

# GAME MANUAL

*Larry Bond's*  
**HARPOON**  
**ULTIMATE EDITION**™



## HARPOON 3 – ADVANCED NAVAL WARFARE – BASIC MANUAL



Advanced  
Gaming  
Systems



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- Do not play when tired or short on sleep.
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# 1.0 INSTALLATION AND SUPPORT

## MINIMUM SYSTEM REQUIREMENTS

OS: Microsoft Windows XP/Vista (32//Vista 64 bit)/Windows 7 (32/64bit) /Windows 7 64 bit

Processor: 1.5 GHz CPU

RAM: 1 GB

Video Card: 256 MB memory Video Card

Sound Card: 16 bit Sound Card (Direct X 8+ Compatible)

Hard Drive: 500 MB free, uncompressed hard drive space

DirectX Version: 9+

## 1.1. INSTALLATION

Please ensure your system meets the minimum requirements listed below. To install the game, either double click on the installation file you downloaded or insert the H3ANW CD into your CD-ROM drive. If you have disabled the autorun function on your CD-ROM or if you are installing from a digital download, double-click on the installation archive file, then double click on the file that is shown inside the archive. Follow all on-screen prompts to complete installation.

## 1.2. UNINSTALLING THE GAME

Please use the Add/Remove Programs option from the Windows Control Panel or the Uninstall shortcut in the games Windows START menu folder to uninstall the game. Uninstalling through any other method will not properly uninstall the game.

## 1.3. PRODUCT UPDATES

In order to maintain our product excellence, Matrix Games releases updates containing new features, enhancements, and corrections to any known issues. All our updates are available free on our website and can also be downloaded quickly and easily by clicking on the Update link in your Game Menu or by using the Update Game shortcut in your Windows START menu folder for the game.

We also periodically make beta (preview) updates and other content available to registered owners. Keeping up with these special updates is made easy and is free by signing up for a Matrix Games Member account. When you are signed up, you can then register your Matrix Games products in order to receive access to these game-related materials. Doing so is a simple two step process:

Sign Up for a Matrix Games Member account - THIS IS A ONE TIME PROCEDURE; once you have signed up for a Matrix account, you are in the system and will not need to sign up again. Go to [www.matrixgames.com](http://www.matrixgames.com) and click the Members hyperlink at the top. In the new window, select Register NOW and follow the on-screen instructions. When you're finished,



click the Please Create My New Account button, and a confirmation e-mail will be sent to your specified e-mail account.

**Register a New Game Purchase** - Once you have signed up for a Matrix Games Member account, you can then register any Matrix Games title you own in your new account. To do so, log in to your account on the Matrix Games website ([www.matrixgames.com](http://www.matrixgames.com)). Click Register Game near the top to register your new Matrix Games purchase.

We strongly recommend registering your game as it will give you a backup location for your serial number should you lose it in the future. Once you've registered your game, when you log in to the Members section you can view your list of registered titles by clicking My Games. Each game title is a hyperlink that will take you to an information page on the game (including all the latest news on that title). Also on this list is a Downloads hyperlink that takes you to a page that has all the latest public and registered downloads, including patches, for that particular title.

You can also access patches and updates via our Games Section (<http://www.matrixgames.com/products/latestdownloads.asp>), once there select the game you wish to check updates for, then check the downloads link. Certain value content and additional downloads will be restricted to Members Area members. So it is always worthwhile to sign up there.

Remember, once you have signed up for a Matrix Games Member account, you do not have to sign up again at that point you are free to register for any Matrix Games product you purchase.

Thank you and enjoy your game!

### 1.4. GAME FORUMS

Our forums are one of the best things about Matrix Games. Every game has its own forum with our designers, developers and the gamers playing the game. If you are experiencing a problem, have a question or just an idea on how to make the game better, post a message there. Go to [www.matrixgames.com](http://www.matrixgames.com) and click on the Forums hyperlink.

### 1.5. NEED HELP?

The best way to contact us if you are having a problem with one of our games is through our Help Desk. Our Help Desk has FAQs as well as a dedicated support staff that answer questions within 24 hours, Monday through Friday. Support questions sent in on Saturday and Sunday may wait 48 hours for a reply. You can get to our Help Desk by going to <http://www.matrixgames.com/helpdesk/>.

### 1.6. THE H3ANW DEMO

#### 1.6.1. What are the differences between the H3ANW HARPOON demo and the full H3ANW?

The main limitation on the H3ANW Demo is that it can only open H3ANW tutorial scenarios. You can save the Tutorial scenarios, but can't reopen them. Also, there are no movies with the Demo (to save space). Matrix Games and AGSI make no guarantee as to the availability of a demo version of HARPOON.

### 1.6.2. Do I need to register to play one of the demos?

No.

### 1.6.3. How do I install the windows version?

Simply run the self-installing zip file into a directory. (We suggest \ H3ANW)

**Note: When the Windows demo runs for the first time, it will print information into the Console window, and create a file named "HARPOON3.ini". It has NOT crashed. Read the information it prints out (which most likely will tell you to hit any key to continue)**

### 1.7. WHERE DO I GET GAME UPDATES AND WHAT DO I DO WITH THEM?

You can find all downloads for H3ANW at the AGSI download page.

Typically AGSI will tell you what to download via the various user groups for the game on the Internet. The most typical download is the game engine update and the editors. Please be sure to unzip these to your root H3ANW directory and then create a new shortcut on your desktop.

You do not need to download the entire game (H3ANW Game with Installer) to update.

## 12.0 INTRODUCTION

***It follows then as certain as night succeeds day, that without a decisive naval force we can do nothing definitive, and that with it everything honorable and glorious.***

**-George Washington**

Welcome Aboard!

You are about to take command of the awesome power of modern naval and air forces. If you are new to the HARPOON series, there is much to learn to successfully command these forces under the most difficult scenarios. If you are a seasoned "Harpooner," however, we believe we have put together an experience that, like the first HARPOON computer game, will provide you with thousands of hours of entertainment and challenging modern conflict. H3ANW has plenty of things the veteran HARPOON user will find familiar, and yet there are many new features that will demand both your attention and newly acquired familiarity.

H3ANW is more than just a game; it is a simulation that accurately represents the capabilities and limitations of modern naval and air forces. A painstakingly detailed labor of love went into providing H3ANW with the most accurate data that can be obtained from open and unclassified sources. You will not find another entertainment product on the market that has the amount of data contained in the H3ANW database.

The dedicated efforts of many people went into making this product the most accurate and exciting simulation you can run without security clearance. H3ANW is not difficult to play, but it is a challenge to play well. While we want you to start enjoying the experience right away,

we heartily recommend taking some time to become familiar with this manual before you set sail for the new challenges that await you. You will be a more proficient commander if you log a few hours doing the head work necessary to be the cool, confident, modern commander required to meet the contingencies and conflicts found in H3ANW. As mentioned above, with the vast amount of information that you will receive as you command your forces, it is not uncommon to become overwhelmed. The greater your familiarity with the interface, and the custom features it offers, the better prepared you will be to lead your forces to the successful completion of the mission objectives.

In order to ensure your smooth transition from land to sea command, we will present to you a list of terminology first in order to get you acquainted with the language of this manual but also in-game information. After this, information regarding the interface, including hot keys and menu commands, will be covered. Once you have these basics reviewed, the Tutorial section will follow so you can jump right in and try your hand – after all, one learns best by doing.

Following these sections will be the detailed information regarding every aspect of the H3ANW game. Once you've tried the Tutorial a time or two, reading this information will help you become more familiar with the specific aspects of commanding a ship or fleet in modern sea combat.

Congratulations, Commander, and good luck to you – the waterways of the world are a dangerous place, so you're going to need it.

### 2.1. HOT KEYS

Although the use of a mouse is required to play H3ANW, many commands and options may be selected using the keyboard. Throughout this manual the use of individual keystrokes and combinations of keystrokes are referred to as hot keys. A list of hotkeys is displayed below; please review this information to become familiar with them.

Many of these functions will be explained later in the manual, so don't feel daunted if you're unfamiliar with the lingo.

#### 2.1.1. Numeric Keypad

In order to utilize the numeric keypad on your keyboard, ensure that the NUMBER LOCK key is turned OFF.

KEY ACTION	FUNCTION
/	Course Tracks All/Sel/Off
*	Data Block All/Sel/Off
-	Decrease Time Compression
+	Increase Time Compression
7	Rename Unit/Group/Contact/Nav Zone
9	Display Groups/Units
5	Toggle Range/Bearings On/Off
3	Clear Old Contact*
0	Add Reference Point
DEL	Delete Reference Point
Ctrl+7	Rename Reference Points

\* To remove an old contact from the screen, use the Clear Contact hot key ("3"). This feature can be used to clear old contacts and contacts that are no longer important (such as a sinking ship). This is useful if a target has sunk, but you did not actually see it go down; the old contact will hang around cluttering your display. If the contact is cleared and later reappears, it has been re-acquired by your sensors.

### 2.1.2. Function Keys

KEY ACTION	FUNCTION
F1	Attack
F2	Speed/Alt/Depth
F3	Navigation Mode
F4	Formation Editor
F5	Logistics
F6	Air Ops
F7	Nav Zone Editor
F8	Window Preferences
F9	Sensors
F10	New Zoom Window
F12	Pause/Resume Game
Ctrl+F1	Bearing Only Attack

### 2.1.3. Regular Keys

KEY ACTION	FUNCTION
~	Weapons Free
D	Detach Unit
G	Group Selected Units
H	Mark the selected contact(s) as hostile*
K	Mark the selected contact as "Probably Killed"***
Alt-M	Toggle GIS graphicsH3MilSim
U	Unassign (tac map)***
BACKSPACE	Select Previous Group/Unit

\* Contacts can be manually designated as hostile using the hotkey ("H"). If an unknown contact is designated hostile it will be attacked by your units. Be careful you do not designate a neutral unit or group.

\*\* "Probably Killed" is a Battle Damage Assessment (BDA) state that prevents further attacks from being launched, but patrol and recon missions will still attempt ID and BDA on the contact. It can also be automatically assigned if a contact is stopped, not emitting or firing weapons, and not in BDA range of a friendly unit.

\*\*\* If an aircraft is returning to base (RTB) or is assigned to a mission, you can unassign it by using the hot key ("U"). If you use this option you will be responsible for getting the aircraft to a tanker or another base prior to its fuel being expended. This hot key is handy when an intercepting aircraft's mission is cancelled because of range or lack of fuel yet you want to assign the aircraft to another intercept or patrol mission.

### 2.1.4. Sonobuoy Release

KEY ACTION	FUNCTION
,	Drop Passive* Sonobuoy
.	Drop Active* Sonobuoy
[	Drop Directional Passive** Sonobuoy
]	Drop Directional Active** Sonobuoy
{	Drop Best*** Passive Sonobuoy
}	Drop Best*** Active Sonobuoy
;	Drop a Line of Sonobuoys

\* Drop Passive and Drop Active will drop omnidirectional sonobuoys if any are present, otherwise directional sonobuoys if those are present instead.

\*\* Drop Directional Passive and Drop Directional Active will never drop omnidirectional sonobuoys.

\*\*\* Currently “Best” is interpreted as “least number available” among most suitable sonobuoys present.

This is useful for dropping scarce attack localization buoys (VLAD, Barra, and CAMBS, for example) to nail down a contact detected the cheaper and more common LOFAR and DIFAR sonobuoys. The other keys select “greatest number available”. *Remember, the simulation tracks how many buoys are onboard the aircraft and when it is out – you have to return to base to re-load!*

2.1.5. Window Controls

KEY ACTION	FUNCTION
F10	New Zoom Window
Z	Zoom In
X	Expand Out
F8	Window Preferences
T	Tracking Window On/Off
Shift-Click	Select/Deselect multiple units/groups
Alt-S	Toggle map window scale

2.1.6. Command Card

For quick reference, a handy command card has been included in the back of the manual.

3.0 INTERFACE

***The reason that the American Navy does so well in wartime, is that war is chaos, and the Americans practice chaos on a daily basis.***  
**-Admiral Karl Doenitz**

H3 uses a window type interface. Your use of the interface to create a screen layout will make obtaining and managing the information easier. The interface gives you the versatility to customize the game display and set the level of detail that best suits your style of play and the tactical situations at hand.

3.1. TOOLBAR BUTTONS

Toolbar buttons are used to give commands to your forces and configure game maps. Toolbars are found only with Map Windows. In most cases, a unit or group must be selected before using a toolbar button to issue commands. The H3 Launcher utility allows you to adjust the size of the toolbar when you adjust the size of your windows. Below is a listing of each toolbar button and its function:

### 3.1.1. Main Window Toolbar



#### Zoom Window



A Zoom Window can be created by first clicking on the Zoom Window toolbar button. The mouse cursor will resemble a “+”. Place the mouse cursor at any location on the map area and drag a box as you hold the left mouse button down. Once you release the mouse button, a new map window will appear. Please refer to the Zoom Window section (5.2) for further details on preferences particular to this type of window.

#### PREF



Activates various map display options. It is important to note that you may set a combination of display preferences in each individual window; each window may have an independent set of preferences. Use this feature to create windows containing a variety of display information. Refer to the Map Preferences section (4.3) for further details.

#### Attack



There are several ways to attack targets in H3ANW. An attack can be a manual engagement where the user orders a specific unit or group to engage a target. Attacks can also be made automatically by assigning units or groups to either a Strike or a Patrol Mission. Attacks can be made against a known target that is currently in range, or when the exact location of the target is unknown an attack can be made as a bearing-only launch. Units or groups can also be ordered to intercept and attack when they are currently out of range of a target. Refer to the Attack section (8.0) for further details.

#### Sensor



To change sensor settings, select a unit, group, or base to change it for and click this toolbar button. This will produce a small dialog window with several options, including Radars, Sonars, ECM, and Comm Link. These sensors can be set to Active, Passive, or Intermittent. Refer to the Sensor section (11.0) for further details.

#### Navigation

Allows you to tell a unit or group where to move to. To use the Navigator, first click on the unit or group you want to move and then click this button; the mouse cursor will change to a pencil shape. Using the pencil cursor, click on where you want the unit or group to move to. You can enter several points for a unit at a time by continuing to click on new places on the map. Each time you click you will place a small circle with line segments connecting the circles. These small circles are called waypoints. After a course has been plotted, the user can select individual waypoints to either move or delete them. You will also see small triangles in between the waypoints; these are midpoints. Refer to the Navigation section (7.0) for further details.

### Speed/Altitude/Depth



To change the speed, altitude, or depth of a unit or group, first select the unit or group and then click this button. This will produce a Speed/Altitude/Depth window with settings appropriate to the type of unit or group you've selected. Thus, surface and submarine units can have speed settings from Stop to Flank, while aircraft units can have speeds from Loiter to Afterburner (if that speed is available for that type of aircraft). Subs will have depth settings and aircraft will have altitude settings. Also, you can enter an exact speed, depth, or altitude in the text block as appropriate.

### Air Ops



All of the operations involving aircraft in H3ANW can be controlled by using this button. The Air Ops toolbar button is one of the most versatile controls used in H3ANW. Refer to the Air Ops (10.3.3.5) section for further details.

### Formation Editor



Used to position units in the best possible configuration to attack and defend against potential threats. Units properly configured and assigned to their most capable missions will provide the best possible defensive and offensive capability for the group. Besides the obvious placement of units in relation to each other, the Formation Editor also allows the user to assign individual units in the formation to specific Patrol Zones. Refer to the Formation Editor section or Lesson VII for further details.

### Logistics



If the Aircraft Logistics difficulty setting is set to ON, the Logistics toolbar button can be used to refuel and resupply ships. Ordnance for carrier-based aircraft can be provided to carriers. The ability to conduct aerial refueling, while a logistical operation, is executed using the Air Ops toolbar button and is covered in the Air Ops section (10.3.3.5) of this manual; please refer there for further details.

### Nav Zone



Navigation or "Nav" Zones are areas that can be designated as off-limits to all or some of your units. Nav Zones are used to prevent your H3ANW Operating Instructions units from navigating into areas because of threats, rules of engagement restrictions, or to avoid detection ranges of known enemy units or facilities. Refer to the Nav Zone section (6.6.3) for further details.

### 3.1.2. Zoom Functions

#### Zoom In



Causes the area displayed by the window to become smaller, producing a close-up view of the area; this button can be clicked on many times, creating a steadily closer view. Note that H3ANW is capable of displaying a map area of a few feet across if you zoom in far enough. There is no Zoom In button for the Main Map window.



### Zoom Out



Causes the area displayed by the Zoom Window to become larger. There is no Zoom Out button for the Main Map window.

### Zoom Window



Creates a manually-created zoomed-in Window. The mouse cursor will resemble a plus sign (+). Place the cursor at any location on the map area and drag a box as you hold the mouse button down. Once you release the mouse button, a new map window will be displayed. Refer to the rest of this section for further details on the preferences available for the Zoom Window.

### Tracking Window



This is a window that will automatically track a selected unit in its very own unit. To turn a Zoom Window into a Tracking Window, first click the unit you would like the window to track and then click this button; the title bar will change to indicate that this window is now a Tracking window. You can change a Tracking window back into a Zoom window by clicking on the Track Unit/Group button again. Use the Map Preferences toolbar button in the Zoom Window to rename the Tracking Window.

#### 3.1.3. Formation Editor Toolbar

The Formation Editor is a modern version of the US Navy's "Mo Board" or "Maneuver Board" which was an analog computer used to help move vessels to various stations within a formation. The Formation Editor should be thought of as manipulating a circle; Patrol Zones are a slice of this circle. There can be no square-shaped patrol areas.

### Patrol Zone Formation



Allows the creation of a Patrol Zone, which is an area assigned to a unit within the formation. The zone is a function of the threats being defended against and the unit's capability.

### Threat-Axis-Tracking Formation Editor



One of the more advanced features of the Formation Editor as it allows you to "tag" a threat axis to the contact you wish to track. To activate this feature, click on the axis you would like to assign to a particular contact, making sure the type of axis you pick matches the contact type you would like to track. Single click your tactical display window and then double click the contact you would like to track. Your axis is now locked on that contact and will shift appropriately until you reassign it or the contact moves outside sensor range. If the contact is lost the axis will stay oriented toward the last known bearing of the contact. This feature can be turned off if assigned to the AI (also known as the Staff Assistant).

### Detach Unit Formation Editor



Clicking a unit in the Formation Editor and clicking this button will detach a unit from the group; it will then appear on the map as its own unit.

### CPU Formation Editor



This button allows you to hand over the control of a unit within a formation to the AI. The AI will then assign to an axis and threat zone. The AI will also gain control of all the aviation units of that vessel. To activate this feature, first select the unit by clicking it within the Formation Editor and then click this button. To cancel this feature, reassign the vessel within the formation editor.

## 3.2. PULL-DOWN MENUS

*The difference between a good and great officer is about ten seconds.*

**-Admiral Arleigh Burke**

### 3.2.1. Pull-down Menu Selections



The menu bar at the top of the H3ANW screen contains features that apply to the entire game. In general, H3ANW is arranged so that functions applying to the entire game (such as loading a scenario or setting time compression) are in this menu bar, while functions applying to specific units and groups are presented in windows and dialog boxes. The menu bar contains the following items:

#### PC Pull-Down Menu

Clicking PC on the menu bar will produce a menu with the following four items:

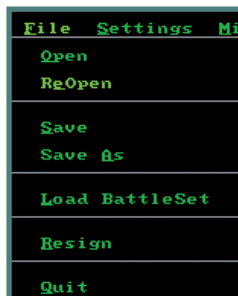
- About Harpoon 3 – Shows the names the H3ANW Development Team and our dedicated Beta Testers going all the way back to the Harpoon II team in 1995.
- Tutorial – Displays the updated HARPOON 3 tutorials.
- Grab Screen – Grab Screen will take a screenshot of the H3ANW window and save it in the ScreenShot folder on the drive where H3ANW is installed. If the directory does not exist, it will be created. These screen capture files will be saved in \*.PCX (Zsoft Paintbrush) format. For those wishing to capture their harpoon screenshots in alternate formats, a freeware utility such as Irfanview (<http://www.irfanview.net/>) is commonly used by members of the development team.



