY

1. From DOS, type the name of the directory containing *SeaWolf* Example: CD\SeaWolf), then press ENTER.

2. Type TWOPLAY, then press ENTER. The list of available communication drivers appears.

3. Type A to connect to a modem. The Modem Directory Editing screen appears. This menu lets you store up to fifty numbers.

STEP ONE: EDITING THE DIRECTORY

To Edit:

1. Use the up/down arrow keys to highlight a line.

2. Type E.

3. Enter the information requested at the bottom of the screen, then press ENTER.

Notes:

Name — Identify the person whose number you are entering.

Port — SeaWolf supports 4 com ports, but we recommend using ports 1 or 2 for best results.

Baud — SeaWolf supports a maximum baud rate of 9,600.

Phone — If you are making the call, type in the numbers. If you are answering the call, press ENTER so that ANSWER appears in the Phone column.

#AT — The command prefix option allows you to override modem factory-installed commands. Unless you are an advanced user, we *highly* recommend you press ENTER to use the factory default settings. If you choose to override the standard commands, this slot is where you enter the number of commands you wish to change. Consult your modem reference card for details.

Dial Cmd Should you wish to override the factory-installed settings on your modem, this slot is where you enter the specific commands.

To Delete an entry:

Type K to kill an entry.

To Sort names alphabetically:

Type S to sort.

To Update (Save) and Exit:

Type U.

To Quit and cancel changes:

Type Q.

To Connect to the other player's computer:

Type C.

STEP TWO: CONFIRMING A CONNECTION

When a player's modem answers the call, the blue chat screen appears.

1. Each player should enter a message to confirm the connection.
2. Press the ESC key when you have confirmed a connection. The game loads.

Note: If during the course of the game one or both players' modem disconnects, both players should exit the game and try again to establish a clear line of communication via modem. Exit and repeat the connection process.

NULL-MODEM CONNECTION

1. From DOS, type the name of the directory containing *SeaWolf* (Example: cd\seawolf), then press ENTER.
2. Type TWOPLAY, then press ENTER. The list of available communication drivers appears.

EVASIVE MANEUVERS (cont.)

At short range, the best you can do is change course such that your heading is 150° or 210° off the torpedo's bow, again choosing the shortest means possible to get there. With luck, the torpedo will not be able to turn with you and will "overshoot." If successful, the torpedo will be forced again to initiate a search program, giving you time to slip away.

Responses to an Incoming Torpedo

At long range, the best tactic is to turn and outrun the torpedo. This involves a certain amount of arithmetic — the captain must calculate his current distance from the torpedo as well as the torpedo's bearing, speed, and range. For example, say a torpedo has been launched behind you from a range of 5 miles. A long range torpedo has a top speed of 36 kts and a range of 10 miles. In this situation, you could easily outrun the torpedo at 1/2 speed, the torpedo closing the gap to about one mile before it expires.

Using Noisemakers

Noisemakers are torpedo-like decoys launched from drop tubes that use sonar transmitters to "simulate" the submarine. These devices can be used to "lure" enemy submarines into launching weapons — thereby giving away their position — or as a means of evading incoming torpedoes.

EVASIVE MANEUVERS (cont.)

High Speed Evasion

As a last ditch effort, FULL or FLANK speed may be used for short periods to outrun a torpedo. The SeaWolf *is capable of over 60 kts and can outrun all torpedoes in the Russian arsenal. This maneuver can backfire, however, especially when enemy surface ships and helicopters are in the area. Your submarine is highly visible while operating at high speeds, and enemy ASW forces will prosecute you relentlessly with helicopters and stand-off weapons as long as you remain a target in their sights. Your turning radius is greatly increased at high speeds, thereby reducing your ability to outmaneuver a torpedo dropped squarely in your path.*

Anti-Torpedo "Attack"

An advanced defensive tactic is the Anti-Torpedo "Attack," a maneuver that's simple in theory and difficult in practice. The premise is that enemy torpedoes are headed your way at a medium to long range. You respond by launching a torpedo in the direction of the incoming torpedos. When both sets of torpedoes have closed to a distance under 2/10ths of a mile, you detonate your torpedo. The blast destroys the enemy torpedoes while you counterattack. This tactic depends on a very narrow success margin (.2 miles) and should be undertaken only when you can track the enemy torpedoes with some certainty.