### File Pull-Down Menu

Clicking File in the menu bar will produce a menu with the following six items:

- **Open** – Displays a window listing all the available scenarios and currently saved games. Clicking on an item in this list and OK will start a new scenario or return to a previously saved game. H3ANW supports cross-platform loading and saving of scenarios. However, attempting to load a game saved from a scenario that was part of a BattleSet you do not own will produce unpredictable results.
- **ReOpen** – Restarts the current scenario allowing you to switch sides and select a different difficulty level.
- **Save** – Saves the game to a file with the same name you used last for this scenario. If you want to save the same game at two different points, or change the name of the saved game, select Save As.
- **Save As** – Displays a dialog box to enter a new file name in for this saved game. As noted above, this feature allows you to save the same scenario at different points. A .SAV extension is added by default.
- **Load BattleSet** – Displays the Scenario Selection dialog box. Use this selection if you want to load a different scenario or if you want to restart the one you are currently playing. After a scenario is selected, the Side Selection dialog box will appear.
- **Resign** – Select to quit a scenario and obtain an evaluation of your efforts to achieve victory conditions. (The End of Scenario Evaluation screen also provides information about losses suffered by each side in the scenario and whether or not any rules of engagement were violated.)
- **Quit** – Exits H3ANW and returns to the computer's desktop. A confirmation will be displayed first; if you want to use the Save or Save As command click on CANCEL and then save your game before quitting.



### Settings Pull-Down Menu

Clicking on Settings in the menu bar will produce a menu with the following eight items:

- **Start/Resume or Pause** – The status of the game determines the value that is displayed. If a game is running, Pause is displayed, and clicking it will pause the game. If the game is paused, Start/Resume is displayed, and clicking it will un-pause the game. This function can also be toggled by using the correct hot key
- **Time Compression** – Increasing the time compression should only be used when you wish to speed the game up to make first contact, to transit units or groups, or to ready aircraft. Do not use a high time compression at all times when playing H3ANW. Time compression does not provide a compression rate of the selected rate for every second of real time that passes. Instead, the time compression feature

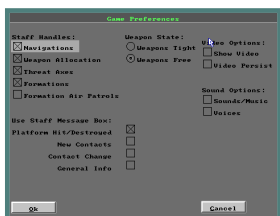


updates the screen to what has happened in the selected compression interval every time the screen updates. Screen update times vary and are dependent upon the speed of your computer, the size of the scenario, and what is taking place in the scenario at any given moment. If you are playing H3ANW on a slow machine, or if you have multiple aircraft and missiles airborne, the game speed will be affected. Playing with a high time compression rate can prevent you from having enough time to make decisions that could decide the fate of your forces. Use time compression to speed up game events such as transit to an area or the readying of aircraft. This function can also be toggled by using the correct hot key

- **Toggle Rng/Bearing [ON/OFF]** – This menu item has two configurations. If Ranging is currently turned off, Toggle Range/Bearing [OFF] will be displayed; if Ranging is currently turned on, Toggle Range/Bearing [ON] will be displayed. Turning Ranging on causes the distance and bearing between consecutive mouse clicks within either the main map or a zoom window (or even across windows) to be displayed in the Incoming Message window. To determine the distance between two groups, for example, you should turn on this feature, click on one group, and then click on the other group. When you click on the second group, the range, bearing, depth, and position (in latitude and longitude) will be displayed in the message window. This function can also be toggled by using the correct hot key.
- **Mouseover Display [ON/OFF]** – Gives the Latitude and Longitude of the mouse in degrees, minutes, and seconds.
- **Set Flagship** – Allows you to change to a new flagship (which is essentially the center of your communications network); this feature is useful if your current flagship is threatened or has moved to a disadvantageous position. To set a new flagship, click on the desired ship and then select Settings and Set Flagship. Setting a new flagship moves the center of your side's communications net to the newly selected platform (a flagship can be any manned platform with communications gear - ships, subs, airplanes, but not missiles or the group symbol). The newly selected flagship must be on the current communications network for this function to work.
- **Edit Way Pt Orders** – To edit the orders assigned to a particular waypoint, first select a waypoint and then click on Edit Waypoint Orders. A box will appear with a listing of the orders assigned to the currently selected waypoint. You may delete any order by selecting it and then clicking on the Discard Order button. To add a different order, select the waypoint and use the toolbar button for the particular order you wish to assign to that waypoint.
- **Colors** – H3ANW provides the user with the ability to change the colors used to represent the interface, maps, and the game elements (such as symbols). There are three ways to change the colors:
  - o Load a Default Palette
  - o Load a User Palette
  - o Create a New Palette

- **Symbol Set** – H3ANW comes with two sets of platform (ship, sub, aircraft, and base) symbols: Stylized and NTDS. NTDS stands for Naval Tactical Display System. The NTDS symbols are adapted from the symbols actually used by the United States military and many other western navies. Stylized symbols are actual images of boats, ships, planes, etc. familiar to most wargamers. It is recommended for beginners to start with the Stylized symbol set and, once comfortable, switch to the NTDS.
- **Rules of Engagement** – Allows you to dynamically set if your units will attach on sight or only attack in self defense.
- **Game Preferences** – Displays a variety of preferences that you can set. Refer to the next section for details.

### 3.2.2. Game Preferences



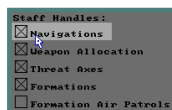
#### Setting Game Preferences

Click on the Game Preferences selection under the Settings pull-down menu to bring up the window containing a variety of preferences that you can set for the following areas:

#### Staff

When selected, your Staff will handle operations related to the following:

- **Navigation** – When drawing a course across land for a ship or sub, or through a Nav Zone for affected units, the Staff will navigate the portion of the course that is restricted and proceed with an alternate course to reach the desired destination.
- **Weapon Allocation** – When attacking, the Staff will automatically allocate the proper weapon(s) to the selected target(s).
- **Threat Axes** – The Staff will assign the ASuW, and AAW threat axes for the Formation Editor to use.
- **Formations** – The Staff will create formations for any groups. Patrol Zones will be established for each unit in the group.
- **Formation Air Patrols** – The Staff will assign aircraft attached to the units or bases in the group to automatically conduct AAW and AEW air patrols within the group's formation.



### Use Staff Message Box

Text Message Boxes can be used in addition to sounds to announce the following events:

- Platform Hit/Destroyed – Any time a platform is hit, damaged, or destroyed.
- New Contacts – Any time a new contact is detected.
- Contact Change – Any time a contact is lost.
- General Info – Information about units being damaged, damage control activities, aircraft ready status, and many other routine messages.

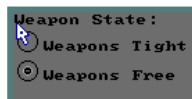


If you do not have sound capability for your computer it is recommended that you configure all the staff messages to be presented in message boxes.

Furthermore, when a Staff Message window is displayed, time compression will automatically return to one second until the window is closed. If you select Keep 1:1, then the game will revert to one second after the window is closed.

### Weapon State

Units in H3ANW that are not assigned to a mission will automatically engage incoming air and missile threats if the Weapon State is set to Weapons Free. To prevent units from engaging air and missile threats on their own, the Weapons State can be set to Weapons Tight. The initial default setting for Weapon State is Weapons Free. CAUTION: Setting the Weapons State to Weapons Tight will prevent your forces from defending themselves against air and missile attacks. Also note that closing to intercept effectively places those units on a mission, meaning they will react as if Weapons Free is selected. To prevent units with Weapons Tight ROE from being attacked while effectively helpless, the Settings menu for the Rules of Engagement menu has an auto-defence feature. By checking the Self-Defense box under the Weapons Tight state Plotted Mission and No Mission craft will auto-defend if attacked.



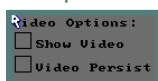
### Weapons Tight

All weapons launches will be executed by the user except for units assigned to a mission or (if enabled) if attacked.

### Weapons Free

Units and groups will attack air and missile threats on their own. The user may still intervene and launch weapons as well.

### Video Options



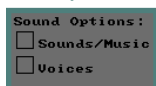
### Show Video

Select to display launch and hit videos during the game.

### Video Persist

Selecting this option sets the video display to remain open following an event that activates a video sequence, such as a weapon launch. Having the video display remain open provides the user the ability to drag the video display box to any location on the screen. To move the video display, left click and hold on the top bar of the video box, drag it to a new location, and release the mouse button. Once the video display has been moved, all video sequences will be displayed at the new location unless moved again. While the video display is persistent, it may be closed by clicking on the center of the box. Turning the Video Persist selection off will enable the video display to close itself following a video sequence.

### Sound Options



#### Sounds/Music

Select to enable sound effects to play during the game. Sound effects include the following:

- Weapons Firing or Launching
- Aircraft Launching
- Explosions
- Button Clicks

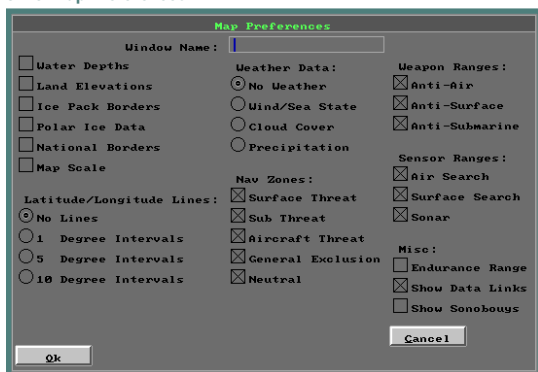
#### Voices

Select to enable voice sounds to play during the game. Voice sounds are used to announce the following:

- New Contacts
- Contacts Lost

Map Preferences – Map preferences can be accessed for each Zoom Map with the PREF toolbar button. Refer to the next section for details.

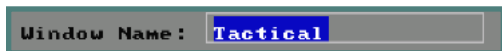
## 3.2.3. Map Preferences



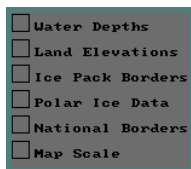
To activate the various map display options, click the PREF toolbar button. This is the Map Preferences button and will display a dialog box with a variety of display options which may be selected. It is important to note that you may set a combination of display preferences in each individual window. Each window may have an independent set of preferences. Use this feature to create windows containing a variety of display information. The following map display options are available:

### Window Name

To change the name you see displayed in the title bar of a window, click on the text and type the new name. The window names can be changed during a game to keep track of various areas, units, or groups. Be aware that long names will not be practical when the map window is in icon form. Use short names or abbreviations when naming windows.



### Terrain



### Water Depths

Water depths are represented by colored tick marks every 30 minutes of map distance. The water depth scale is represented for three levels: 10, 100, or 1000+ meters. Tick marks are placed in 30 minute (one-half degree or 30 nautical miles at the equator) intervals on the map. The colors used to represent the depth bands may be changed by clicking Settings, Colors, and Map Colors.



### Land Elevations

Land elevations can be displayed in 500 meter bands starting at sea level (0 meters) and going up to 2500 meters. Each band can be represented by a colored tick mark. Tick marks are placed in 30 minute (one-half degree or 30 nautical miles at the equator) intervals on the map. The color of the tick mark indicates the elevation for that particular area on the map. The size of the tick mark will depend on the size of the map area represented by the map window and the level at which the map is magnified. The colors used to represent the elevation bands may be changed by clicking Settings, Colors, and Map Colors.

### Ice Pack Borders

Displays polar ice pack borders when selected. Ice packs will only be displayed in scenarios taking place close to the polar regions of the world. Surface ships cannot traverse across polar ice. Ice packs are represented on the map as a line similar to coastlines; think of them as a variable coastline that changes with the seasons.

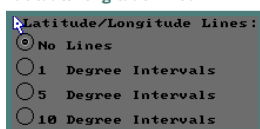
### Polar Ice Data

When selected, the entire area defined by the Ice Pack Borders will be displayed.

### National Borders

This option displays national borders when selected. Borders are represented as lines within the land masses on the map. H3ANW has two border sets: Cold War (e.g., West and East Germany) and Post-Cold War (e.g., a unified Germany), depending on the scenario.

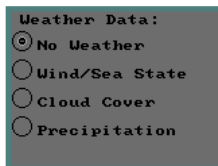
### Latitude/Longitude Lines



Latitude and Longitude can be represented on any map. Selections include no lines or lines at 1, 5, or 10 degree intervals.

### Weather Data

H3ANW contains a global weather model that creates the weather conditions most likely to be found in the geographic region in which the scenario takes place. Weather generation takes place during scenario creation and variability is related to both the size of the scenario map and the scenario's duration. The following weather display choices are available:



### No Weather

No weather information will be displayed on the map.

### Wind/Sea State

Color coded tick marks similar to the land elevation and depth information will be displayed. The colors vary with the speed of the wind in each half degree interval.

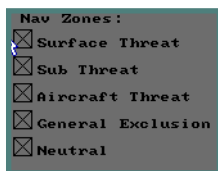
### Cloud Cover

The color tick marks represent the type of cloud cover in a given area. The categories for cloud cover are Clear, Scattered, Partly Cloudy, and Overcast.

### Precipitation

The color tick marks represent nine categories of precipitation, which include three levels of fog, three levels of rain, and three levels of snow. No precipitation is present if no tick marks are displayed. Colors used for weather data can be found in the Weather Legend under the Window pull-down menu. The colors may be changed by clicking Settings, Colors, and Weather Colors.

### Nav Zones



Navigation, or "Nav" Zones, are areas that can be designated as off-limits to all or some of your units. Nav Zones may either be user defined for permanently set (e.g. not modifiable) for the scenario.

#### Surface Threat

A Surface Threat Nav Zone will exclude all surface ships from entering the zone. Aircraft and submarines are unaffected by this type of Nav Zone. You may create, modify, or delete this type of Nav Zone.

#### Sub Threat

A Sub Threat Nav Zone will exclude all submarines from entering the zone. Aircraft and ships are unaffected by this type of Nav Zone. You may create, modify, or delete this type of Nav Zone.

#### Aircraft Threat

An Aircraft Threat Nav Zone will exclude all aircraft from entering the zone. Submarines and ships are unaffected by this type of Nav Zone. You may create, modify, or delete this type of Nav Zone.

#### General Exclusion

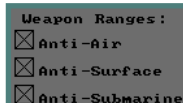
A General Exclusion Nav Zone will exclude all units, aircraft, ships, and submarines, from entering the zone. You may create, modify, or delete this type of Nav Zone.

#### Neutral

Similar to a General Exclusion Nav Zone, a Neutral Nav Zone will exclude all units, aircraft, ships, and submarines, from entering the zone. Players may not create, modify, or delete this type of zone. Most Neutral Nav Zones will be created when the scenario is designed and will be present from the start of the scenario. To display the various Nav Zones, you would select each one so an "X" appears in the boxes.

## Weapon Ranges

Weapon ranges are displayed for units, not groups. To display the approximate ranges of your unit's weapons, make the following selections as necessary:



### Anti-Air

Displays a ring depicting the approximate range of the farthest reaching AAW weapon for each platform.

### Anti-Surface

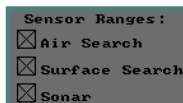
Displays a ring depicting the approximate range of the farthest reaching ASuW weapon for each platform.

### Anti-Submarine

Displays a ring depicting the approximate range of the farthest reaching ASW weapon for each platform. The colors used for weapon range circles can be found in the Tactical Legend under the Window pull-down menu. The colors may be changed by clicking Settings, Colors, and Game Colors.

## Sensor Ranges

Like weapon ranges, sensor ranges are displayed for units only. To display the approximate ranges of your units' sensors, make the following selections as necessary:



### Air Search

Displays a ring depicting the approximate range of the farthest reaching AAW sensor for each platform. Detection of air units will depend on the target's own cross sectional values. Even though a radar system may be capable of detecting a target at say 100nm, detection will only take place if the target is above the radar horizon for the unit attempting detection and the target is presenting an aspect that generates a return signal strength sufficient to allow detection to take place.

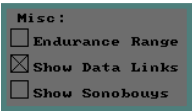
### Surface Search

Displays a ring depicting the range of the farthest reaching ASuW sensor for each platform. Detection of surface units will depend on the target's own cross sectional values. Even though a radar system may be capable of detecting a target at say 40nm, detection will only take place if the target is above the radar horizon for the unit attempting detection and the target is presenting an aspect that generates a return signal strength sufficient to allow a detection.

### Sonar

Displays a ring depicting the approximate range of the farthest reaching ASW sensor for each platform. The colors used for sensor range circles can be found in the Tactical Legend under the Window pull-down menu. The colors may be changed by clicking Settings, Colors, and Game Colors. Note that passive sonar does not cover the indicated area consistently; it may have rings of coverage in between rings of no coverage due to an affect called Convergence Zones.

Miscellaneous



Endurance Range

Select this item to display the approximate range each platform has based upon its current fuel state and speed. This applies to units only.

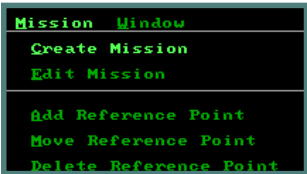
Show Data Links

Data Links are used to relay communications, sensor, and contact information between platforms. Data links can only be established between units with operational communications equipment that are in range of one another. A data link provides the ability to “see” things from the point of view of another platform. Think of a data link system as a network of sensors and communications equipment. If you select the Show Data Links selection, the links will be represented by thin lines between the data link capable platforms on your side.

Show Sonobuoys

Select this item to display individual sonobuoys on the map. Sonobuoys are dropped into the water by ASW aircraft and have their own sensor range circles and data link lines. Because many sonobuoys on the screen can clutter the view, it is a good idea to only use the Show Sonobuoys display option in windows that are being used for ASW operations.

3.2.4. Mission Pull-Down Menu



The Mission pull-down menu is used to access the H3ANW Mission Editor feature which allows units or groups to perform a variety of different task organized missions. Assigning units or groups to missions offers the user the flexibility of allocating various assets to perform specific functions continuously during a H3ANW session. Once units or groups are assigned to a mission, they will automatically launch, transit, patrol, detect, and in most cases, prosecute

enemy contacts. Missions are more than just patrols.

They can also be modified as the tactical situation changes during a scenario.

There are four types of missions:

1. Transit Missions
  2. Strike Missions
  3. Area Missions
- and
4. Reconnaissance Missions.

The Mission pull-down menu allows you to add, move, and delete reference points. It also allows you to create and edit missions.

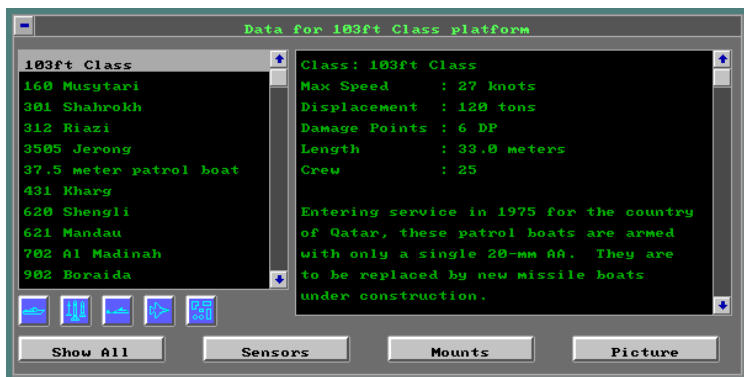
- Create Mission – Transit, Area and Reconnaissance missions require Reference Points while Strike missions require a target type be designated. Please refer to the Missions section (23.0) for detailed information on how to create missions.
- Edit Mission – After a mission has been created, units or groups need to be assigned before the mission may commence. The Mission Editor can be accessed two ways: first by clicking Edit Now when creating a mission with the Create Mission window and pressing OK; secondly, by clicking Missions and Edit Mission. Please refer to the Mission Editor section (9.2.9) for detailed information on how to edit missions.
- Add Reference Point – Use the Add Reference Point selection from the Mission pull-down menu to add a Reference Point to the map. Once Add Reference Point is selected, the mouse cursor will change to a pointer finger. Place the cursor where you want the Reference point to appear and click once. Please refer to the Reference Point section (6.6) in Lesson II for a detailed explanation of Reference points.
- Move Reference Point – Reference Points can also be moved to another location. Select the Reference Point you want to move and then click Mission and Move Reference Point. The mouse cursor will change to the pointer finger. Place the mouse cursor on the new location and click. The selected Reference Point will move to the new location. Note: there are some reference points in the scenario that have a 'locked' status. These points cannot be moved. Please refer to the Reference Point section (6.6) in Lesson II for a detailed explanation of Reference points.
- Delete Reference Point – To delete a Reference point, click Mission and Delete Reference Point. The mouse cursor will change to the pointer finger. Place the mouse cursor on the Reference Point you wish to delete and click once; the Reference Point will disappear from the map. Note: there are some reference points in the scenario that have a 'locked' status. These points cannot be deleted. Please refer to the Reference Point section (6.6) in Lesson II for a detailed explanation of Reference points.

### 3.2.5. Window Pull-Down Menu



The Window pull-down menu displays the following ten items:

- Game Status – This will open the Game Status window or, if it is already open, brings it to the front. This window displays the current game time, date, and the time compression ratio.
- Unit Status – This will open the Unit Status window or, if it was already open, brings it to the front. The Unit Status window provides information about a selected unit's status including speed, course, altitude or depth, and emission state. A Report can be accessed from this window that provides details about a unit's weapons and sensors. Clicking on the Database button brings up the Platform Display dialog window.
- Platform Display – Opens the Platform Display dialog window. The Platform Display displays text and picture information about the individual platforms contained in the H3ANW database.



The window displays the possible platform/system types in the left-hand window; anything selected in this left window will have a description and other information displayed in the right-hand window.

Each of the five blue buttons at the bottom left of this window allow you to select the type of unit you would like to view. From left to right these are Ships, Weapon Systems, Submarines, Aircraft, and Facility Emplacements.



Along the bottom of the window are a series of buttons:



- o Show Selected – Displays the selected item.
- o Sensors – Displays a list of sensors available to the selected item.
- o Mounts – Displays a list of mount (emplacements) capable of utilizing the selected item. If you select this, a Weapons button will be displayed; select the mount from the left window and click Weapons to view the types of weapons used in them.
- o Picture – Displays a color or black & white photograph (if available) of the selected item.

The rest of the items for the Window pull-down menu are:

- Order of Battle – Clicking on this selection will open a box containing a complete listing of all of the groups, units, and bases currently under your command. Please refer to the Order of Battle section (6.5.13) for further details.

- Legend – There are four sets of legends that can be selected from the Legends sub-menu. Please refer to the Legends section (6.5.14) for further details.
- Message – This opens the Message window or, if it was already open, brings it to the front. General information about contacts, unit status, range and bearing information, and much more is displayed in this window. It is recommended that you always have this window open while playing H3ANW. Please refer to the Message Window section (6.5.15) for further details.
- Current Orders – This opens the Current Orders window or, if it was already open, brings it to the front. The Current Orders window contains the same orders that are available from the Scenario Selection menu.
- Scenario Info – This opens the Scenario Information window or, if it was already open, brings it to the front. This is the same information that is displayed from the Load BattleSet dialog box at the beginning of the scenario.
- Window Schemes
  - o Load Scheme
  - o Save Scheme
- Close – Deletes the currently active window. The main map window cannot be closed.
- Active Window listing – At the bottom of the Window pull-down menu, all windows currently active for the scenario you are playing are listed. Either click on any of them to bring that window to the front of the display, or use the relevant number key to select it. This feature is useful when you have many windows open and some are obscured by others and you need to view a window that is beneath others.

## 4.0 SCENARIOS

***It's extremely difficult to second guess the American Navy, because the Americans rarely read their doctrine, and don't feel compelled to follow it when they do.***

**-Admiral of the Soviet Fleet Sergei Gorshkov**

In H3ANW you can play many Scenarios. The original download includes the tutorial scenarios as well as several different Battlesets. If you use a Database that is different from the original H3ANW database (such as the ANWDB or HUD3) you need to watch out that the scenario you are trying to load was created with that database.

### 4.1. LOADING A SCENARIO

When you start H3ANW the Scenario Selection screen will be displayed. If you want to play a stand-alone scenario click on Load file.

## 5.0 TUTORIALS

***We make war that we may live in peace.***  
—Aristotle

The H3ANW Tutorials have been designed to take you through a series of lesson scenarios. These lessons will familiarize you with the interface while demonstrating how to use each command and menu function in H3ANW. The H3ANW Tutorial is a wise investment of your time; you can learn while playing.

### 5.1. SETTING UP A TUTORIAL

#### 5.1.1. Loading the Tutorial

In the Scenario Selection dialog menu, select the Tutorial by placing the mouse cursor on the word “Tutorial” in the BattleSet box and clicking with your left mouse button. Once you have selected the Tutorial from the Scenario Selection dialog menu, you will see a set of Lesson Scenarios displayed to the right side of the dialog menu. Each of these lessons focuses on a particular series of commands and functions in H3ANW.

We will start with Lesson I: Orientation. Select the first scenario of the Tutorial by either double-clicking on the scenario name or by clicking once on the scenario name and then on OK in the lower left area of the Scenario Selection dialog menu .

While the scenario is loading watch the Incoming Message Window to see the various portions of the scenario as they are loaded into the computer’s memory.

#### 5.1.2. Choosing Sides

Once the scenario has loaded, click on Good Guys.

#### 5.1.3. Difficulty Settings

Press the Difficulty button to set the level of difficulty for the scenario you will be playing.

DIFFICULTY	DESCRIPTION
Easy	<b>Detection Setting:</b> Show All <b>Staff Settings:</b> Navigation, Weapon Allocation, Threat Axes, Formations, Formation Air Patrols <b>Real-time:</b> Not Enforced
Average	<b>Detection Setting:</b> Auto Side ID <b>Staff Settings:</b> Navigation, Weapon Allocation, Threat Axes, Formations <b>Real-time:</b> Not Enforced
Hard	<b>Detection Setting:</b> Full Reality <b>Staff Settings:</b> None <b>Real-time:</b> Enforced



Default	This is always selected when you start a scenario. The Default setting configures your Detection Setting and Staff Handling parameters to the configuration set in the H3ANW Launcher.
Custom	Use the Custom button to modify the difficulty settings for the scenario you are about to play. To modify the actual default settings you will need to edit the HARPOON .ini file.  <b>Consult the Advanced Manual for more information on editing the .ini file.</b>

The initial setting for H3ANW is Default. Press OK.

#### 5.1.4. Viewing Orders

After selecting your side and setting difficulty level, it is time to review your orders. Take a moment to read the scenario orders on the right side of the Side Selection window. Because this screen stipulates what must be done to win the scenario, it is important to be at least preliminarily acquainted with one's orders.

You can use the scroll bar at the side of the orders window to scroll through all of the orders. These orders can also be viewed at anytime while you are playing the game by clicking on Current Orders in the Window pull-down menu. Once you have reviewed your orders, click OK.

### 5.2. LESSON I - ORIENTATION

Now that you have selected your side, examined your orders, and the scenario has been loaded, it is time to become familiar with the H3ANW screen and the components of the interface.

#### 5.2.1. Main Window

The Main Window depicts the entire map area of the scenario. In the Lesson I scenario the Main Window is currently in icon form and labeled "Lesson I." Double-click on this icon. The window will expand and the entire map area will be displayed. For this first Tutorial scenario, the only map features that are active are the coastlines and a single unit symbol. The unit represented here is the USS Lewis B. Puller. We'll learn more about the Puller later in this lesson.

#### 5.2.2. Toolbar

Let's go over the components of the map. The map area itself is where the ocean, coastlines, groups, units, and bases are displayed. At the top of the display area is the toolbar containing the buttons used to issue orders to your units or change the window's features.

#### 5.2.3. Map Preferences

To activate the various display options, click on the toolbar button marked PREF. This is the PREF toolbar button and will display an options screen with a variety of display options which may be selected.

Each window may have an independent set of preferences. Use this feature to create windows containing a variety of display information. Let's try out the various Preferences. Go ahead and

click the PREF toolbar button from the Main Window. The Map Preferences box should now be in the center of your screen.

Please refer to the Map Preferences section for a detailed explanation of the different settings. For the purposes of this tutorial you should have the following settings for Map Preferences:

- Water Depths – OFF
- Land Elevations – OFF
- Ice Pack Borders – OFF
- Polar Ice Data – OFF
- National Borders – OFF
- Map Scale -- OFF
- Latitude/Longitude – NO LINES
- Weather – NO WEATHER
- Nav Zones – All OFF
- Weapons Ranges – All OFF
- Sensor Ranges – All ON
- Endurance Range – OFF
- Show Data Links – ON
- Show Sonobuoys – OFF

### 5.2.4. Creating Zoom Windows

A Zoom Window can be created by first clicking on the Zoom Window toolbar button. The mouse cursor should now resemble a plus sign (+). Place the cursor at any location on the Main Map area and drag a box as you hold the mouse button down. Once you release the mouse button, a new map window will appear. The new window is a Zoom Window labeled “Zoom Map 1.” Note this new window has its own toolbar buttons. A Zoom Window will have the same preferences as the map from which it was originally created. If you wish to have different settings, use the Map Preferences button (PREF) for this new window to give it its own display parameters. Click on the PREF button in this new Zoom Window and rename it “Tactical View”. Now grab the corner of Tactical View zoom window and stretch the window so it’s big enough for you to see all of the toolbar buttons for this window. Unlike the Main Map window, zoom windows do not stay proportional and can be stretched to any size without distorting the map.

### 5.2.5. Centering the Screen

Since the map area displayed in the new Zoom Window is smaller than the Main Map, you can move around within the map and center it on any location. To center the map in the Zoom Window, place the mouse cursor on the point you wish to designate as the new center of the map and click the right mouse button. The map should now be centered on the point where you clicked. Try it by clicking around and making various points on the map the center. This is a rapid means of traversing across the map surface in any direction.

**Note: If you right-click to center the screen at a point near the boundary of the map it will not center. There must be enough map area on all sides for the map to center properly. If you are near the edge of the map and want to center on a point, try zooming in prior to centering.**

### 5.2.6. Zooming In/Out

The new window has three toolbar buttons that were absent from the Main Map. The first two buttons are the Zoom In toolbar button and the Zoom Out toolbar button. Use these buttons to magnify or expand your view in the map. Try clicking the Zoom In button three times and watch what happens to the view in Tactical View; it should zoom in towards the map. Now click on the Zoom Out button three times. Doing this should have expanded the view back to where it was prior to using the Zoom In button. Go ahead and center the map on several areas using the center map feature described above and use the Zoom In and Zoom Out buttons to change the magnification of the view. For example, try centering the map on a coastline and then zoom in and out or center on the Puller and change the magnification. When you are comfortable with how these two buttons function, center the map on the Puller and zoom out enough to where you can see the Puller and some of the coastlines.

### 5.2.7. Creating Tracking Windows

Another toolbar button not found on the Main Map is the Tracking Window toolbar button. A Tracking Window allows the user to select a unit or group and center the map screen continuously on that unit or group. This means the window will keep the selected unit or group in the center of the window as it moves across the map. To create a Tracking Window, select the Puller. Next, click on the Tracking Window toolbar button. This should center the window on the Puller and the title bar for the window should now read "Tracking." You can use the PREF button to rename the window to whatever you choose. Go ahead and name the window "Tracking USS Puller." A Tracking Window can be changed back into a regular Zoom Window by clicking on the Tracking Window toolbar button again. Try it now. As you can see, the window returns to a normal zoom window and if you select tracking window again, the map centers on, and follows, the Puller. You will have to rename the tracking window each time you go from a tracking window to a normal zoom window. Go ahead and rename the window "Tracking USS Puller."

### 5.2.8. Additional Window Types

There are a variety of windows used by the H3ANW interface to display information. We have already learned about the map windows; now, we will take a look at the other types of windows that can be displayed using the Window pull-down menu.

### 5.2.9. Game Status Window

The Game Status Window provides you with the current game time and the time compression ratio. In this Tutorial scenario the Game Status Window is already active. If it had not been, you would have needed to select Game Status Window from the Window pull-down menu. The Game Status Window can be moved anywhere on the screen. To display the Game Status Window after it has closed, use the Window pull-down menu selection and select Game Status Window. As you can see, the current game time is 12:00 noon on January 1, 1994 and the game is currently paused. The time is displayed in Greenwich Mean Time (GMT) which is also referred to as "Zulu" time.

### 5.2.10. Unit Status Window

The Unit Status Window contains information relating to the current unit or group that is selected. The Unit Status Window is already active in this Tutorial scenario so we do not need to use the Window pull-down menu to create it. If the Unit Status Window was not active, all you

would need to do is click on Unit Status in the Window pull-down menu. Go ahead and select the ship symbol in the middle of the main window. The Unit Status Window should now show you that the selected ship is the USS Lewis B. Puller, a Perry-class guided-missile frigate, operating on the side of "The Good Guys." The Puller has a speed of 5 (creep) and has no damage. The current endurance in hours and the current Emission Control (EMCON) state is displayed. The Puller is not currently assigned to a Mission and awaits your orders. Had the Puller been an aircraft, submarine, or unknown contact, the Unit Status Window would differ slightly. We will note the differences for these other types of platforms later in the Tutorial. There are two buttons in the Unit Status Window, the database button and the Report button.

### 5.2.11. Database Window

Finally, click on the Database button. Selecting this button brings up the Platform Database entry for the USS Puller. You can also view the platform database by selecting the Platform Display selection from the Window pull-down menu.

By clicking one of the corresponding Platform Selection Button in the database window you can view detailed information on ships, weapons, subs, aircraft, and facilities. Press Show All (or Show Selected) to toggle between the currently selected unit and all of the items in the database.

By clicking the corresponding Sensors and Mounts button on the database window it is possible to view weapons and sensor information. Close these windows by double-clicking the button in the upper-left corner.

Many platforms have a description. Scroll through the data text for the Puller to learn more about its specifications and to read a brief description of the Ingraham subclass of the O.H. Perry-class guided-missile frigate.

Some platforms have an image in the database. To view a diagram and photograph of the Puller, click on the Picture button in the lower right corner. A window containing a line diagram and photograph of the ship class will appear on your screen.

### 5.2.12. Unit Report window

Close the Database window and click Report in the Unit Status window for detailed information about the current unit or base selected. The Report provides more detailed information than the Unit Status window. You will see sections of the Report window listing the weapons and sensors available to the Puller. You can use the scroll bar at the side of each section to view the entire weapon and sensor list. Go ahead and close the Report when you have finished reading it.

**A note about the weapons list: The Report window lists the mounts and weapons that are currently in each mount. The number of rounds available, the capacity, and the rate of fire are displayed. For example: 2/6 means that there are two rounds in a mount that can hold up to six rounds (eg. 2 of 6). If the first number is a zero, that mount is currently empty.**

### 5.2.13. Order of Battle

Click on the Order of Battle selection in the Window pull-down menu to produce a listing of all the groups, units, and bases that are currently under your command. Close the Order of Battle box when you are finished viewing it.

### 5.2.14. Legends

There are four Legends to provide you with information about symbols and colors used to represent units & groups, map components, sensors, weapon ranges, and weather. Go ahead and select Legends from the Window pull-down menu and then select each of the following from the Legends sub-menu:

- The Symbol Legend depicts the symbols that represent various unit, group, base, and other “game pieces.”
- The Map Legend depicts the colors used to represent various elevation, depth, borders and coastline, and Threat Zones.
- The Tactical Legend depicts the colors used to represent various sensor & weapons ranges, as well as contact status.
- The Weather Legend depicts the colors used to represent various weather-related information.

### 5.2.15. Incoming Messages Window

The Incoming Messages Window is where text information is presented. This window is already active for this tutorial scenario. Information about contacts, threats, and your own Damage Control will be displayed in this window. The location and size of the Incoming Messages window is up to you. It will appear at the bottom of the screen before and during the process of loading a scenario. After the scenario has loaded, the Incoming Messages window may appear in another location or may not appear at all, depending on how the scenario screen layout was saved when the scenario was last exited. You can also resize the Incoming Messages window to your liking. The following information is displayed in the Incoming Messages window:

If you select Toggle Rng/Bearing and click on it so that it reads ON in the Settings pull-down menu, the range and bearing between mouse clicks on any map window will be displayed in the Message Window. Altitude/depth and lighting conditions are also provided for each point. Go ahead and click Settings and Toggle Rng/Bearing so it reads ON. Now click anywhere on the map; click several times on the map to note the changes in range and bearing as you click. Once you are comfortable with the use of this feature, please turn it OFF until we need it later in the Tutorial.

The Message Window is the only window you will see on the screen as a scenario is loading and will indicate the Scenario load status. While a scenario is loading, it will indicate the various portions of the scenario that are being loaded into the computer’s memory.

When a platform is hit, sunk, or destroyed, a text message will appear in the Message Window. If this event type is selected in the Game Settings then this text will also appear in a Staff Message window.

When a platform is detected, a text message will appear in the Message Window. If this event type is selected in the Game Settings then this text will also appear in a Staff Message window.

When a contact is lost, a text message will appear in the Message Window. If this event type is selected in the Game preferences then this text will also appear in a Staff Message Box.

General information regarding aircraft ready status, damage reports, mounts reloading, and other information will appear as text messages in the Message Window. If this event type is selected in the Game Settings then this text will also appear in a Staff Message window.

### 5.2.16. Current Orders

You can review your orders at anytime by selecting Current Orders from the Window pull-down menu. The orders are identical to the ones you viewed earlier after side selection. It is not necessary to have the orders displayed during the game. If you want, the Current Orders text can be reduced to an icon so that you can easily review them from time to time by double-clicking on the icon.

### 5.2.17. Scenario Info

You can review a synopsis about the scenario you are currently running by clicking on Scenario Info from the Window pull-down menu. This information is identical to the Scenario Info available when selecting a scenario.

### 5.2.18. Colors

H3ANW provides the user with the ability to change the colors used to represent the interface, maps, and the game elements (such as symbols). There are three ways to change the colors, but for the purpose of this tutorial we will only be covering one of them. Click Settings and Colors; a sub-menu should now be displayed to the side of the Settings menu. Click Default Palettes. You will be given the following five choices:

- Aegis Display
- Amber Display
- OJ-663 Display
- Grayscale Display
- Conventional Display

Select Aegis Display. Doing this should change the map colors on your display. Now, try the other selections. The OJ-663 Display is the initial default setting for H3ANW. For the purposes of this tutorial, please reset the palette to OJ-663 before continuing with the lessons. Refer to section 3.2.1 (Settings Pull-Down Menu) for further details.

### 5.2.19. Choosing a Symbol Set

Select Symbol Set from the Settings pull-down menu. A sub-menu should appear offering the choice of either Stylized or NTDS symbols. The symbols in the legends for both NTDS and Stylized display Hostile, Unknown (or neutral) and Friendly symbols.  
Stylized

Stylized symbols are more intuitively understood and are drawn to resemble various platforms. Because they are easier for new players to recognize, the stylized set is the initial default set for H3ANW.