Note: If possible, connect to the same com-port as the player on the other computer.

3. Type B or C to connect to the other player. A message appears asking you to wait for the other player to come online.

4. When both players are online, the CHAT screen appears. Enter a message to confirm the connection, then press ESC. The opening screen appears, and you're ready to go.

Note: The kind of null modem cable you'll need depends on the number of pins *each* computer has in its serial ports. Most serial ports have a 25-pin male connector, but some have only 9 pins. Both you and your opponent should check your machines to see how many pins your serial ports have. Your modem cable will have to be constructed with female connectors to fit the serial ports on both machines. There are three possible configurations for your null modem cable:

NETWORK PLAY

1. Make sure both you and the other player are connected to the network and have Netbios® loaded. Each machine must have the Netbios program loaded in order to play in Two-Player mode on a network.

2. From DOS, type the name of the directory containing *SeaWolf* (Example: CD\SeaWolf), then press ENTER.

3. Type TWOPLAY, then press ENTER. The list of available communication drivers appears.

4. Type the letter corresponding to the group you wish to use (D-G). The Chat Window appears. Up to four pairs of players can play on each network.

5. Type a message to the other player, and wait for him to type a return message.

6. Press ESC. The Introduction screen appears.

Note: Player 1 (the first player to log on) chooses the mission as described in the Main Menu on page 4.

SeaWolf was designed to run point-to-point over a Local Area Network. This means that a pair of players can play a scenario of their choice in any way they choose. Some of the common ways we play at Electronic Arts are *cooperative play* in hard scenarios (I recommend #33), *competitive play* (such as who can get the most kills without hitting the other player) on just about any scenario, or all-out head-to-head *war* (last boat alive is the winner).

There are a few things about network play that might not be clear. *First*, only Local Area Networks are supported. That is, Wide Area Networks are NOT supported. You can ask your network administrator for details, but basically that means you can play with people in the same building and not against people in other sites. In fact, depending on the structure of your network, you may be limited to play against people on the same floor, or perhaps even the same workgroup. And *second*, although it may seem that eight players can play, that is not the correct interpretation of what we are saying. In order to minimize network traffic over the whole network, we have designed SeaWolf to run over four "channels," where each channel supports one pair of players. This arrangement means that only two players can play against each other on any given channel on any given LAN. If there are several LANs in your office, then each LAN can run only four games, with two players in each game.

APPENDIX I

A Brief History of Submarine Warfare

The history of the submarine shares much in common with the history of the airplane. Simply put, both evolutions involved man using machines to take the leap from familiar ground to mysterious and unknown realms. As foreign as the concept of man flying in a contraption many times heavier than air, the idea of diving to the ocean's depths in a weighted and enclosed vessel instilled fear and uncertainty into those who first dreamed such feats. Although writings and designs for submersible vessels were common by as early as the 16th century, it is not certain who conducted the first submarine descent. Records indicate a Dutchman, Cornelius van Drebbel, carried out the first dive in the River Thames in the presence of King James I. In June, 1774, a wagon maker named John Day demonstrated a watertight vessel containing ballast. Theoretically, when the ballast was jettisoned, the vessel, aided by 75 empty hogs' heads, would rise to the surface. Needless to say, Day was the first known casualty of the submarine. The evolution of submarine design was slow in coming (These designers wanted only to submerge, travel a short distance, and return to the surface intact.); and it wasn't until James Bushnell, a former student of Yale, originated the concept of the submarine as a weapon of war did submarine design begin to grow in leaps and bounds.