#### NTDS

Naval Tactical Display System symbols are based upon the symbols used by actual military systems. H3ANW has been designed to resemble these actual military systems. To achieve true realism, users may consider learning and using the NTDS Symbology. After all, millions of your tax dollars went into the design of these symbols to make them easy to recognize. The H3ANW Design Team invites you to learn these symbols and play H3ANW as realistically as possible. They were designed to convey information without relying on context. This is important when a screen is crowded with symbols, time-pressure is high, and you are approaching information overload. Users can instantly see the relations and capabilities of a threat presented by a symbol with a minimal amount of thought.

#### 5.2.20. Saving a Game

Click File and Save As. A dialog window will be displayed where you can enter the name to be used for the saved game. Save the game as LESSONA.SAV. Once it is saved, you can load the saved game by clicking File, Open, and selecting LESSONA.SAV.

#### 5.2.21. Lesson Summary

That concludes Lesson I: Orientation. If you followed each step of the lesson you should now be familiar with each element of H3ANW's interface. You also learned to move about a map and how to create Zoom Maps and configure them to display a variety of information. Now that we are finished with the first lesson, let's move on to the next lesson. Click File and Load BattleSet. Once you have the BattleSet Selection menu up, select the Tutorial BattleSet and click Lesson II: Plotting Course & Speed.

### 5.3. LESSON II - COURSE & SPEED

After you have selected Lesson II, select Good Guys as your side. Leave the Difficulty Settings as they are currently set. You should now be looking at a display almost identical to the Lesson I. Once again, the USS Lewis B. Puller is the lone unit on the map. We will be using the Puller to become familiar with navigation procedures for H3ANW. Notice that there are three small "X's" located at various points on the map; these are Reference Points. We will be using them to assist us in our navigation lesson.

Reference Points can be placed anywhere on the map. Besides the obvious use in marking a particular location, Reference Points play an important role in mission planning. Use the Add Reference Point selection from the Mission pull-down menu to add a Reference Point to the map. Once Add Reference Point is selected the mouse cursor will change to a pointer finger. Place the cursor where you want the Reference point to appear and click once.

#### 5.3.1. Showing Data Blocks

A Data Block is the text information displayed next to each unit, group, base, or reference point. Use the Show Data Blocks hot key to toggle the data block settings. There are three settings for Data Blocks:

- Data Blocks Off for all units
- Data Blocks On for all units
- Data Blocks On for the selected unit only.

Go ahead and try it – press the Show Data Blocks hot key (\*) several times and watch the map display. Also notice that the current setting is displayed in the Incoming Messages window. Data Blocks provide Unit/Group Designator (or name), course, speed, and when appropriate, altitude/depth. You should set Data Blocks to ON for all units for the remainder of this tutorial lesson.

**Make sure that you have selected the Tactical window prior to using the Show Data Blocks hot key. Display Hot Keys will work with selected windows only. Also note that if Caps Lock is set the key pad hot keys will fail to become active.**

### 5.3.2. Navigation

#### Drawing & Plotting a Course

Let's start by plotting a course to Reference Point 1. Select the Puller and then click the Navigation toolbar button. Your mouse cursor should now change into a pencil shape. Place the cursor at a point about one-third the distance from the Puller to Reference Point 1 and click with your mouse button. A line should appear from the unit symbol to the point where you clicked the mouse. If a line does not appear, try the course tracks hot key that toggles the display of course tracks for all units, the selected unit, and no tracks at all. Consult the Hot Keys (Section 2.2) to determine the correct key for toggling the course tracks. Once you are looking at the line you just created, notice at the point the line ends there is a small circle. This circle is called a waypoint. Halfway between the unit symbol and the first waypoint is a small triangle, this is called a midpoint. We will examine both the waypoint and the midpoint shortly.

Suppose you want to change the course you just plotted. Let's examine how to edit our existing course. First, let's say that we want to change the location of the final waypoint of our present course. Start by clicking on the third waypoint. It should change color to indicate that it has been selected. Click on third waypoint and hold on the mouse button to grab it. Now move the mouse to drag the waypoint to a new location. Notice the outline of the course segment from the second and third waypoints now is displayed as another color and moves as you move the mouse. Drag the third waypoint a short distance from its original location and release the mouse button. The course will change to the new location.

For now, let's resume plotting our course to Reference Point 1. Place the mouse cursor on a point that is two-thirds the distance from the Puller to Reference Point 1 and click on that spot. Another line segment with a waypoint and a midpoint should appear. Now let's finish our course. Place the cursor at a point just beyond Reference Point 1 and click. A third line segment, waypoint, and midpoint should appear. You have now finished drawing the course to Reference Point 1. We are finished plotting the course so we need to exit Navigation mode. Click the Navigation toolbar button and your mouse cursor should now be back to normal (an arrow). After clicking this button, the Navigator now examines the course you have drawn and plots it.



While you are in Navigation mode you are drawing the course, and when you exit Navigation mode the course is actually plotted and assigned to the unit or group.

### **Inserting a Waypoint**

To insert a waypoint between two existing waypoints, click and hold the midpoint between the two waypoints and drag it to the place you wish to insert the new waypoint. When you release the mouse button a new waypoint, course segment, and midpoint are created. Go ahead and create a new waypoint by dragging one of the midpoints a short distance from its present location and releasing the mouse button.

### **Deleting a Waypoint**

To delete an existing waypoint click and hold the waypoint to delete, then move it over an adjacent waypoint. Release the mouse button to delete it. Use this method right now to delete the waypoint you just created.

### **Editing a Course Using Navigation Mode**

You can also edit a course with Navigation Mode used earlier to create the original course. Select the second waypoint and then click the Navigation toolbar button. The part of the course after the second waypoint has been deleted. Since you are now in Navigation Mode, click on a new point near Reference Point 2. A new course segment should be displayed.

Click the Navigation toolbar button again and this new course will be plotted. You can revise a course using this procedure from any waypoint including the current location of your unit or group. Clicking on the unit or group clears any other waypoint from being selected. When you have clicked on the unit or group you are now at waypoint 0. Waypoint 0 is constantly changing as it is the current location of the unit or group. If you click on the Navigation toolbar button while on waypoint 0, your entire course will be deleted.

Be careful when using the Navigation toolbar button with a unit or group that already has a course plotted.

The Navigation routine used by H3ANW (referred to as “Navigator”) ensures that the course you have drawn does not violate Nav Zones and, in the case of ships and submarines, does not traverse land. When a course is drawn that would take a unit or group through one of the above mentioned regions, the Navigator will plot a course around the area. Let’s try it out. Select the Puller and then click the Navigation toolbar button. Any previous course plotted is now deleted. Draw a course directly to Reference Point 3, even though the course goes right through land to reach the destination. Now, click the Navigation toolbar button to plot the course.

The Navigator will begin to work on plotting the best course around the land mass. This will take a few seconds, so don’t be surprised if the course is not plotted immediately. A small “N” will still appear in the lower left of the ship or sub symbol when the Navigator is computing a course.

Once the Navigator has found the optimum path, it will complete the plot. You can now edit the course manually if you wish. Go ahead and keep the course to Reference Point 3 as we move on in the lesson to learn about setting speed.

### Setting Speed

Ensure that you have selected the Puller (waypoint 0) and then click the Speed/Altitude/Depth toolbar button. A menu will be displayed that allows you to set your speed to one of the following:

- Stop: Engines disengaged, speed set to zero.
- Creep: Engines engaged at low speed. Optimum passive sonar speed. Actual speed varies between ship and sub types.
- Cruise: Engines engaged at intermediate speed. Optimum fuel efficiency achieved. Actual speed varies between ship and sub types.
- Full: Engines engaged at high speed. Maximum speed available for sustained periods of time without suffering an engine casualty. Fuel consumption rate is greatly increased. Actual speed varies between ship and sub types.
- Flank: Engines engaged to maximum speed possible. Fuel consumption rate is very high at Flank. To be used in urgent or emergency conditions only. Actual speed varies between ship and sub types.

Beside the above settings, a speed can be entered in the text block provided with the Speed/Altitude/Depth menu box. Go ahead and select the Cruise setting and click on OK. You have now set the initial speed for the Puller.

### Waypoint Orders

Certain orders can be preset to be executed upon reaching a waypoint. For example, we can create an order for the Puller to change speeds once it reaches the first waypoint. Let's try it. First, select the first waypoint. Next, click the Speed/Altitude/Depth toolbar button. The same menu that we used to set the Puller's initial speed will be displayed. Select Full and click OK. When the Puller reaches Waypoint 1, it will change from Cruise to Full.

#### 5.3.3. Lesson Summary

You should now be familiar with how to draw and plot courses and assign speed settings. Go ahead and experiment with setting course and speed until you are comfortable. Once you are familiar with what you learned in this Lesson, click File and Load BattleSet and select Lesson III: Using Sensors.

### 5.4. MORE INFORMATION ABOUT NAVIGATION

***I wish to have no connection with any ship that does not sail fast, for I intend to go in harm's way.***

**-Captain John Paul Jones**

The Navigation toolbar button allows you to order a unit or group to move somewhere. To use the Navigator, click on the unit or group you want to move first, and then click on the Navigator button; the mouse cursor will change to a pencil.

Using the pencil cursor, click on where you want the unit or group to go. You can enter several points for a unit at a time by continuing to click on new places on the map. Each time you click you will place a small circle with line segments connecting the circles. These small circles are called waypoints. After a course has been plotted, the user can select individual waypoints to either move or delete them. Moving and deleting waypoints is simple:

- To move a waypoint, first select the waypoint and then drag it to its new location.
- To delete a waypoint, drag it to the previous or next waypoint.

The current location of the unit or group is always considered to be Waypoint 0.

To insert additional waypoints, drag the midpoint (the small triangle between two waypoints) and release it where you want a new waypoint to appear. To exit the Navigator, click on the Navigation toolbar button again or double-click the last point in the path.

For air units, the Navigator's operation is simple; the unit flies from its current location to the new location, avoiding only threat polygons. For surface and submarine units, the operation is more complex since the Navigator must determine a path around whatever land masses may be in the way, as well as threat polygons. H3ANW has a very good navigation routine, but it can be confused by a long course around a lot of land masses (such as an island group); if it can't figure out the whole course you had in mind, do it in stages. Also, the more complex the task, the longer the navigation routine will take; so, navigating around several islands may cause a unit to "sit and think" for quite a while. Note that a small "N" appears next to the unit when the navigation routine is working on its path.

#### 5.4.1. Setting Waypoint Orders

At each waypoint in a unit's or group's path, you can have it Change Speed, Altitude, Depth and Sensor Settings. To do so, select the unit you want to execute the orders, provide a navigation path for it (if you haven't already), and click on the desired waypoint. With the waypoint selected, use the appropriate toolbar button to give the unit or group a delayed order. The unit or group will execute the order when it reaches the waypoint. A waypoint order can be deleted by either deleting the waypoint or using the Edit Waypoint Orders option from the Settings pull-down window. For more information about using the Navigation functions in H3ANW, refer to Lesson II in the Tutorial section.

#### 5.4.2. A Note about the Navigator

In the original HARPOON, as well as in many other wargames, the ability of a computer AI to plot a course on its own was a risky proposition at best. When the objects to be avoided (usually terrain) are large and regular, or perhaps simple bitmaps, a simple right/left path algorithm will work just fine. However, in H3ANW we model coastline polygons whose vertexes are a minimum of 1000 yards (0.5nm) apart, but vertexes from different polygons can be placed

within 18 inches of each other. When a scenario may be thousands of miles across and your coordinate scale is 18 inches, the math becomes a little more complex.

The H3ANW Navigator uses many different methods for finding a least-cost path for platforms. In many cases (such as with aircraft), the restrictions are not as stringent, but ships transiting straits or traveling great-circle paths on multiple map projections were extremely difficult to write. As it was, we used multi-threaded events to break up these calculations over a minute or more of real time. The game progresses normally while the navigator gets a share of the CPU every few microseconds to complete its tasks without stopping play.

Even with all the hoops and tricks we used, sometimes the Navigator will be forced to give up trying to solve a complicated navigation problem so it can service requests from other platforms. The moral of this story is “Don’t select your ship in the Black Sea and ask it to navigate to Gibraltar on its own”.

### Nav Zones

Navigation or “Nav” Zones are areas that you can designate as off limits to all or some of your units.

- A Surface Threat Nav Zone will exclude all surface ships from entering the zone. Aircraft and submarines are unaffected by this type of Nav Zone. You may create, modify, or delete this type of Nav Zone.
- A Sub Threat Nav Zone will exclude all submarines from entering the zone. Aircraft and ships are unaffected by this type of Nav Zone. You may create, modify, or delete this type of Nav Zone.
- An Aircraft Threat Nav Zone will exclude all aircraft from entering the zone. Submarines and ships are unaffected by this type of Nav Zone. You may create, modify, or delete this type of Nav Zone.
- A General Exclusion Nav Zone will exclude all units, aircraft, ships, and submarines, from entering the zone. You may create, modify, or delete this type of Nav Zone.
- Neutral Nav Zones are similar to a General Exclusion Nav Zone, a Neutral Nav Zone will exclude all units, aircraft, ships, and submarines, from entering the zone. You may NOT create, modify or delete a Neutral Nav Zone. Most Neutral Nav Zones will be created when the scenario is designed and will be present from the start of the scenario.

To display the various Nav Zones, open the Map Preferences Window using the PREF toolbar button and select each so an “X” is displayed in the boxes. We are now going to create a Nav Zone and see what effect it has on navigation.

In addition to Threat Nav Zones there are also Detection Nav Zones. Both types are identical in nature except for how they are labeled. Use a Detection Nav Zone around something that can detect your units if they enter the area. Use a Threat Nav Zone around something that can fire on your units.

## Creating a Nav Zone

Prior to creating a Nav Zone, make sure that you have the Nav Zones checked to display from the Map Preferences menu. To create a Nav Zone, start by clicking the Nav Zone toolbar button. Your mouse cursor should change into a pencil cursor identical to the one used while in Navigation Mode.

Place the cursor at a point near Reference Point 1 and start clicking and moving the mouse around the waypoint.

Draw a box around the waypoint with the line segments created each time you click. When you reach the point where you are ready to close the polygon you just created, click the Nav Zone button again and the polygon will close automatically. A dialog box should appear with a variety of exclusion zones to choose from. Select Ship Threat A and click OK. The line segments should change into one line making up the polygon with a small circle at the point where you first clicked to begin drawing the polygon. This circle is used to select the polygon to edit or delete it.

## Editing a Nav Zone

Select the circle. Note that when selected, the individual points you used to create the polygon appear. These polygon nodes can be moved and deleted exactly like the navigation waypoints. We will cover deleting a Nav Zone after we have used this particular Nav Zone to demonstrate navigation around and through it.

## Navigating Around Nav Zones

Now that we have a Ship Exclusion Nav Zone around Reference Point 1, let's try to navigate through it. Select the Puller again, click the Navigation toolbar button, and draw a course through the Nav Zone you just created. The Navigator will plot a course around the Nav Zone in a manner similar to the way the course was plotted around land to Reference Point 3 in the earlier example.

## Navigating Through Nav Zones

You may require that a unit ignore a Nav Zone because it is critical for the successful completion of the mission to get to a spot inside. To navigate through the Zone, start by selecting the unit or group that you want to navigate through the zone. Next, double-click the Nav Zone toolbar button. The menu used to designate Nav Zone types will be displayed with each type of Nav Zone that the selected unit or group currently respects.

In our case, click the Ship Threat A box to clear it and then click OK. The selected unit will now ignore any Nav Zone that has this type. If the polygon has other types selected, the unit may avoid for those reasons. It is important to check and see if a Nav Zone has multiple types before attempting to navigate through with the ignore feature. Try it out. Plot a new course through the Nav Zone you created earlier. The Navigator will now plot a course through this type of Nav Zone. To restore the original settings for the selected unit, simply repeat the process and place an "X" in the box as it was before.

### Deleting a Nav Zone

To delete a Nav Zone, select the Nav Zone you wish to delete and then double-click the Nav Zone toolbar button. The Nav Zone type menu will be displayed again; click the “X” representing the selected Nav Zone type to remove it; this will delete the selected Nav Zone. Go ahead and delete the Nav Zone you created earlier.

### Showing the Navigator in Operation

Click Settings and Start/Resume. The game will now start and the Puller will begin to move on the course plotted. As the game runs, you can edit the course at anytime. Go ahead and create or move a waypoint so that Reference Point 1 is close to the Puller. Select Reference Point 1 and click the Speed/Altitude/Depth toolbar button. Select Full to give the Puller a speed change at Reference Point 1 as we did earlier in this lesson. If you want, you can speed the time compression by pressing the plus key (+) on the number pad portion of your keyboard. To reduce the time compression rate hit the minus key (-) on the number pad. Watch either the speed setting on the Unit Status Window or the unit data block as the Puller approaches Reference Point 1; when the Puller reaches it, its speed will change to Full.

## 5.5. LESSON III - USING SENSORS

After you have selected Lesson III, select Good Guys as your side. To demonstrate the effective use of sensors and how the detection model in H3ANW works, it will be necessary to change the Difficulty setting for this Tutorial scenario. Click Difficulty button and select Average Difficulty Level. Using this level will provide us with a Detection Setting of Auto Side ID which will make the sensor detection more realistic. Click OK to confirm the selection. Now, click OK on the Side Selection window to start the Tutorial scenario.

### 5.5.1. Passive vs. Active

You should now be looking at a display almost identical to the first two Lessons. Once again, the USS Lewis B. Puller is the lone unit for your side on the map. We will be using the Puller to become familiar with the use of sensors. Note in the Unit Status window that our sensors are currently passive which means that we are not using active sensors at this time; it also means that your passive sensors are on-line and sensitive.

An active sensor is a radar, sonar, ECM, or optical device that is emitting either electric or sound energy. An active radar sends out electronic pulses which reflect off of a target and are interpreted by the radar and displayed on a screen. The same is true for active sonar which uses sound energy instead of electric energy in the pulse.

While passive sensors do not receive nearly the detailed information that active sensors do, they are quiet and therefore undetectable. The tradeoff is that, for that highly detailed information, you'll need to use active sensors and therefore will electronically broadcast your position to anyone within listening distance.

### 5.5.2. Composite Warfare Command Structure

H3ANW uses a command structure based upon the U.S. Navy's Composite Warfare Command. This structure divides the aspects of naval operations into several areas. For the purposes of H3ANW we have used five of these aspects. Each Composite Commander has a particular call sign to identify them when making radio or intercom (called the "1MC" on U.S. Navy ships) broadcasts. An actual radio or 1MC call will be simulated when a contact is made by one of the following Composite Warfare Commanders:

- Alpha Bravo (AB) - The Senior Commander. In H3ANW, this means you. All radio calls to AB are directed to you, the player.
- Alpha Echo (AE) - The Electronic Warfare Commander. Anytime an emission from a jammer is detected or lost, AB will be informed by AE. Unknown electronic or electromagnetic signals, such as jammer emissions, are referred to as "rackets".
- Alpha Sierra (AS) - The Anti-Surface Warfare Commander. Anytime a surface contact is made or lost, AB will be informed by AS. An unknown surface contact is referred to as a "skunk".
- Alpha Whiskey (AW) - The Anti-Air Warfare Commander. Anytime an air contact is made or lost, AB will be informed by AW. An unknown air contact is referred to as a "bogie."
- Alpha X-ray (AX) - The Anti-Submarine Warfare Commander. Anytime a sub contact is made or lost, AB will be informed by AX. An unknown sub contact is referred to as a "goblin".

### 5.5.3. Start the Lesson

Start the Lesson by clicking Settings and Start/Resume. The scenario will start with the Puller awaiting your orders. Plot a course to Reference Point 1 and set your speed to Cruise. Following this course will provide you with several different contacts.

After a few moments, you should receive a contact report from AW alerting you to a new air contact. Notice that the contact is displayed to the north of your position. If the exact location of the contact cannot be determined, an Electronic Support Measures (ESM) track will appear as an elongated diamond with an air unit symbol inside. This represents what your passive sensors have detected. It means that the contact is emitting some kind of energy from either radar or radio communications and is strong enough to be detected by your ESM sensors.

The actual location of the air contact is somewhere inside the diamond. The area bordered by the changing diamond is an uncertainty region. Uncertainty regions appear when the contact's location is not known but there is enough information on the direction of the contact to interpolate the region where it is most likely to be located.

### 5.5.4. Evaluating a Contact

Click on the aircraft symbol and take a look at the Unit Status window. Here you will be able to view information about the contact. Since it is an unknown contact we have little information about it. Notice, for example, that there is no information about course and speed on the contact. Click the Report button in the Unit Status window. In the Sensor text box there is a listing of the type of emission that is coming from the air contact.

Emitters that are currently emitting are marked by an asterisk (\*). Since the emission is an air weather radar and a transponder set with a commercial code, there is a high probability that the contact is civilian air traffic. Depending on your tactical situation, your orders, and the number of assets you have available, you could find out more about the contact by using other sensors or by sending your aircraft to intercept and identify. Since we are a lone ship we can only use our sensors.

### 5.5.5. Using Active Radar

Turn on your radar by clicking the Sensor toolbar button. Click the Active selection for Radar in the Sensor Selection dialog window. Range circles should now be displayed around the Puller and the Unit Status window should say ACTIVE in the EMCON block. The range circles represent the maximum effective range of the sensors. These are not absolute as sensor ranges can vary due to meteorological conditions as well as factors relating to the position and size of the contact. The yellow circle represents the surface search radar and the white circle (which is only visible as a large arc) is the air search radar.

### 5.5.6. Radar Contacts

You should now have a better fix on the first air contact while also detecting a second air contact for a total of two air contacts. If you click on either of these contacts you will see that you can now see information about their speed and course. The reason we did not detect this second contact is because the aircraft was not radiating energy from radar or radio. Confirm this by clicking on the new air contact and selecting the Report button in the Unit Status window. There is no type of sensor listed which means the contact is not emitting. Since we have no ESM information coming from the new contact, it is truly an unknown. For the purposes of this lesson we are going to allow the air contact to approach our ship to demonstrate visual identification.

Let the air contact approach and watch what happens. It should head straight for the Puller. The first air contact is moving more to the east away from your location. Notice that as it moves past, the contact will switch between being displayed as a solid contact and as an uncertain ESM track. This happens more frequently with contacts moving near the maximum range of the detecting platform. You may also temporarily lose the contact only to have it reacquired and reported as a new contact. Pay particular attention when this happens so you don't incorrectly assume that another aircraft has been detected. As the first air contact moves to the east, the accuracy of the contact will diminish and will eventually be lost. Additionally the contact's representation on the map will dim and change color to denote the degradation of information about it. An uncertainty zone will also appear so the player can see a rough extrapolation region of the contact's location without direct evidence placing at any particular point. Since the first air contact is moving away from our location it is not a concern. The second air contact is, however, beginning to turn towards our location. Although this would normally be the cause for some concern on our part, we will allow the contact to get closer.

### 5.5.7. Visual Identification

Once the second air contact is in visual range (which varies depending on weather, time of day, size of contact, and the altitude of the contact) you will receive a message indicating that we have identified it. Notice that ID information is now provided in the Unit Status Window. We can see the contact is a civilian airliner taking a big chance by not having its transponder or



radar turned on! Since it is not a threat, we will allow it to pass. In real life that pilot would have received a stern radio warning or would have been intercepted by fighters or even shot down if the tactical situation was tense. We will allow the contact to pass and continue. Leave the radar active for now.

#### 5.5.8. Sonar

As we continue on our course we will now learn more about the sonar. Your passive sonar is always on. The capability of your passive sonar to detect is reduced as the ship's speed is increased. Let's first increase our speed to Flank by clicking Speed/Altitude/Depth toolbar button and selecting Flank. Then observe the passive sonar range circle shrink. Then decrease our speed to Creep. Notice that the passive sonar range circle increases once the Puller has slowed. This increase in passive sonar range is due to the reduction in noise that results from the ship moving slower through the water. Return the ship to Cruise after you have noted the change in the sonar range circle. After a while, you should detect an unknown submerged contact (probably a submarine) somewhere below and along your course.

#### 5.5.9. Sub Surface Contacts

Unlike ships and aircraft, it is unlikely that you will ever visually ID a submarine contact. Sub contacts are very difficult to pinpoint. There is always the strong possibility that you will lose contact with a submarine. The location, speed, aspect to your platform, and a variety of other factors, will determine the accuracy of your submarine detection. Submarines will often make aspect changes to foil any attempt follow them from behind. This tactic can also make it more difficult to maintain a solid passive contact on the submarine.

#### 5.5.10. Working the Contact

Let's do a little bit of aspect changing ourselves. Go ahead and make a few minor changes to the Puller's course so the ship zigzags across its original course. Do this by making several 45 degree turns back and forth. See if the contact changes as you make the turns. For this example the submarine is making turns as well, so you should see some changes.

#### 5.5.11. Active Sonar

After watching the contact for a short while, go ahead and turn on the active sonar. Do this by clicking the Sensor toolbar button and selecting Active Sonar. Notice that the sonar range changes colors to indicate that the sonar is now active. The big drawback to using active sonar is that you are now sending sound pulses through the water that can be traced back to your location. Active sonar announces to everyone where you are located. Depending on the location of the sub contact when you go active, there may be changes in the quality of the contact. Observe the contact for a few moments and then turn off the active sonar.

#### 5.5.12. Resume Course and Speed

The submarine used in this lesson was neutral and not a threat. We will let it pass, noting that the quality of the contact degrades as we move further away. Notice that the size of the uncertainty region surrounding the sub contact increases as we get further away. Let's continue on our original course to Reference Point 1. Go ahead and increase speed to Cruise.

### 5.5.13. Surface Contacts

After continuing on the course towards Reference Point 1, you should soon detect a surface contact. Notice that the contact is an ESM detection which means that the Puller is detecting some kind of energy radiating from the contact. Select the contact and click Report in the Unit Status Window. The sensor list shows several types of radar common to British naval vessels. The contact is not in radar range yet so we will wait a bit and see if the detection improves as we get closer. Eventually the contact will solidify and you will be able to determine the contact's exact location. Once this happens, the contact will change to a brighter color indicating a solid contact.

### 5.5.14. ESM vs. Active Radar Detection

Once you have a solid contact, turn off your radar and watch what happens to the contact. It went back to being an ESM track. Now turn the radar back on and watch the contact solidify again.

**The contact may not return to an ESM track. It may stay as a solid contact depending upon the range, and aspect to the detecting platform.**

### 5.5.15. Identification

As the contact gets closer there is a chance that we will make a visual identification. If we wanted, we could also send up a helicopter to identify the contact. We will cover the capabilities of on-board helicopter use in another lesson. At this range the contact has detected us as well. If it were an enemy ship there is a good chance we would have several missile contacts as well. Once the surface contact is in visual range it will be identified as H.M.S. Exeter, a British Navy destroyer.

### 5.5.16. ECM

At a point close to where Puller and Exeter pass each other, Exeter will turn on her Electronic Counter-Measures (ECM). Turning on the jammers can affect radar and communications. Note that when the jammer is turned on, a small "Q" will appear in the upper right corner of the unit symbol representing Exeter, and a small "X" will appear in the upper right corner of Puller. These markings designate the Exeter as the jamming source and that Puller is having her sensors degraded due to jamming. After a short while Exeter will shut off her jammer. Once this happens, go ahead and try out Puller's ECM gear by clicking the Sensor toolbar button and selecting ECM Active. Note the "Q" marking on Puller. You will not have information about other ships being jammed unless they are in communications with you. There is a "Q" on Puller because your own jammers are affecting your sensors. Go ahead and turn the jammers off for now.

### 5.5.17. Comm Link

The only selection in the Sensor Selection box that we have not used is Comm Link. This is used to establish and maintain communications between units on your side. We will cover this in detail in an upcoming lesson.

### 5.5.18. Remainder of the Lesson

The remainder of Lesson III takes place as the Puller turns east and traverses between Reference Points 1 and 2. You should make contact with another submarine and one more surface vessel. Go ahead and explore the remainder of this scenario by working these two contacts.

#### 5.5.19. Change the Detection Setting

To properly demonstrate how to work sensor contacts you should try running this scenario again with a more difficult Detection Setting. This time, select a Difficulty of Custom. Go ahead and give it a try. Reload the Lesson III tutorial scenario and set the Detection Setting to Full Reality using the Custom difficulty setting button. Running at Full Reality will provide you with less information about the contacts once they are detected. This will make it more difficult to positively identify contacts. When you have fully explored the scenario at Full Reality you can go back and try each of the various detection settings. When you are ready to move to the next lesson go ahead and open the Tutorial BattleSet again to load Lesson IV: Using Weapons. Finally! You get to shoot at something!

### 5.6. LESSON IV - USING WEAPONS

Select Lesson IV: Using Weapons from the Scenario Selection window. It is recommended you set your Difficulty Level to Average for this lesson. Select Good Guys from the Side Selection window.

Once again, you are in command of the USS Lewis B. Puller. As with the other two previous scenarios, you will be navigating from the present position of the Puller to Reference Points 1 & 2. Go ahead and set your course to the two Reference Points as you did in the previous lessons. Set your speed to Cruise and leave your sensors turned off for the time being. Note that for this lesson scenario, some new range circles are shown around the Puller; these are the ranges for Anti-Surface, Anti-Air, and Anti-Submarine weapons. These circles represent the maximum range of the weapon in each category. Go ahead and start the scenario lesson by clicking Settings and Start/Resume.

#### 5.6.1. Weapons Free or Weapons Tight

There is an option in the Game Preferences dialog window under the Settings menu that determines whether or not your units will fire on enemy air targets independently. Weapons Free allows units under your command to engage independently and Weapons Tight prevents units under your command from firing without orders from you. The default setting on H3ANW is Weapons Free. When Weapons Tight is selected it will be up to you, the user, to engage incoming air and missile targets. It is important to note that Weapons Tight is only respected by units that are unassigned or on plotted missions. Units on other missions or out of comm range will always behave as if the Weapons Free option is selected. For the purpose of this lesson leave the setting as Weapons Free.

#### 5.6.2. Air Threats

Shortly into the scenario you should have two air contacts to the north. Go ahead and watch these contacts for a few minutes to see if you can determine more information about them without turning your sensors on and revealing your position. Click on each contact and determine what kind of emissions your ESM gear has detected. The contacts are emitting surface search radar that can be found on several Soviet made heavy bombers. So, it is a logical assumption (for this scenario, at least) that these are the Bad Guys. Let's watch them for a while and see where they are headed.

### 5.6.3. Acquire Air Targets

After observing these contacts for a few minutes, we can see they are headed for our position. It looks like we may have a fight on our hands. In most scenarios you would probably have additional assets such as fighter aircraft to intercept a possible threat. We are going it alone in this scenario to demonstrate the use of surface-to-air weapons. Go ahead and activate your radar (you should know how to do this from our last lesson). You should quickly obtain solid contacts on both aircraft. The next portion of the Tutorial will demonstrate the difference between automatic and manual engagements.

### Automatic Engagements

Since we have set the Game Preferences option to Weapons Free, allow the first aircraft to get close enough for a visual ID to see if the Puller will engage the air threat on her own. The first aircraft is identified as a Bear-F Bomber (ASW variant). Once it has been identified, the Puller will automatically engage. You should see a video of a missile launch and if you have a PC with a sound card, the sound of the missile launch will be heard as well. A missile symbol will appear and begin tracking towards the target. If it hits you will notice a rosette pattern representing an explosion surround the aircraft hit by a missile; if it misses, additional missiles will be automatically launched.

### Manual Engagements

We are going to engage the second air target manually. First, click Settings, Game Preferences, and Weapons Tight. Then, click the Attack toolbar button. Your cursor should now be a targeting crosshair. Once the second air threat has crossed the range circle for your air weapons, double-click on the aircraft symbol. A window will be displayed with four panels.

The upper-left is the firing unit; the upper-right is the list of available weapons listed in the order of most capable weapon for the designated target. The lower-left panel lists the target(s) and the lower-right lists the weapons allocated for the target(s) listed. This is the Weapons Allocation dialog window. As you can see, one SM-1 missile has been allocated to engage the target. Let's fire three missiles by clicking twice on the listing for the SM-1 in the upper-right panel. The number of SM-1 missiles allocated should now be three. On second thought, let's only fire two missiles and save some of the taxpayer's money. Click once on the listing of three missiles in the lower-right panel. The number of missiles should now read two. Then, click OK. The missiles should now launch with a display identical to the automatic sequence used to engage the first threat aircraft. In the unlikely event that both of your missiles should miss, fire again. By the time the second aircraft is destroyed you should pick up a third incoming air contact.

### Manual Engagements with Groups

We are going to engage the last air threat as a group. Although it doesn't seem so, the third incoming air threat is actually a group of two aircraft. Make sure that the Puller is selected. When the aircraft come within range, click the Attack toolbar button and then drag-select the incoming air group. Once again the Weapon Allocation dialog window will be displayed, but you will notice that this time there are two Bears listed in the enemy unit section of the screen.

You will see that the staff has already allocated an SM-1 to each. Go ahead and click OK. The missiles should now launch and each of the allocated missiles will track its assigned target. In the unlikely event that both of your missiles should miss, fire again.

Drag-selecting can be used to select reference points, friendly units, and enemy units. One key function of drag-selecting is in forming groups. To do so, simply drag-select the units you wish to group and press the 'G' hot key. To group friendly airborne units, the units must be the same type of aircraft, have identical loadout types, and be on the same mission. Note that trying to group enemy units with the 'G' hot key will not work.

#### 5.6.4. Staff Allocation

Each time you attack a target your staff will automatically allocate a number of appropriate weapons unless you do not have Allocate Weapons selected (click Settings, Game Preferences to view this). Even if you have the staff allocate weapons, you can still manually edit the allocation by clicking on the various selections in each panel on the Weapons Allocation box.

The staff will allocate two weapons for ships while subs will have only one weapon allocated. Also note that targets will have weapons allocated for them based on their missile allocation value, assuming that the target has been fully identified.

#### 5.6.5. Surface Threats

With the air threat eliminated, let's continue on course for Reference Points 1 & 2. Leave your radar on. As we near Reference Point 1 we should be detecting two surface contacts. (You may detect a sub contact prior to detecting the surface contacts.) Once there is a surface detection, go ahead and continue to close on the contacts to make a visual ID. In the meantime, evaluate the contacts by selecting each and clicking the Report button to determine what type of radar each one is emitting. We can see that the first contact is radiating a Square Tie Surface Search (SS) radar and a Drum Tilt acquisition radar, both are common to Soviet missile boats. The second contact has a generic navigation radar. Looks like a cargo ship being escorted by a missile boat. Let's take 'em both out.

Once the first contact is in range of your surface weapons (outer weapons range circle), select the Puller and click the Attack toolbar button. The cursor should change to a targeting crosshair. Either double-click on the first surface contact or drag-select it. The Weapons Allocation Window will be displayed as it did when we were targeting air targets earlier in this Lesson. This time the target is a surface contact and the weapons are surface-to-surface missiles and guns. Because the Staff Allocation feature is turned on in Staff Preferences, a Harpoon missile has already been allocated for the target. Double-click on the allocated Harpoon missile to remove it from the allocation list. Instead, select the Standard Anti-Radiation Missile (ARM) by double-clicking it in the Weapons Available list.

#### 5.6.6. Anti-Radiation Missiles

Anti-Radiation Missiles (ARMs) are weapons that guide on radiated energy and are used to destroy an enemy's radar system. An ARM will lock on to the signal radiating from an enemy radar or jammer and fly directly to that source. ARMs can be launched from surface ships and from aircraft. Click OK after allocating one ARM to be targeted on the first surface contact.

Another dialog window will be displayed listing the number of ARMs allocated and the various types of emitters currently detected that are radiating from the target. You can then allocate each individual ARM salvo to one particular emitter. Essentially, each plane can only attack one emitter with any single Attack action. Click OK to confirm the selection that has already been made by your staff.

Video and audio representations of a missile launching will play and a missile symbol will appear on the map screen heading toward the target. If the missile is shot down or misses the target, fire another. Go ahead and target the first surface contact with a Harpoon missile to finish it off. After it has been hit, click the unit symbol for the first contact and note that in the Unit Status window the unit is on fire and sinking.

### 5.6.7. Bearing Only Attacks (BOL)

Some weapons can be launched without designating a target. Bearing Only Attacks allow the player to designate a point on the map where the weapon's targeting sensors will activate and begin searching for a target. This can be useful if you have lost a contact but have a good idea where it is located and want to launch an attack even though you do not have a fix on it. To launch a Bearing Only Attack, use the Bearing Only Attack hot key. The cursor will change to a pointer finger cursor. Move the cursor to the point you want the weapon's seeker to activate. Click once with the mouse button to designate the activation point. The Weapons Allocation window will be displayed with a list of Bearing-Only capable weapons. Allocate and launch in the same manner as before. Go ahead and launch a Harpoon in the general direction of the second surface contact designating an activation point just in front of the contact. The missile will launch, proceed to the activation point, and then activate its search radar to acquire a target. The missile should hit if the weapon's sensor locks-on to the target.

### 5.6.8. Naval Gunfire

Naval Gunfire does not have the range of surface-to-surface (SSM) or surface-to-air (SAM) missile; you have to get in closer to use guns. Go ahead and close with the second surface contact. Click the Attack toolbar button and allocate several gun bursts from several of the available guns. Each allocation of a gun is a burst that fires several rounds. The number of rounds per burst varies with each weapon. Click OK to fire. It will take many shots to sink the ship. Once it is damaged and burning, go ahead and proceed on the original course towards Reference Points 1 and 2.

Naval gunfire will NOT show up on the tactical displays; instead, only a message that the unit is engaged will display.

### 5.6.9. Continue on Course

After the Puller passes Reference Point 1 and changes its heading for Reference Point 2, you should detect another surface contact. This contact is going to be more of a challenge; it is an enemy missile boat loaded with several missiles. We are going to engage it to demonstrate how missile air defense works. However, even though this is a tutorial, there is a chance that the Puller could get hit or possibly destroyed, which would end the scenario. This would, therefore, be a great time to discuss the Save Game feature. If for some reason the enemy gets lucky and destroys the Puller, you can return to this point in the Lesson without having to repeat the first two engagements.

### 5.6.10. Air Defense Against Missiles

We have a saved game available, so we're safe for now – let's press on into battle. Continue on course to close the distance between the Puller and the enemy contact. When the contact is in range of your surface-to-surface weapons, fire away!

It is likely that as soon as you fire, the contact will launch missiles at your missiles and at you directly. Watch what happens as both sides defend against inbound missiles. Several of the missiles will be shot down, resulting in a video of an air target being hit and the symbol for the missile disappearing from the map. Since Weapons Free is currently selected in Staff Preferences, the Puller has been defending itself without your intervention. This does not preclude you from targeting an inbound missile manually. To do so, treat the inbound missile in the same manner as you did when you targeted and launched on the incoming Bear-F aircraft. Go ahead and try to engage manually if you wish. If the Puller is sunk, or even if it isn't and you want more practice, reload the game you previously saved and try again until you are comfortable with how to engage missiles. This is also a good opportunity for you to have some fun by getting into a shooting match with the enemy missile boat. When you have had enough, continue with the rest of the Lesson.