The first documented instance of a submersible craft, devised specifically for warfare, carrying out an act of aggression occurred in the late stages of the War of Independence. On the night of September 6, 1776, Sergeant Ezra Lee, a former foot soldier in George Washington's army, piloted a single-man submersible toward the 64-gun British man-of-war *HMS Eagle*, which was anchored in the New York Harbor. The *Turtle* was propelled by a hand-cranked propeller mounted on the bow. An identical hand-cranked propeller, mounted on the top of the craft, controlled the rate of vertical ascents and descents. The craft was steered by a conventional aft-mounted rudder and was balanced and trimmed with lead ballast. A pair of tanks could be filled with water and emptied with a foot pump. Lee peered through a glass peephole housed in a brass conning tower. Secured to a top-mounted screw was a gunpowder explosive, the extent of the *Turtle's* arsenal. The entire vessel measured roughly six feet by seven feet, and could remain submerged for approximately thirty minutes.

Lee cranked away, and when he neared the *Eagle,* he sumberged and began to screw the explosive into the hull of the warship. Unbeknownst to the sergeant, he had positioned his craft in such a way that the screw was aligned with an iron strap that connected the *Eagle's* rudder hinge with her stern. There was nothing he could do. The screw would not penetrate the target. Lee aborted the mission and returned to the tip of Manhattan Island about five hours after he had set out. The *Turtle* made two more attacks against British warships in the following weeks, but with no success. Eventually the revolutionaries gave up on the sub, which is thought to have been destroyed to prevent the British from capturing it.

Despite the failures of the *Turtle,* submarine warfare was born. European countries began experimenting with sumbersible war craft soon after, though it was in an American conflict where the first instance of a submarine successfully sinking a surface vessel occurred. During the American Civil

War, the Confederacy was blocked by the Union Navy. In response, the *HL Hunley*, a submarine which had drowned numerous volunteers in testing, sunk the USS *Housatonic.* If the tradgedies of the *Hunley's* testing period were an indication of the dangers of submarine warfare, the confrontation with the *Housatonic* was proof, as the sub too felt the wrath of its own explosive and sunk, killing the entire crew.

The next twenty years saw rapid progress in the development and implementation of hand-cranked submarines, the United States, France and Italy being the major innovators. By the outbreak of World War I, both large and small navies had purchased submarines from various manufacturers. Experts agreed the primary tactical role of the submarine would be as a destroyer of warships, and the majority was surprised to realize the most significant contribution of the sub was in its destruction of merchant ships. Although they had little effect on the British Fleet, the submarines of the High Seas Fleet of the Imperial German Navy sunk over 2,600 British Merchant ships from February 1917 to January 1918, bearing vast damages and nearly bringing Great Britain to defeat. It wasn't until the British began employing the convoy system as a countermeasure in mid-year 1917 that the phenomenal success of the U-boats began to taper off. By the end of the war, the submarine was an established and sophisticated weapon, its technology having advanced far beyond that which anyone could have thought possible at the turn of the century.

In the years following the war, navies began to rebuild their fleets using information and experience they had acquired from the war. Several experimental submarines were developed for specific purposes, such as laying mines, attacking enemy submarines, and carrying aircraft. Many navies began the practice of arming submarines with exceptionally large guns. Most of these experiments were short-lived, and at the outbreak of World War II, submarines were technically similar to those of the first world war.

Though the technology was almost identical to that of the previous conflict, the number of navies with submarine fleets was substantially larger. In 1939, tweny-six submarine fleets were in existence. The three major theatres of submarine warfare in World War II were the Atlantic, the Mediterranean and the Pacific. Both Allied and Axis submarines established vital communication lines via the submarine. German U-boats (the Type VII and the Type IX, developed in the 1930's) were effective in sinking large numbers of Allied shipping, but they were no match for the Allied anti-submarine warfare (ASW). This was in large due to the increasing range and capabilties of ASW aircraft and the accomplishments of the electronic warfare organization, whose cryptographers cracked the *Enigma* code and thus were able to interpret intercepted messages and react accordingly. While the U-boat losses spurred the Germans into developing new types of submarines, American subs continued to be built based on a single design. As the war neared its end, it was clear that the new German submarines, though superior to the current American submarines, could not be produced in effective numbers to alter the determined course of Allied naval forces.

Following World War II, American submarine development continued at a fast pace. The primary potential enemy was the Soviet Union, which was also building new submarines based on fast submarine technology obtained from the Germans. Consequently, the race to produce a superior fleet fueled the leap in submarine technology that began in 1945 and continues to present.

Three great achievments were made in the early 1950's: nuclear propulsion, improved hull design, and ballistic and cruise missles. Nuclear propelled submarines solved the problem that was most inherent in the submarine: the need to surface at regular intervals to take in supplies of air necessary to run the diesel engines that recharge its batteries. The longer a submarine could stay below the surface, the less likely it was to be detected. The second major advance was in the shape of the hull. The popular long and narrow shape limited submarines to a top speed of 18-20 knots before a significant loss of control was experienced. This problem, which had plagued designers since the early 20th century, was corrected when the United States Navy began to study hull shape in earnest in the late 1940's and early 1950's. The solution was simple: a shorter, broader hull provided greater high-speed stability under water. Finally, the development of ballistic and cruise missles gave the submarine true global capabilities. In addition to these major technical accomplishments, improvements to sensors and listening and detection devices were made during this time.

Over two hundred years after the appearance of the *Turtle*, the United States and Russia have made startling developments in submarine technology and tactics. One submarine, launched from the tip of Manhattan Island and carrying a single gunpowder explosive, has evolved into a nuclear propelled war machine that can travel underwater indefinately and that packs more firepower than all the armies and navies of World War I and World War II combined. Today's submarines truly are the most advanced weapons systems in the world.

APPENDIX II

Modern Submarine Classes

United States SSNs

Permit class

The Thresher/Permit class was the first operational submarine to be fitted with the BQQ-2 sonar suite, with a tranducer for the active/passive array located in the bow and torpedo tubes angled out beneath the fin. All subsequent US-made submarines have since adopted this design. The first unit of this nuclear-powered attack sub, the Thresher, sank with all hands two years after its completion in 1961. The next ship built, the Permit, became the flagship of the class. Four torpedo tubes, angled out ten degrees, are equipped to fire the Mk14/16 anti-ship torpedo, the Mk 37 antisubmarine torpedo, and the Mk 45 ASTOR nuclear-tipped torpedo first carried by the Skipjack class. Units built after 1976 can carry the dual-role Mk 48 torpedo and the Harpoon anti-ship missile. Eighteen torpedoes or missles can be accomodated.

Sturgeon class

Modified from the Permit class, the Sturgeon became the standard SSN of the US Navy in the late 1970s. The latter class was developed to overcome many of the compromises of the Permit, primarily a lack of speed. The entire design was enlarged to provide an interior which could accomodate additional electronics and more effective noise insulation. The Sturgeon's fin is substantially larger than the Permit's, and it can be rotated to the vertical so the ship can break through ice packs. The latter units were lengthened some ten feet to accomodate updated sonar equipment and targeting electronics. In addition to the standard armnament of the Permit class, Sturgeons are equipped to fire the SUBROC missile, a two-stage solid-fuel rocket with a nuclear warhead. Later boats are equipped to fire the Sub-Harpoon missile.