### 5.6.11. Active & Passive Counter-Measures Against Missiles

#### Close-in Weapons System (CIWS)

Many ships are equipped with a Close-in Weapons System (CIWS) that is used as a last resort. CIWS is a rapid-fire Gatling gun that engages inbound missiles at close range. This defensive system is automatic if set in the database.

#### Naval Guns

Some naval guns may also be used to engage an incoming missile threat. In H3ANW, this type of point defense is conducted automatically.

#### Chaff

Chaff is a cloud of radar-reflective material that is fired from ships and airplanes to confuse enemy radar. The most common use of chaff is to decoy inbound missiles. The launching of chaff is conducted automatically.

#### Flares

Flares are very hot incendiary devices that are fired from ships or aircraft to decoy heat seeking missiles.

Flares are used and depicted in the same manner as chaff.

#### Jamming

Some ships and aircraft have the ability to jam enemy radar by transmitting powerful signals that interfere with enemy radar. To turn on jammers, click the Sensor toolbar button and select Active for the Electronic Counter-Measures (ECM) selection.

### 5.6.12. About Submarine Threats

Now that we have engaged air, surface, and missile contacts, let's discuss submarine threats. As we noted in Lesson III, submarines are very elusive. The range of the Puller's Anti-Submarine Warfare (ASW) weapons system (the MK-46 torpedo) is not that impressive. In order to utilize it, the Pullman would have to get close to the submarine, which is not a sound tactical move. Normally, the submarine will prevail in such a case.

In this situation, ASW helicopters should be launched from the Puller's flight deck to prosecute a sub contact. We will cover this aspect of ASW in the Air Ops Tutorial Lesson. Engaging a sub contact with surface-launched torpedoes uses the same targeting and weapons allocation procedure as we used to engage air or surface targets with missiles. If you should find yourself in the position where you are on top of an enemy sub it would be best to launch a couple of torpedoes and leave the area as quickly as possible.

### 5.6.13. Run at Full Reality

For a greater challenge, try running this lesson again with the Detection Setting at Full Reality. You will notice that it is more of a challenge when the enemy is more difficult to identify. While you already know what will happen in this scenario, running it at Full Reality will make you appreciate the efforts required to identify contacts before engaging.

It's important to realize that when in full reality mode, a number of things are going to happen:

- You will lose control of your subs (radio signals cannot go thru water) and submarine signaling is not possible. Normally you should plot the sub's course or put it on a mission and then set its depth. At that point the sub will dive and you will not be able to control it as contact will be lost. Once the sub has completed its navigation path or mission, it will then come to periscope depth and you will regain contact (and control) of that sub. It is, in effect, asking for instructions when it has completed whatever you wanted it to do.
- Units have a comm range that is specified at the bottom of the unit status window. There are two values; Active and Passive, with values displayed next to them. That value is the range in nautical miles of the platforms communications devices. Once a platform goes beyond that range, the user will lose contact (and control) over that platform. This especially applies to aircraft on missions.
- In real life, you'd have a series of links set up to communicate to and from the flagship. For example, a link from a carrier to the E-2 and on to the F-14 for example. Because of this link, it is possible that the F-14 may not be able to contact the carrier directly but require the associated E-2 Hawkeye to act as a radio relay aircraft.

Many players run full reality with communications automated so they can take part in the action as it happens. Try it. It's fun!

Let's move on to the other side of the equation and learn about submarine warfare from the point-of-view of the submarine commander. For the next tutorial, load Lesson V: Submarine Operations.



### 5.7. MORE INFORMATION ABOUT ATTACKING

***We are outnumbered; there is only one thing to do. We must attack! -Admiral Andrew Cunningham***

For a complete listing of all weapons platforms and systems used in the game, please refer to the Platform Display option under the Window pull-down menu.

There are several ways to attack targets in H3ANW. An attack can be a manual engagement where the user orders a specific unit or group to engage a target. Attacks can also be made automatically by assigning units or groups to either a Strike or a Patrol Mission. Attacks can be made against a known target that is currently in range, or when the exact location of the target is unknown an attack can be made as a bearing-only launch. Units or groups can also be ordered to close and attack when they are currently out of range of a target.

#### 5.7.1. Manual Engagements

To engage a target manually, select the unit or group from which the attack will be launched. Next, click the Attack toolbar button. Finally, double-click (or drag-select) on the target unit(s) or group(s). If the target is in range of any of your weapons, the Weapons Allocation dialog window will be displayed, which allows you to assign specific weapons from each attacking platform to some or all of the designated targets.

#### 5.7.2. Close-to-Attack

If a target you have designated is not in range, a dialog window will be displayed asking if you wish to have the attacking units close with the target and attack when they are in range. If you select Yes, the attacking unit will attempt to navigate an intercept to the target and engage it as soon as weapons are in range. This effectively places those units on an Intercept mission.

Any units selected while in unit mode and ordered to attack will split off from the group to do so. If an order to attack is given while in group mode the group will stay together and move to engage the target.

#### 5.7.3. Staff Allocation

To have your staff automatically allocate appropriate weapons to targets, click Settings, Game Preferences, and select Allocate Weapons. Even if you have your staff allocate weapons, you can still manually edit the allocation by clicking on the various selections in each panel on the Weapons Allocation window.

#### 5.7.4. Manual Allocation

The Weapons Allocation dialog window has four sections containing lists: the attacking units, the weapons available for the unit selected, the designated targets, and a list of weapons that have been allocated to the selected target. These four sections are interdependent.

For example, if you click on one of the targets in the lower left list, the listing for allocated weapons in the lower right list will change to show the number and types of ordnance allocated by all attacking platforms against the currently selected target. If you click on one

of the attacking platforms in the upper left list, the listing of available weapons will change to reflect the weapons available from the particular attacker.

To allocate weapons, make sure that the desired target is selected in the target listing and the unit you are attacking with is selected in the attacking platforms list. Next, double-click on the weapon you wish to allocate in the weapons listing. Each time you click, you will notice another weapon being allocated in the weapons allocated listing. To deselect a weapon, double-click on it in the weapons allocated listing. Each time you click, one unit of the weapon type will no longer be allocated. When deselected, the number of the particular weapon will increase in the weapons available listing. You can allocate weapons from each individual attacker to each individual target.

When you are finished allocating, click OK and the weapons will begin launching.

### 5.7.5. Bearing Only Attacks (BOL)

In real life, most SSMs, a few ARMs, and no AAMs can be fired in BOL mode. In game, if a weapon has the 'BOL Capable' flag toggled, it can be launched in BOL mode.

Players should feel free to discuss this with the author of the database should they wish to.

Some weapons can be launched without designating a target; these are called Bearing Only Attacks, and they allow the player to designate a point on the map where the weapon's targeting sensors will activate and begin searching for a target. This can be useful if you have lost a contact but have a good idea where it is located and want to launch an attack without an exact fix on the target.

To launch a Bearing Only Attack press the Bearing Only Attack hot key (Ctrl-B). The cursor will change to a pointer finger. Move the cursor to the point you want the weapon's seeker to activate. Click once with the mouse button to designate the activation point. The Weapons Allocation window will appear with a list of Bearing-Only capable weapons. Allocate and launch in the same manner as before. The weapon's activation point will be listed as the target.

### Surface-to-Surface Missiles (SSMs)

An SSM is a guided projectile (a warhead mated with a propulsion system) that can be launched from a variety of systems, including hand-held, vehicle mounted, towed, fixed emplacement, ship, or aircraft (including helicopters). They are used to engage ships and land targets; they are found on ships, some types of submarines, and in rare cases, bases with coastal defenses. No special procedure is required to launch surface missiles; however, submarines must be at a depth of Shallow or less.

Most surface missiles can be launched Bearing-Only.

### Air-to-Air Missiles (AAMs)

An AAM is a guided projectile (a warhead mated with a propulsion system and onboard sensor system) fired from aircraft only. Their purpose is to seek out and destroy other aircraft. There are two types of missiles: heat-seeking (or, infra-red) and radar homing.

Heat-seeking, or Infra-red, guided missiles home in on the heat produced by an aircraft; this is usually their engine exhaust, but this can also be the aircraft's surface (which warms from friction of airflow across its surface). These types of missiles can be possibly distracted or knocked off course by the use of flares.

Radar homing missiles come in two flavors: active and semi-active. Active missiles carry their own radar and tracking systems on board, whereas semi-active missiles require guidance, usually from the parent aircraft that launched it but possible from an AEW platform.

Note that you can't launch IRH or SARH missiles in BOL mode. Active radar homing missiles AIM-54/AIM-120 can be launched, however.

### **Surface-to-Air Missiles (SAMs)**

A SAM is a guided projectile (a warhead mated with a propulsion system and onboard sensor system) fired from a ground-based launcher at aircraft. They come in all sizes, from shoulder launched versions to larger ones on mobile platforms or fixed installations. SAMs can also be used to engage missiles. In most cases, the platform launching SAMs must have radar active for SAMs to acquire their targets. Some types of SAMs, such as the Standards, can be used to engage surface targets as well.

Most SAMs can not be launched bearing-only.

### **Anti-Radiation Missiles (ARMs)**

An ARM is a guided projectile (a warhead mated with a propulsion system) usually fired from a specialist aircraft used in the Suppression of Enemy Air Defenses (SEAD) role. These missiles will lock onto radar energy being broadcasted by enemy units and will home in on them. Usually, the radar they attack guide enemy SAM batteries; destroying these leaves supplemental waves of strike aircraft able to carry munitions intended for their target(s) instead of SAM batteries, increasing the number of weapons they can put on target.

ARMs can also be launched from surface ships. A specialized dialog window is used in conjunction with the Weapons Allocation dialog window; it lists the number of ARMs allocated and the various types of emitters radiating from a target. You can then allocate each individual ARM to a particular emitter.

ARMs can be launched bearing-only, but since they guide on a radiating target, it is not a wise use of ordnance, as the target can turn its radar off at any time.

### **Torpedoes**

While in real life torpedoes can have some pretty amazing ranges (especially for the Russian wake homers), in most custom databases their range is limited to anywhere between 5 and 10 nm.

The weapon has enough fuel to travel its full range just that the firing range (envelope) has been reduced to that 5 to 10 nm range. The reason for this is to give the AI a chance against human players. The reduced range forces the AI to get in close to the target prior to firing its weapons.

Torpedoes are the 'grandpa' weapon of the game, having existed in rudimentary form since the American Civil War. These are missile-shaped projectiles equipped with their own guidance system and underwater propulsion system, launched from torpedo-equipped ships, submarines, and aircraft, with the purpose of seeking out and destroying enemy submarines and ships. Launching a torpedo is similar to any other type of weapon; the only exception is with wire-guided torpedoes. These types of torpedoes are available on certain submarines and can be steered by the user.

To steer a wire-guided torpedo, select the torpedo symbol and alter its path in a manner similar to modifying a ship's course. The best method to steer is to grab the torpedo's waypoint and move it to where you want the torpedo to go. The ability to steer and use torpedo sensors is limited to wire-guided torpedoes only.

Torpedoes can have both a passive and an active sensor. If, while steering the torpedo, your torpedo detects a target, it will home in on that target. To improve the ability to detect, click the Sensor toolbar button and turn on the torpedo's active sonar. Eventually, the torpedo will run out of fuel and be lost if it does not hit a target.

### **Aircraft Guns**

Most aircraft (especially fighters) are equipped with small rotary Gatling-gun-type cannons, usually 20mm in size. These weapons are used in close-in dogfights between aircraft and sometimes to strafe enemy ground positions. Usually, this weapon is only used when all other ordnance has been expended or the range between the attacker and target is less than the minimum engagement range of the aircraft's AAMs.

Since the range for these types of guns is limited, be very careful that your aircraft are not endangering themselves trying to engage a surface target that has air defenses. Aircraft guns can be very effective against soft ground targets or ships without air defense capabilities.

### **Naval Gunfire**

Ships of all types usually carry large guns, usually intended to engage other surface vessels and surfaced submarines, but some types of guns can be used in the anti-aircraft role as well. Also, these guns can be used to attack enemy ground installations, if within range. However, naval gunfire does not have the range of SSMs or SAMs; you have to get in closer to use these weapons. Each allocation of a gun is a burst that fires several rounds. The number of rounds per burst varies with each weapon.

### **Air Intercepts**

Air Intercepts are functions of the Air Ops toolbar button. Refer to that section (10.3.3.5) for further details.

### 5.7.6. Automatic Engagements

If the Weapons State is set to Weapons Free (selected in Game Preferences under the Settings pull-down menu), units will automatically defend themselves against air and missile threats. If you do not want your units or groups automatically defending themselves, select Weapons Tight instead. Units or groups on Strike and Intercept missions, ordered to close-and-attack, or plotted intercepts will automatically engage enemy contacts.

## 5.8. LESSON V - SUBMARINE OPERATIONS

For best results, set your Difficulty Setting to Average for this tutorial scenario.

In this lesson we will leave the USS Lewis B. Puller and take command of the USS La Jolla, a Los Angeles-class fast attack submarine. We will examine some of the unique characteristics of submarine operations. Once you have loaded Lesson V, select Good Guys again. The Lesson V tactical map is identical to the previous lessons, except that instead of the Puller, the La Jolla is present.

### 5.8.1. Navigation

Select the La Jolla and plot a course to Reference Points 1 and 2. Navigation for submarines is identical to the procedures used for surface ships. The major difference is that submarines can change depth. The Speed/Altitude/Depth toolbar button is used to set a submarine's speed and depth at which it will operate. Go ahead and set the La Jolla's speed to Creep and her depth to Intermediate.

The primary sensor for a submarine is its passive sonar. You can see the passive sonar range circle for the La Jolla on the map display. Although submarines also have an active sonar capability, using active sonar will reveal the sub's presence and the element of surprise will be lost. The passive sonar is always functioning; therefore, it does not need to be turned on. Continue on course with passive sonar only. You can increase the time compression to 5 minutes. As soon as you detect a surface contact reduce your time compression to 1 second.

### 5.8.2. Surface Contacts

The quality of the contact will depend on several factors, including the speed, size, and aspect of the contact. Your speed and depth, as well as the location of the thermocline, all affect the quality of a sonar contact. Try changing your depth and course if you need to improve the contact. Since the contact is very large, it has been identified as the Alligator, a cargo vessel for the Bad Guys. It is very unlikely that it is traveling unescorted, which means there is probably another ship in the area we have not detected yet. The second contact should be made shortly after the first and will be a Nanuchka-class missile boat. Fortunately for the La Jolla, neither of the contacts has any ASW weapons.

It has been said that the best way to hunt a submarine is with another submarine. Shortly after detecting the two surface contacts, a submarine contact will be detected to the northeast of the La Jolla's position. We now have two surface contacts that are lucrative targets while a sub threat exists nearby. Let's take out the two surface contacts and then deal with the sub.

### 5.8.3. Using Weapons

Escort or not, we are going to attack the Alligator first. With the La Jolla selected, click the Attack toolbar button, allocate two Mark 48 ADCAP torpedoes, and click OK. You will see two torpedo

symbols appear and move toward the Alligator. Normally, we would immediately change course and depth to evade any counterattacks. However, let's demonstrate the use of missiles from submarines by attacking the Nanuchka II class escort. The procedure for launching a missile from a submarine is identical to that used with ships with one important exception: the submarine must be at Shallow depth or above when launching. Go ahead and change the La Jolla's depth to Shallow by clicking the Speed/Altitude/Depth toolbar button. It will take a minute or two for the sub to change depth. Additionally, because the torpedo tubes on the La Jolla were all loaded with ADCAPS, we must load the missile manually.

Once the sub reaches Shallow depth, double-click on the Logistics toolbar button. In the Reload Weapon Selection dialog window you will see three panels: Mount List, Mount Weapons, and Magazine Weapons.

The Mount List displays the available mounts on the selected unit and whether or not they are currently loaded. The numbers next to a mount (in this case "1/1") indicate both the number of rounds it contains and the number it can hold when full.

The Mount Weapons panel shows all the possible weapons that can be loaded into the selected mount and which ones currently are loaded there. The Magazine Weapons panel displays all the remaining unallocated ordnance on the selected platform. In the Mount List, select one of the full torpedo tubes. It should be designated as 533 mm MK68TT x 1/1. In the Mount Weapons list, find and double click on one of the MK48 ADCAP 1/1 torpedoes. Notice the 1/1 becomes 0/1 and the selected tube in the Mount List also changes from 1/1 to 0/1. This designates that the torpedo tube mount is now empty.

To load the mount, double-click on Harpoon ID x 6/8 in the Magazine Weapons panel. Notice it decreases to 5/8, the Harpoon ID in the Mount Weapons list changes to 1/1, and the selected torpedo mount in the Mount List changes to 1/1. Click OK. Loading mounts takes a certain amount of time, so allow several minutes to pass (game minutes, that is). Once finished, attack the Nanuchka or the Kriminsky Komsomolets by clicking the Attack toolbar button, double clicking on the Nanuchka or the Kriminsky Komsomolets, and allocating a UGM-84D Harpoon ID. After clicking OK, you will see a missile symbol appear. The missile will fly to the target and if it hits, the hit video will display. If it misses, reload the other mounts with Harpoons or attack the Nanuchka or the Kriminsky Komsomolets with ADCAPS. Now it is time to deal with the sub contact.

### 5.8.4. Using the Thermocline

The temperature of water creates layers in the ocean that affect the propagation of sound. These layers, called the "Thermocline" or simply "the layer," are used by submarine commanders the world over to help them avoid detection.

In H3ANW, the layer is located between the Shallow and Intermediate depth bands. Being above or below the layer offers a submarine the ability to minimize detection depending upon the location of enemy subs. You may have to change the La Jolla's depth several times to get the best detection and attempt to determine the enemy submarine contact's depth. Remember, the contact may have detected you as well. Changing your course and depth is a wise tactical procedure. Go ahead and alter both course and depth from time to time as

you close with the sub contact. However, note that the thermocline diminishes during winter months. Temperature changes in the ocean can make the layer disappear. Without a layer, hiding isn't much of an option; instead, moving away as fast as possible is your best bet.

#### 5.8.5. Closing with the Sub Contact

For now, let's set the La Jolla's depth to Intermediate and plot a course toward the submarine contact.

As the La Jolla gets closer to the contact, we should have enough of a quality detection on it to identify the class of submarine. Even if you cannot identify the sub, attack it anyway. This contact is an Akula-class attack submarine. It should be noted that the closer you get to the target the more likely that the contact will detect you, with often un-desirable results.

#### 5.8.6. Engaging the Sub Contact

Attempt to maneuver behind the Akula. You may need to alter speed to catch it in the correct position. Once you are behind it, close to within two or three miles. Once in position, attack the Akula with a MK-48 ADCAP torpedo.

Feel free to reload the lesson if the La Jolla gets sunk. Learning from mistakes is the best way to learn the ropes. When you are ready, go ahead and end the scenario and load Lesson VI: Air Operations.

### 5.9. LESSON VI - AIR OPERATIONS

Set your Difficulty Setting to Average for this Tutorial Lesson. We will concentrate our attention on the use of aviation assets. Once the Lesson VI tutorial scenario has been loaded select, as always, to play the Good Guys side. Examine the map and note that we have one airbase labeled "Good Guys 1" located on the northern half of the map. On station to the northwest of the base is the aircraft carrier USS Theodore Roosevelt. A known enemy installation, a fuel depot, is located just south of Good Guys 1. Just north of the base one aircraft is circling, a F-16 Fighting Falcon.