Los Angeles class

The Los Angeles class nuclear-powered attack submarine was designed and built in response to the development of the Soviet Charlie class SSGN with its SS-N-7 "pop-up" missile, which posed a great threat to US carrier battle groups. The Navy developed a defense tactic that involved attack submarines stationed ahead of the battle groups to detect the Soviet missile boats as they closed in or took positions of attack. The new submarine would have to be substantially faster than the Permit and Sturgeon classes, whose speed had been compromised for quiet operation. In addition, the new submarine would have to be at least as quiet as its predecessors in order to successfully confront the Soviet boats. The problem was solved with a reactor with twice the power of earlier types. Expenses were cut, too: the cylindrical middle-hull is almost as efficient as the continuously curved hull common to submarines of the time, but it is much easier to build. The reactor system employs natural circulation, but it must rely on circulation pumps when at high speed. This design catered to the "sprint-and-drift" tactics the Los Angeles subs were to use in their escort role. The extremely large

size of the submarine enabled its designers to more effectively isolate noise-generating machinery, making the Los Angeles the quietest nuclear submarine ever built. Early versions were equipped to fire the Mk 48 torpedo and the SUBROC nuclear-tipped missile. Later ships could fire the Harpoon missile, and in 1983, the Tomahawk. The Los Angeles submarines featured four torpedo tubes located amidship.

United States SSBNs

Ohio Class

The Ohio Class, which consists of the largest submarines in the West, replaced the Ethan Allen and George Washington classes. The US was concerned with the increasingly capable Soviet antisubmarine attack, as well as with the risk of deploying submarines out of the forward ports of Europe, where they were vulnerable to both terrorist and preemptive attacks. The new Trident C-4 missle had a range of over 4000 nautical miles, which extended the available sea space for SSBN patrol operations to fourteen million square miles (an significant increase over the three million square miles previously available). This development enabled US submarines to target major cities of the Soviet Union without having to operate out of forward bases. Submarines of the Ohio class can carry 24 missles and feature a fully automated transfer system for the four tubes firing Mk 48 high-performance torpedoes.

Soviet SSNs

Kilo class

The Kilo is a general-purpose, diesel-powered attack submarine based on the earlier Whiskey class, though significantly larger so as to accomodate deep-water missions of a longer range. First launched in 1982, the Kilo shares more design features with Western submarines than with previous Soviet endeavors. The vessel is shorter and wider than the Tango, and it most closely resembles the US Barbel and the Dutch Walrus. However, the Kilo maintains the Soviet traditions of the double hull and long fin, the latter which is fully retractable to prevent damage during surface operations in icy waters. Six bow tubes complement the Kilo, each capable of firing standard Soviet anti-ship and antisubmarine torpedoes. Each tube can be fitted with two mines, rather than a single torpedo.

Victor class

The Victor class is thought to be the first Soviet submarine designed specifically to hunt and kill enemy submarines. The class featured a new bow-mounted active/passive sonar. Initially the submarine attempted to track and tail enemy SSBNs, but the tactic met with little success, and the Victors began to defend their own ballistic missile submarines. Of a new design incorporating little from existing Soviet SSNs, the hull was encased in anechoic rubber sheathing. Other borrowed designs include a Western-based cruciform tail surface. Initially armed with only conventional anti-ship and acoustic-homing antisubmarine torpedoes to be fired from six forward torpedo tubes, later variations incorporated the SS-N-15 antisubmarine missile, which features a nuclear warhead.

Alfa class

The Alfa was probably developed in reaction to the need for fast, deep-diving submarines similar to those the US Navy was developing. The first of the class was launched in 1972, and it featured a titanium hull of greater tensile strength and of lesser weight than the traditional steel hull. The Alfa was able to dive to approximately 3,000 feet, and it was powered by a liquid-metal reactor which employed a lead-bizmuth mixture as coolant. The compact reactor was able to run hotter and generate large amounts of steam for exceptionally high horsepower ratings. Breaking from the tradition of a double-hull construction, the Alfa's single hull allows substantial machinery noise to escape, thus making it a loud runner at speed. It is also rumored that the safety standards for this class were low. The Alpha is fitted with six 21-inch bow tubes which can fire conventional anti-ship or antisubmarine torpedoes. It can also fire the SS-N-15 nuclear-tipped antisubmarine missile.

Foxtrot

The Foxtrot was a successor to the Zulu, which was based on the German Type XXI. US weaponry development, particularly the ability to launch carrier-based jets capable of carrying a nuclear load, made it necessary for the Soviets to launch a long-range class of submarines. The Foxtrot and its nuclear twin, the November, were to carry a newly developed torpedo with a nuclear warhead for use against large formations of ships and attacks on enemy ports. While the November proved to be ineffective, the Foxtrot was a good general-purpose boat. The classic cigar shaped design, though not innovative, was able to be slightly modified to carry modern sonar equipment. The boat was powered by three separate reactors turning three screws. Fully retractable forward hydroplanes

allow for operations in ice-bound waters. Reportedly, the Foxtrot has ten 21-inch torpedo tubes—six in the bow and four in the stern. It can fire anti-ship torpedoes with both conventional and nuclear warheads, and can carry a total of 22 torpedoes.

Akula class

The Akula is a steel-hulled vessel running on a pressurized water cooler turning a single shaft. Similar to the Victor III and the Sierra classes of submarines, the Akula features a single seven-bladed propeller and a broad fin. It has six 21-inch torpedo tubes and six 25.6-inch torpedo tubes, enabling it to fire virtually all torpedoes in the current Soviet arsenal. It can also fire the SS-N-15 missile.

Soviet SSBNs

Yankee class

The first of a new type of SSBN, the first Yankee class submarine was launched in the early 1960s. The SS-N-6 missile it carried had nearly twice the range of its predecessor. Still, the Yankees would have to patrol close to the East and West coasts of the United States in order to be able to target the major cities. Because the situation involved lengthy transits, and Yankees serving with the Northern Fleet would have to pass through the NATO submarine barrier in the Greenland/Iceland/UK Gap, speed was of the utmost importance, and these submarines put out nearly twice the horsepower of the fastest Western-built boomers. The Yankees are of the same generation as the Victor and Charlie classes, with double-hull designs and twin-screw propulsion. Each Yankee is armed with 16 SS-N-6 missiles and has six bow-tubes for standard torpedoes.

Delta class (I-IV)

The Delta is essentially a modified Yankee designed around a missile with a much greater range. The SS-N-8, first installed in Delta class submarines, had a range of over 4,000 nautical miles, for the first time enabling a Soviet submarine to target every major US city while operating in the relative safety of the Soviet-dominated waters of the North Pacific and Arctic. Subsequent Deltas remained basically unchanged, with the exception of the casing modifications necessary to accomodate newly developed missiles, including the SS-N-18 Stingray. Deltas are equipped to carry 16 missiles and have six bow-tubes for standard torpedoes. The first Delta I was completed in 1972, while the Delta IV class continues to be constructed today.

Typhoon Class

Shortly after the SS-N-18 missile was developed, enabling Soviet subs to target the major US cities while operating in Soviet-controlled waters, the SS-N-20 Sturgeon, with a range of 4,500 nautical miles, was introduced. No longer did the Soviet ballistic submarines have to be designed around speed and performance. The Typhoon, the first of the new generation, was quite a different animal than even its most immediate predecessors, the Yankee and the Delta. It is the largest submarine in the world, not because of its length, but because of its unique hull design. Two pressure cylinders run the length of the sub and join a third located at the base of the fin. All three pressure cylinders are housed in an outer casting. Each of the two long cylinders houses a reactor which turns a screw, enabling the Typhoon to continue operations even if one reactor has shut completely down. The Typhoon carries 20 SS-N-20 missiles and has four torpedo tubes.