There are also two Reference Points that will be used during the lesson.

#### 5.9.1. Launch Aircraft

Let's get a better idea of what our situation is by launching an E-3 Airborne Warning and Control (AWACS) aircraft, but first start the game by selecting Start/Resume from the Settings pull-down menu. Select the Good Guy 1 airbase, then click Window and Order of Battle. The report will provide a listing of what aircraft are currently assigned to the base. You will see there are only one E-3 Sentry and four F-16 Fighting Falcons available. There are three ways to launch an aircraft from a base or ship:

- Formation Air Patrol – Using the Formation Editor
- Air Mission – Using the Mission Editor
- Manual Launch – Using the Launch/Ready Aircraft Window

We will be using the Manual Launch method to get the E-3 airborne. Close the Order of Battle window and then click the Air Ops toolbar button. A Launch/Ready Aircraft window will be displayed, listing the E-3 as well as its loadout, status, and mission assignment.

Below the aircraft listing is an inventory of the highlighted aircraft's loadout. Click on the E-3 Sentry and press the Launch button at the bottom of the screen. A small window will be displayed asking how many aircraft you desire to launch; click Continue to approve the one already selected. Notice that listing for the E-3 now includes "O/T Launch" which stands for "Ordered To Launch." If you change your mind and do not want the aircraft to launch, click the Clear button to remove the launch order for that aircraft. However, we want to launch the E-3, so click Continue to execute the launch order. The window will close and after about two to three minutes the E-3 Sentry will launch and begin circling near the airbase, awaiting your orders.

Select the E-3 and click the Navigation toolbar button. Plot a course to Reference Point 1, set the E-3's speed to Cruise, and the altitude to High. A higher altitude will improve radar range. After the aircraft begins to head towards Reference Point 1, turn on the radar. You should immediately detect an airborne contact and a surface contact.

### 5.9.2. Ready Aircraft

Aircraft can be configured to carry a variety of different weapons, fuel tanks, and jamming pods. Collectively these components are called "stores." The type of mission the aircraft will perform dictates the particular loadout it will use.

Loadouts will differ between aircraft as each aircraft has its own capacity and endurance range. Let's demonstrate how to ready aircraft by selecting the Good Guy 1 airbase and clicking the Air Ops toolbar button. As before, the Launch/Ready Aircraft window is displayed; select one of the F-16s and click Ready. The top portion of the window will now display a list of available loadouts for the F-16. Click on several to view the contents of each loadout in the lower portion of the window.

For this first F-16, select a PGM (Precision Guided Munition) loadout and click Continue. The list of loadouts will change to the list of aircraft. Note that one of the F-16s is now listed with a PGM loadout and will be ready in 240 minutes. Go ahead and ready each of the four F-16s with different loadouts of your choice. When aircraft are ready a message will appear in the Incoming Message window and, if selected, a Staff Message window. The procedure we used to ready aircraft for the airbase is identical to readying aircraft on a carrier or a ship with helicopter facilities.

### 5.9.3. Anti-Ship Strikes

Now that the E-3 is providing us with a better picture of our situation, let's take a closer look at the surface contact. Select the USS Roosevelt and click the Air Ops toolbar button to view the Launch/Ready Aircraft window.

The "Teddy R" has one F/A-18 Hornet with a Standoff loadout (SO), another F/A-18 Hornet with an Iron Bomb (IB) loadout, an F-14 Tomcat with an Air-to-Air loadout (ATA), and an SH-60B Seahawk helicopter with an Anti-Submarine loadout (ASW). Select the F/A-18 with the Standoff Loadout,





which we can see in the loadout listing below includes two AGM-84D Harpoon missiles. Click Launch and OK to confirm.

Now we will learn how to use the Airborne Intercept Routine. Once the Hornet is airborne, select it and click the Air Ops toolbar button. The mouse cursor will turn into a targeting crosshair. Double-click on the surface contact; doing this will order the F/A-18 Hornet to intercept it. When ordered to intercept the contact, the Hornet will set

its own course, speed, and altitude toward the surface contact. If the contact is determined to be hostile, the Hornet will engage the target. As we will soon see, the surface contact is our old friend the Kriminsky Komsomolets. When the Hornet is in range it will launch one or both Harpoon missiles at the ship and either return to base or launch another missile depending on the result of the first launch.

Now let's focus our attention on the enemy fuel depot.

#### 5.9.4. Air-to-Ground Strikes



As we did with the first F/A-18 Hornet, launch the second F/A-18 Hornet (with the IB loadout) from the Roosevelt. The Hornet's iron bomb loadout should be quite effective against the fuel depot. You can select to have the Hornet intercept the fuel depot; alternatively, you can plot a course for the F/A-18 to the depot and when it is directly over it, click the Attack toolbar button and allocate your load of iron bombs against the fuel depot. When you have expended bombs on this target, let's move on to the air contact.

#### 5.9.5. Air-to-Air Engagements



We still have to deal with the airborne contact. Select the USS Roosevelt again and launch the F-14 Tomcat to intercept the air contact. When the F-14 is in range of the contact it will launch an AIM-54 Phoenix missile at it. The contact in this lesson scenario is a TU-16 Badger bomber. If your missile misses, launch again or close with the target and engage with guns by clicking the Attack toolbar button and allocating bursts from the 20 mm cannon. You

must be in very close to the target to engage with guns. When the target is destroyed the F-14 will remain on station loitering until it is low on fuel ("BINGO FUEL" in pilot terms), at which time it will return to base.

### 5.9.6. Airborne ASW



There is a submarine in the vicinity of Reference Point 2. Select the USS Roosevelt and launch the SH-60 Seahawk helicopter. Once it is airborne, plot a course for Reference Point 2. Plot the course so that the SH-60 passes back and forth over Reference Point 2.

To locate the sub we will drop several sonobuoys. When the Seahawk reaches the area around the Reference Point, hit the one of the Sonobuoy Release hot keys on your keyboard.

There are two types of sonobuoys: Passive and Active. A Passive sonobuoy listens for sounds in the water while an Active sonobuoy sends out a sonar ping and listens for the return of the sound to determine if there is a submarine in the area. When you drop a Passive sonobuoy it will be in communication with the aircraft that dropped it, providing constant contact information.

An Active sonobuoy has a passive capability identical to the Passive sonobuoy but can be turned on to send out pulses of sound energy to detect submarines. To turn on an Active sonobuoy, first select the sonobuoy and click the Sensor toolbar button. Drop several of each type of sonobuoys and wait to see if they detect the sub. When the sub is detected, engage it by selecting the SH-60, clicking the Attack toolbar button, and clicking on the sub contact. Allocate a torpedo and click OK. The torpedo will deploy and begin to search for the submarine. Sub contacts can also be intercepted in a similar fashion to that used to intercept aircraft, ships, and ground targets. Play around with the sub contact for a few minutes and then let's move on to explore aerial refueling.

### 5.9.7. Land Aircraft

Once you are finished with the aerial refueling, let's end this Tutorial Lesson by ordering all airborne aircraft to return to base. Select the aircraft you wish to order back to base and click the Air Ops toolbar button. The mouse cursor will change into a crosshair; click the desired landing site, either a base or ship.

The base or ship must be capable of supporting the selected aircraft! For example, you cannot land a fighter jet on a frigate, or a land-based aircraft like the E-3 on an aircraft carrier.

Go ahead and order any of the other aircraft used in this lesson to land. This completes Lesson VI. Our next lesson deals with creating & editing missions.

### 5.9.8. Notes on Weapons and Ordnance

***Put your trust in God, but keep your powder dry. -Oliver Cromwell***

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Here are some insights into how various weapons and ordnance are being employed in H3ANW.

One of the trickiest pieces of modeling we did in H3ANW was the employment of semi-active radar homing missiles (SARH) which, due to engagement geometry, were forced to share illuminators. It was a simple enough problem when confined to illuminate-all-the-way missiles, but several real missile systems had inertial/command guided fly out and only required illumination in the terminal phase of their flight. This meant we had to keep track of when each director would be busy (in the future) and prevent a missile from firing if no directors would be available at the intercept time.

So, each director/illuminator received a rolling bit field representing a 15-second engagement time slice and we wrote a simple timesharing system to keep the launchers honest. When you also consider that each mount has a rate-of-fire (ROF) cycle and finite reload time, the whole affair has suddenly grown beyond the user's ability to effectively micromanage. In real life, a trained Air Warfare Officer and his crew will have a very hard time keeping up with the multi-dimensional geometry of even the simplest engagements. Since the average H3ANW user would probably have even less training, we had to let the computer handle a lot of the functionality for them. The design paradigm of H3ANW states clearly that "Once the missiles start to fly, the user is mostly out of the loop." While this may be less fun than shooting each missile yourself (a la most flight simulators), the emphasis is really on learning about and employing modern naval tactics and not how quick your mouse hand reflexes are.

In real life, a SARH missile tracks reflected microwave energy that has bounced off its intended target. This energy usually originates from an 'illuminator'. An illuminator is a generally a radar emitter that produces a tight microwave beam used to guide a SARH missile.

A typical missile engagement using SARH missiles would probably go like this: A search radar will detect a target and tell the illuminator where to point. The illuminator then emits a microwave beam which reaches out to the target. Some of the energy bounces off the target and is visible to the radar seeker head in the missile (which is still on the rails). The missile says to the fire control computers "I can see the reflected energy." The missile is fired towards the target and will steer itself towards the reflected energy, eventually intercepting the target and exploding. If the illuminator is turned off for some reason, the missile will no longer see any reflected energy and will miss the target. Some missiles will self-destruct when they lose their illumination. There are some problems with this system. First, the illuminator must be constantly pointed at the target during the entire flight of the outbound missile. This means you may only shoot at as many targets as you have directors to guide them.

Some missiles and torpedoes employ search patterns in the terminal phase of delivery. This means if they do not see an appropriate target when they have reached their activation point, they will alter their course to search for one. Missiles and sub-launched torpedoes will initiate an expanding 'snake' pattern. A snake pattern simply zigzags back and forth every few minutes by about 45 degrees left and right of its base course. In contrast, aerial delivered torpedoes launched at uncertain submarine contacts will almost always begin an expanding circle pattern (a spiral), occasionally changing depths in its search for a submarine. Care must be taken not to launch at an uncertain target in an area where friendly or neutral

platforms might be spotted by the weapon's seeker head. The weapon cannot tell friend from foe or combatant from civilian and will engage any platform matching its target parameters.

Air-delivered gravity bombs may be tossed ballistically. This simply means that the higher and faster an aircraft is flying, the greater the distance from the target the bomb can be released. This allows aircraft to avoid heavy concentrations of point defense weapons (like handheld SAM launchers and small arms fire).

### Aircraft Loadout Types

The following aircraft loadout types are abbreviated in Ready Aircraft window:

- IB - Iron Bomb (gravity bombs)
- PGM - Precision Guided Munitions (B for bomb, M for Missile)
- SO - Stand-Off (i.e. Harpoon anti-ship missiles)
- SEAD - Suppression of Enemy Air Defense (i.e. Anti-radiation missiles)
- ATA - Air To Air (i.e. Phoenix missiles, Sidewinder missiles)
- ECM - Electronic Counter-Measures (ALQ-99 jammers)
- Tanker - Aerial Refueling
- Minimal - Basic Loadout, (i.e. gun ammo only, detection equipment only)

## 5.10. LESSON VII - USING THE MISSION EDITOR

Load Lesson VII from the Scenario selection screen and select Good Guys as your side. Set the Difficulty Level to Average. The map area for this lesson scenario is identical to the previous Lesson. Again, the airbase Good Guy 1 is present, as well as the USS Theodore Roosevelt. There are several Reference Points placed around the map that will be used during the Lesson.

### 5.10.1. Mission Types

This Lesson demonstrates the use of what is probably the most powerful and useful function in H3ANW: the Mission Editor. Using this feature allows units or groups to perform a variety of missions. Ships, aircraft, submarines, or a combination of these platforms can be assigned to missions. Assigning units or groups to missions offers the user the flexibility of allocating various assets to perform specific functions continuously during a H3ANW session.

Once units or groups are assigned to a mission they will automatically launch, transit, patrol, detect, and in most cases, prosecute enemy contacts. Missions are more than just patrols, however. They can be modified as the tactical situation changes during a scenario. There are three general types of missions:

- Area
- Strike
- Reconnaissance

For the purposes of this Tutorial Lesson, we will be creating one mission from each type. It is recommended that you read more about the various kinds of missions available under each type. Refer to the Mission Editor section (9.2.9) for further details.

### 5.10.2. Reference Points

#### Existing Reference Points

Many of the mission types utilize Reference Points to designate the area in which the mission will take place. Reference Points can be placed anywhere on the map. In this Lesson, there are six Reference Points already on the map. We will use these Points to create some missions later in this Lesson. Use the Data Block hot key to toggle the Reference Point names on.

#### Selecting and Deselecting Reference Points

A Reference Point can be selected in a manner similar to that used to select a unit or group. Click one of the Reference Points on the map. When selected, a Reference Point will change to a triangle. Multiple Reference Points can be selected at the same time by either clicking each in turn or drag-selecting several at the same time.

To deselect a Reference Point, click on it again and it will return to its unselected state. Go ahead and try selecting several Points using both the methods described above. When you are familiar with selecting Reference Points, set all the points so that none are selected.

#### Adding Reference Points

Let's create a new set of Reference Points. Click Mission and Add Reference Point; the mouse cursor will change to a pointer finger. Place the cursor on the point where you want the Reference Point to appear and click once. A small "X" will be displayed. Reference Points may also be added using a hot key. Place two additional Reference Points near Reference Points 1 and 2 using the existing Reference Points to form a rectangle.

#### Move Reference Points

Reference Points can be moved to new locations after they have been placed on the map.

To demonstrate, select one of the Reference Points you created and click Mission and Move Reference Point. The mouse cursor will change to a pointer finger; click the location where you want the selected

Reference Point to be located and the Reference Point will move to the new location.

**Make sure you only have one Point selected when using this feature.**

#### Naming Reference Points

Reference Points are numbered in the order in which they are placed on the map. The name of the Reference Point will be displayed with a datablock name of "Ref X" where "X" is the number of the Reference Point. Reference Points can be renamed by selecting the Reference Point and using a hot key. Go ahead and name one of the points you created to whatever you wish.

### Renaming Reference Points

Reference Points can be renamed by selecting them and then using the rename hot key.

### Deleting Reference Points

To delete a Reference Point, you do not have to select a point first. Instead, click Mission and Delete Reference Point; the mouse cursor will change to the pointer finger. Click the Reference Point you want to delete and it will disappear from the map. Reference Points can also be deleted using a hot key. Be careful you do not delete a Reference Point that is being used by a current mission. Go ahead and delete the Reference Point you just renamed and then create another one to replace it in the same spot. 73

#### 5.10.3. Create a Mission

Let's start by creating an Area Mission using Reference Points 3, 4, 5, and 6. Select each of these Reference Points. Ensure that only these four points are selected; they will define the area in which the mission will take place. Next, click Mission and Create Mission. The Create Mission window will be displayed in the center of the screen.

An operation name will be assigned to the mission. This name is generated randomly from a list of words. Click on the text block and enter AAW Patrol 1 as the mission name, overwriting what the computer chose for you.

We will now select the mission type. Let's send out an Area Anti-Air Warfare Patrol by clicking Patrol AAW.

#### 5.10.4. Emission Control

In the same dialog window you have the ability to set the sensor status desired for the assigned platforms to use during the mission. There are three types of Emission Control:

- Passive: No active sensors to be used on the mission.
- Intermittent: Active sensors will radiate intermittently. A window will appear allowing you to set the interval, duration, and variance of the emissions.
- Active: Active sensors will be used during the duration of the mission.

For the AAW patrol you are creating, select Active.

#### 5.10.5. Time Delay

Missions can be given a time delay so that they commence at a set number of days, hours, and/or minutes from when the mission is assigned. To assign a time delay, click the Time Delay text blocks and enter the desired delay.

**Once you set a time delay it can be changed up until when the mission is activated (i.e. the unit has waited out the duration of its delay). For the "AAW Patrol 1" mission we will not be using the Time Delay feature.**

#### 5.10.6. 1/3 Rule

When the 1/3 Rule check box is selected, the AI will keep one-third of the assigned aircraft in the air. This applies to area missions only. If the 1/3 Rule check box is not selected, all of the aircraft assigned to the area mission are launched. Also note that this check box does not apply for strike type missions.

#### 5.10.7. Edit Now

The Edit Now window allows the user to go directly to the Edit Mission dialog window. Click Missions and Edit Now as we still need to edit this mission. Click OK.

#### 5.10.8. Edit Missions Dialog Box

After a mission has been created, units or groups need to be assigned before the mission may commence.

The Edit Missions dialog box has three columns:

- **Missions:** This column lists all missions that have been created. "Plotted" will display all units currently being manually plotted. You should see "AAW Patrol 1" in this column as well.
- **Assigned Units:** This column lists all units that have been assigned to the mission currently selected in the Missions column.
- **Unassigned Units:** This column lists all units not assigned to a mission. Anything listed in this column can be assigned to a mission. Individual aircraft will not be listed here. If the word "Aircraft" appears in the column it means that there are aircraft available for missions at one or more of the bases, ships, or ship groups listed.

For this first mission, we will assign two F-14 Tomcat fighters to patrol for enemy aircraft in and around the rectangle made by the selected Reference Points. First, click AAW Patrol 1 in the Missions column and Add A/C at the bottom of the window. The Assign Aircraft window will be displayed with a list of aircraft, their current loadout, ready status, and current assignment.

Also displayed in the bottom half of the dialog box are details concerning the loadout of the aircraft currently selected. Click on the F-14 Tomcats and then click Assign. A small dialog window will be displayed asking how many of these aircraft should be assigned to the mission. It should currently display 2, which is what we want, so click OK. The current assignment for the F-14 aircraft will now read "O/T Mission" which stands for "Ordered to Mission." Other aircraft can be assigned or readied using the Assign Aircraft window.

With the two F-14 Tomcats ordered to the mission, click Continue. You will now return to the Edit Missions dialog window. Click Patrol AAW 1 in the first column. You can now see that the word "Aircraft" is listed in the Assigned Units column in the middle of the box. This means that there are currently aircraft assigned to the selected mission.

#### 5.10.9. Confirm Mission Assignments

Click Continue to provide final confirmation for the mission assignments and to exit the Edit Mission dialog window. The mission is now active and will launch shortly. The F-14s will launch and fly to the designated patrol area and begin flying in a patrol pattern searching for air contacts.

While the AAW patrol is launching, let's create a strike mission against the enemy airbase to the south of our airbase. Click the enemy airbase and then Mission and Create Mission. The Create Mission dialog window will be displayed; change the mission name to Ground Strike 1 and click Ground Strike for the mission type. Set Emissions to Passive and click Edit Now. Once you have these selections made, click OK.

### 5.10.10. Edit Strike Mission

From the Edit Missions dialog window, assign four A-6 Intruders to the strike mission using the same procedure used to assign the F-14s to the AAW mission. After the Strike mission is activated, let's continue with our third and last mission, Reconnaissance.

The Mission Editor can also be used to edit existing missions. The Editor is accessed by clicking Mission and Edit Mission.

### 5.10.11. Create a Reconnaissance Mission

Select Reference Points 3, 4, 5, and 6 to designate the mission area. In the Create Mission dialog window, click Recon Ship and ensure Emissions is set to Intermittent. Click Edit Now and OK.

### 5.10.12. Edit Reconnaissance Mission

From the Edit Missions dialog window, assign one P-3 Orion to the recon mission using the same procedure used to assign the previous two missions. After the recon mission is activated, let's sit back and watch what happens.