Soviet SSGNs

Echo class

The first Soviet purpose-built, nuclear-powered cruise missile submarine, the Echo, was designed to provide defense of Soviet territory against attack from the sea. The Echo used the same reactor and propulsion system as the Hotel class SSBN, which was based on the first Soviet SSN and was notoriously unreliable. The boat's elevating missile launchers are located on the top aft of the hull. The indentations which serve to deflect missile exhaust cause considerable water turbulence, making the Echo relatively easy to detect. Eight SS-N-3A missiles were replaced by the SS-N-12 Sandbox missiles. These missiles must be prepared and launched from the surface, making the Echo extremely vulnerable to detection and attack. Preparations take nearly half an hour, after which the submarine must remain on the surface to provide guidance. Six standard 21-inch torpedo tubes located in the bow accomodate the full range of tube-launched weapons.

Charlie Class

A member of the second generation of Soviet nuclear-powered submarines, the Charlie was the first cruise missile submarine to possess the ability to launch a missle while underwater. Submarines equipped with the SS-N-7 missile could approach their targets undetected, launch their missles outside the effective range of the escorts, and escape without exposure to enemy countermeasures. The Charlie has eight launch tubes set into its bow and six 21-inch bow torpedo tubes.

British SSNs

Trafalgar class

The Trafalgar was based on the Swiftsure, which had proven successful in service. The more recent sub is approximately 8 feet longer than the Swiftsure, but its major changes are in the propulsion system, which is powered by an all new reactor and pump jets rather than propellers. The Trafalgars have five torpedo tubes, firing the Mk 24 Tigerfish. The sub also carries one Sub-Harpoon missile.

British SSBNs

Resolution Class

The first unit completed in 1967, the Resolution was based largely on the United States-built Lafayette class. A total of four were built. The Resolution fires the US-made Polaris A-3 missile from each of its sixteen vertical launch tubes. There are 16 torpedo tubes which fire Mk 20 and Mk 23 antisubmarine torpedoes and Mk 24 Tigerfish anti-ship Tigerfish.

French SSNs

Rubis Class

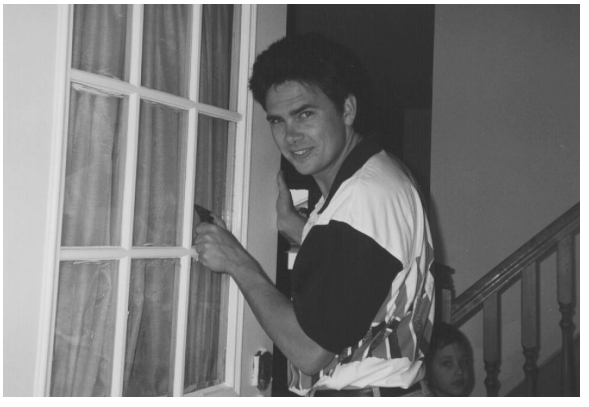
The smallest nuclear-powered submarine ever built, the Rubis class employs an extremely compact reactor/exchanger and has a submerged displacement of only 2,630 tons. Although the French began developing plans for several types of small attack submarines between 1954 and 1980, it wasn't until 1982 that they were able to fully complete a working unit. The result, based on earlier designs, was a nuclear submarine not much larger than the Agosta diesel/electric submarines, the major difference being the single-hull design of the Rubis. The first Rubis features four bow tubes that can accomodate fourteen L 5 Mod.3 accoustic-homing antisubmarine torpedoes and the wire-guided F17. Later boats are capable of firing the SM 39 Exocet anti-ship missile.

Dutch Patrol Submarines

Walrus class

Based on the US Barbel, the Walrus has an Albacore-type hull with fin-mounted hydroplanes and, on later models, X-planes rather than the conventional cruciform tail surfaces. The combination single- and double-hull is constructed of high-tensile steel, enabling extended dives of over 980 feet. The Walrus is propelled by three diesel/electric generators turning a single screw. Four 21-inch bow tubes are of the "water slug" type, which can fire torpedoes from any depth. The Walrus is equipped to fire the Northrop NT-37C and -37D antisubmarine torpedoes as well as variations of the US-made Mk 48 torpedo. Up to 20 torpedoes can be carried at one time.

About the Artist



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