The aircraft assigned to the three missions you created will all perform their assignments in different ways. The AAW mission will patrol the assigned area with active sensors and will engage any enemy air targets it contacts. The Strike Mission will fly to the target, drop bombs, and return to base. The Reconnaissance Mission will patrol the assigned area looking for enemy ships. If any ships are detected, the reconnaissance aircraft will not become decisively engaged and will attempt to identify and "shadow" the contact. For the purposes of this scenario, we have added several enemy contacts for you to deal with as you wish. Go ahead and experiment using the mission aircraft to engage the targets. We have provided you with extra aircraft if you desire to experiment with the other types of missions (refer to the Mission Editor section – 9.2.9 – for further details).

All of our mission examples have been aircraft-related. Ships and subs can also be assigned to missions; the only difference between aircraft missions and ship or submarine missions is the use of the Assign Aircraft to Mission window. Ships and submarines can be assigned to a mission from the Edit Missions dialog window by selecting the mission and then double-clicking on the unassigned ship or sub.

This Lesson provides you with our old friends the Puller and the La Jolla. Experiment using the existing Reference Points, or points that you wish to create, to assign both of these two platforms to missions. You will find that they will take longer to get to their designated areas but that they will generally behave in a manner that is similar to the aircraft on missions.



### 5.10.13. Freeing Units

Units assigned to a mission will not properly execute orders given to them unless you do one of the following:

- 1) Cancel the Mission
- 2) Remove the unit from the mission
- 3) Use the Unassign key ("U" on the keyboard)

When a unit or group is assigned to a mission all orders to change speed, altitude, or course will not be accepted. The computer controls these units until you release the unit or group from the mission using one of the three options listed above.

Intercepts are missions and can be cancelled or edited as well.

If a Strike mission is out of range it will not launch until the carrier or the target moves closer. Manually launching planes assigned to a mission that is not in range will cause them to return to base (RTB) right away.

### 5.10.14. Chained Missions

Chained missions allow the user to set up a series of missions for craft to complete. When a mission is completed, its craft will be assigned to its secondary mission.

See section 6.4.3 for more information about constructing and using chained missions in the Mission Editor.

## 5.11. LESSON VIII - THE FORMATION EDITOR

Select Lesson VIII: The Formation Editor from the Scenario Selection window. It is recommended that your difficulty level be set to Average for this lesson. Select Good Guys from the Side Selection window.

### 5.11.1. The Formation Editor

This Lesson demonstrates the use of the H3ANW Formation Editor. A formation is a group consisting of two or more units.

#### **Submarines cannot be included in any formation.**

The Formation Editor is used to position the units within a group in the best possible configuration to meet potential threats. In this Lesson, you will learn to create and arrange patrol zones within a formation's threat axes, and assign units to these patrol zones. There are three threat axes within a H3ANW formation:

- Anti-Submarine Warfare (ASW)
- Anti-Air Warfare (AAW)
- Anti-Surface Warfare (ASuW)

User-created patrol zones can be assigned to each threat axis. This allows you to set units within the formation on patrols in areas relative to the formation's center as the group moves.

### 5.11.2. Starting the Lesson

As the scenario opens, you should see a group of four ships in the English Channel. This group has no mission and is currently set to move to a default formation. Default formations are quite limited in their design, so in this Lesson you will learn how to arrange the formation in such a way that the group is better protected.

Select the group and then click the Formation Editor Toolbar button. Expand the window to full size and click the Zoom Out toolbar button three times. Now that we can see the group in the formation editor, let's begin by creating an Anti-Submarine Warfare patrol zone within the ASW threat axis.

### 5.11.3. The Anti-Submarine Warfare Axis (ASW)

The ASW threat axis is placed in anticipation of incoming sub threats. As the formation moves, the ASW threat axis moves also, always facing the direction that the formation is headed. This allows you to create and assign a patrol zone to the ASW axis, assign an antisubmarine unit to it, and have that unit automatically transit to face the direction the formation is moving. As most sub threats the group will encounter will be coming from the direction of the group's Path of Intended Motion (PIM), this is a useful function for a group commander.

Turn on the sonar range rings by clicking the PREF toolbar button and selecting ASW Sensor. Click OK. Now find and select the Arleigh Burke. It should be apparent that since the Sir Bedivere has no sonar range ring, it is not an applicable unit for this patrol. Click the Patrol Zone Formation Editor toolbar button and drag-select a zone 1/3 the width of the open end of the ASW wedge (from the outer curved line of the ASW Threat Axis down to the fourteen (14) mile range circle). Try to center this in the ASW wedge if possible. After releasing the mouse button, a dialog window will be displayed prompting you to select the type of patrol movement.

There are three different possible movement configurations:

- **Sprint-Drift:** A high speed run across the unit's formation patrol zone followed by a reduction of speed to drift. This is used to make passive sonar observations during the 'drift' phase, while allowing the main body of the group to continue at its assigned speed.
- **Station Keep:** The unit alters course and speed as the formation moves to maintain a location in the center of the patrol zone.
- **Random:** The unit randomly selects a side of the patrol zone, finds the midpoint of that side, and then navigates there, repeating as needed.

For this patrol, select Sprint-Drift, and then select the Arleigh Burke again to update the display. You should see the newly created patrol zone. If the patrol zone is not satisfactory, you can create another to replace it by repeating this procedure. You may have noticed that the sonar range circle for the Arleigh Burke has changed size; this is because the ship is moving (or will be when we unpause the game), which limits the sonar's effective range.

### 5.11.4. High Value Units (HVUs)

HVUs are those units which must be protected by the formation, such as cargo or troop ships. Since the ASW axis is always facing the path of intended motion, the ideal place for HVUs is in the center of the formation, directly behind the leading anti-submarine unit.

Find and select the Sir Bedivere. Click the Patrol Zone Formation Editor toolbar button and drag-select a zone behind the ASW wedge that covers from about the one mile to the three mile range circle, making it 45 degrees across. Select Station Keep as the patrol type and click OK. Now that all the units assigned to the ASW threat axis are arranged, let's assign a patrol to the Anti-Surface Warfare Axis.

#### 5.11.5. Anti-Surface Warfare Axis (ASuW)

The ASuW threat axis is used to anticipate and counter surface threats. Unlike the ASW threat axis, the ASuW need not necessarily change direction with the group. It will, by default, stay pointing in the same direction relative to the ASW axis, unless we either assign it a specific compass direction, or make it track a specific threat.

Find and select the Ticonderoga. Click on the small colored triangles in the Formation Editor window until you find the ASuW axis. Click the outer arc of the wedge and drag it until it is pointing due south. Now we will place the Ticonderoga on a patrol. Click the Patrol Zone Formation Editor toolbar button and drag-select an area centered in the wedge that ranges from the three to seven mile range circles and is approximately 1/3 the width of the wedge. Select Station Keep as the patrol type and click OK. Click the Ticonderoga again to display the patrol zone. Here we have set the ASuW axis to remain pointing due south.

#### 5.11.6. Anti-Air Warfare Axis (AAW)

The AAW threat axis is primarily used to counter aerial threats. There are times when it is advantageous to make this axis tracking, meaning it will rotate to face the designated threat. For this Lesson, we want to assign an anti-air patrol to the AAW axis and have it track a source of possible air threats.

First, let's create the patrol. Find and select the Stout. Now, click on the colored triangles until you find the AAW threat axis. Click the Patrol Zone Formation Editor toolbar button and drag-select an area within the AAW wedge that ranges from the seven to 10 mile range circles and is about 1/3 the width of the wedge. Select Station Keep as the patrol type and click OK. Click on the Stout again to display the patrol zone.

Now we will make the AAW axis track a source of possible air threats. Resize the Formation Editor window by clicking on the up and down arrow button and then drag the window to the right side of the screen to clear the view of the tactical map. Start the game for a few seconds and let it run until you detect the enemy base to the south, then pause the game. This is the source of the air threat that we want to track. In the Formation Editor window, click Threat-Axes-Tracking Formation Editor and once on the Tactical map window to activate it. Double-click on the enemy base. Next, find and select the Stout in the Formation Editor. Notice that the position of the AAW axis has changed to track the enemy threat. It will continue to rotate throughout the scenario, always facing the enemy base.

#### 5.11.7 Aerial Patrols

In addition to the obvious advantage airborne units have in line-of sight detection, they can also be deployed to several specific patrol types. These are:

- Combat Air Patrol (CAP): An aircraft carries an air-to-air loadout to engage enemy airborne units.
- Advanced Early Warning (AEW): An aircraft carries sensor loadout to search for enemy units.
- Dipping Sonar: A helicopter will occasionally loiter and drop dipping sonar.
- Sonobuoy: A helicopter will drop a line of sonobuoys along the leading edge of the patrol zone.
- Surface Combat Air Patrol (SUCAP): An aircraft carries an anti-surface loadout to engage enemy surface units.

For the purpose of this lesson, let's create a Sonobuoy patrol to watch for possible sub threats. First, resize the Formation Editor window by clicking once on the up arrow, then click the Zoom Out toolbar button twice. Next, drag the 14-mile range circle out to 25 miles and drag the 10-mile range circle out to 20 miles. This is to create a frame of reference for the patrol we are about to make.

Find and select the Arleigh Burke. Click the Air Ops toolbar button. Now, drag-select a zone centered in the ASW wedge ranging from the 20 to the 25 mile range markers. Make this zone 1/3 the width of the ASW wedge. A dialog window should be displayed, requesting that a patrol type be designated; click Sonobuoy and set Radar, Sonar, and ECM to Passive. Click Continue.

At this point, a window should be displayed listing all of the aircraft in the group that are not launching or already in the air. Select a Sea Hawk and click Assign, OK, and Continue. The remaining Sea Hawk will be used to maintain the patrol station when the one we assigned runs low on fuel or is destroyed in combat.

### 5.12. MORE INFORMATION ABOUT THE FORMATION EDITOR

***Any commander who fails to exceed his authority is not of much use to his subordinates.***  
**-Admiral Arleigh Burke**

#### 5.12.1. Introduction

The Formation Editor is one of the most advanced features of the game; it is an extremely useful tool to efficiently manage your operations. The Formation Editor allows players to automate the most routine, operational concerns of their groups, allowing them to concentrate on more pressing tactical issues. However, the best thing about the Formation Editor is that players are not forced to use this feature in its entirety to play the game. The Editor was included so a player can select the amount of AI assistance they want. The player has the option to do with the Editor as they will.

This section will cover the Formation Editor in its entirety. It will answer a few basic questions and then move into in-depth descriptions and step-by-step directions of the Editor's various functions. A practical example of use of the Formation Editor is also included.

### 5.12.2. Basic Questions on the Formation Editor

#### What is the Formation Editor?

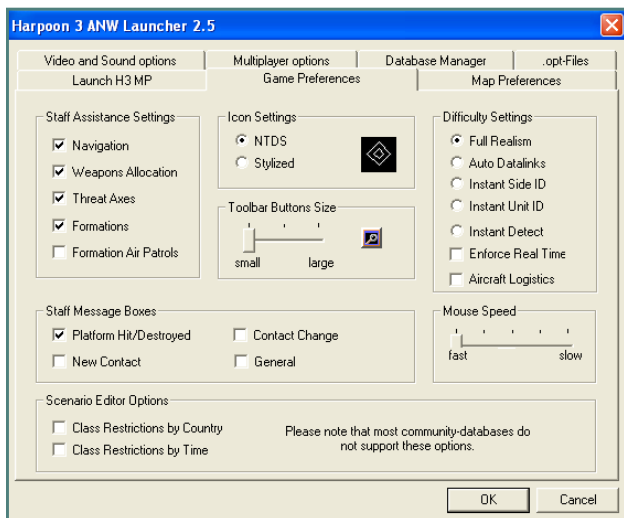
The Formation Editor is a useful tool created by the H3ANW design team to give players and scenario editors the ability to automate the micromanagement of units formed into groups. It accomplishes this by allowing the player to assign individual units into patrol zones along an assigned threat axis (AAW, ASW, or ASuW) which will be retained for the duration of the scenario or until otherwise ordered. Its usefulness lies in the fact that once a player or scenario writer has accomplished this task, they can concentrate on more pressing issues in the simulation while the AI handles the inner management of their groups.

#### When is a good time to use the Formation Editor?

The Formation Editor should be used at the beginning of every scenario to make sure that units are where the player would like them to be within each group they control. All other functions are optional and can be changed or used at any time during the game.

#### What Should I Do Before I Use the Formation Editor?

You must decide how much control you would like over your formations and the game itself. The designers have provided a series of preferences (found in the Game Preferences menu and the H3ANW Launcher) that allow you to allocate control between you and the AI. It is your game and your choice how you wish to use these preferences.



To play a game in which the player has total control and no AI control beyond what is ordered, it is critical that several game preferences be turned off. The reason is that the game has progressed to a point well beyond its original design, and sometimes incorrect aircraft assignment and inefficient sonobuoy deployments could be experienced by activating these preferences.

You have two ways to turn these features off. The first is temporary, using the Game Preferences menu within the game, which will turn them off during the current game only. The second is permanent, by modifying the HARPOON 3.ini file which can be accomplished with the H3ANW Launcher in the Extras folder of the H3ANW game directory. The HARPOON3.ini may also be manually edited by using a text editor; please consult the on-line resources and the Advanced Manual for more information.).

The Game Preferences menu is accessed by clicking the Settings pull-down menu. The Preferences that should be turned off are located under the Staff Handles heading. Using this menu works for the duration of the current game.

The nice feature of these options is that you can gear the level of AI assistance to your liking. The only requirement is that player set up patrol zones so their formations stay in position during game play. This is accomplished by setting all of your ship's patrol zones to the ASW threat axis. Given that the ASW axis is always set to the path of intended motion, the units will not break formation unless attacked by a torpedo.

### **What Are Formations and When Can I Use the Formation Editor?**

All units within the game, with the exception of submarines, can be formed into formations. This is accomplished by clicking on a unit and dragging it to another unit.

The unit that you drag towards with other units will always be the center of the formation. Once this has been accomplished, click the Formation Editor button and begin working in the Formation Editor. Given the functionality of the Editor and the types of commands given, the Editor is best used with groups composed of surface warships.

### **Where is the Formation Editor?**

To access the Formation Editor, first click the formation or group you would like to edit, and then click the Formation Editor Toolbar button.

#### **5.12.3. Functionality**

##### **The Basic Idea**

The basic idea of the Formation Editor is to assign platforms to patrol zones based on threat axes. What you are doing is setting up a template for the AI to micromanage your groups by. You can then shift your defenses with relative ease by simply shifting the threat axes you are working with in a new direction to face a new threat, or you can let the AI do this for you.

## Display Window

Looking at this workspace you will have two main areas of interest. The first is the display window that gives you a visual representation of your group, range measurements, and threat axes. The second area is the Formation Editor Toolbar that includes a series of nine buttons that have specific functions in the editor. You must use these two together to successfully use the Formation Editor.

### Formation Editor Display Window and Its Functions

The Display Window is the visual representation of your formation. It is composed of a circular plot, the units you've added to the group, the threat axis marker triangles, and one visible threat axis at a time (the others are visible by clicking the threat axis marker triangles). This window is like your tactical display in that it gives you the option to view a lot of information. Like your tactical display, you can also change its size and location using the same window function buttons.

#### Circular Plot

The circular plot is simply a visual reference that lets you set up patrol zones in a logical arrangement in reference to the center of the formation. This center would be the center of the group's gravity (where command or HVUs lurk to provide them the most amount of safety possible). This plot is marked by measures of radius in nautical miles, and is editable by clicking and dragging the circles in or out. This allows you to set up formation displays of any reasonable size (depending on your comfort and map size).

#### The Units within the Plot

Viewing units within the circular plot, you will see that all of the units you've clicked and dragged together to form the group are included. The unit that you clicked and dragged everyone else to is at the center of this formation.

You will notice a small PIM (Path of Intended Motion) lines stemming from each unit. You can click and select any unit, which will then be surrounded by a selection box. You can then use any of the other functions within the Editor to issue this unit specific orders.

#### ASW, AAW, ASuW, and Corresponding Marker Triangles

You will notice several colored axes (wedges) and corresponding marker triangles within your circular plot. These are threat axes and are very important to the management of your surface groups. These are your tools to indicate to the AI where expected threats will come from and where the AI should concentrate its efforts in each particular case.

To activate the axis simply click on any vessel which will bring one into view. You will see small triangles within the circular plots that correspond to each axis as well as their positions. Simply clicking the triangles will allow you to view a particular axis. You can only view one axis at a time. To view another axis, click on the corresponding triangle in the circular plot.

To manipulate an axis the procedure is simply click, hold, drag and release. By clicking and dragging the end of each axis you can shift them in any direction you would like. Keep in

mind that the ASW axis is locked to the path of intended motion, so it cannot be shifted. To change the width of each axis simply click on the sides of the axis and drag to the appropriate size.

### Antisubmarine Warfare (ASW) Axis

The ASW Axis cannot be moved since it will always be facing the Path of Intended Motion (PIM). The reason for this is that is where most ASW threats are expected to come from. The ASW axis will not affect sonar performance, so the direction the axis is pointing does not imply better sonar performance.

### Anti Air Warfare (AAW) Axis

The AAW Axis is set to the expected direction of an air threat. This axis can be set by the player and will remain in the same direction until the player or AI changes it. To set this axis, click, hold, and drag the axis to the heading you would like.

### Anti Surface Warfare (ASuW) Axis

The ASuW Axis is set to the expected direction of a surface threat. This axis can be set by the player, and will remain in the same direction until the player or AI changes it. To set this axis, click, hold, and drag the axis to the heading you would like.

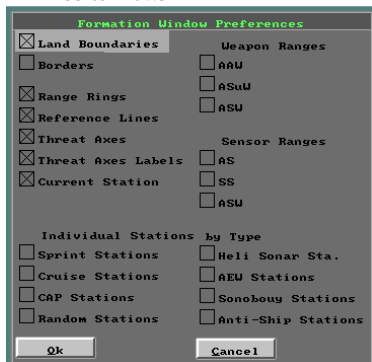
### Display Window Buttons



### Zoom In Toolbar Button and Zoom Out Toolbar Button

These buttons allow player to zoom in and zoom out, respectively, the Formation Editor display.

### PREF Toolbar Button



This button allows players to set certain display options for their Formation Editor display. When clicked the Formation Window Preferences window is displayed, allowing selection of certain visual properties of the display. To select or deselect an option, click the associated boxes. Click OK to process the choices made or Cancel to close the window without processing them.



## Sensor Toolbar Button

This button allows players to set emission conditions for each individual unit in a formation. As in all other emission control menus, you will need to set each type of sensor to the appropriate setting (Active, Passive, or Intermittent). Any unit in your group which has a sensor set to Active will cause the entire group's emission condition to be reported as active although that may only be true with one particular sensor. This does not mean that an enemy will detect your entire group (they will only detect that sensor).

## How Intermittent Sensor Settings Work in the Formation Editor

	Pas	Act	Int	act	%	pas	%
Radars :	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	10	0	0	0
Sonars :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0	0	0	0
ECM :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0	0	0	0
Comm Link :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0	0	0	0

Ok Cancel

You have four paired values to fill in. The first two are Active Duration (ACT) and Percent Variance (%). The second pair is Passive Duration (PAS) and Percent Variance (%). The Active Duration field is where you enter the number of minutes you would like this sensor to be active. The associated Percent Variance is the percent value change you would like your active value to change after each cycle. So if you entered 10 and a 20% variation, your sensor will go active for 8 to 12 minutes (10 minutes plus or minus 20% of 10.) The Passive Duration field and its associated percent variance work in the same manner. Click OK to save your choices or Cancel to exit the window without saving.

## Patrol Zone Formation Editor Toolbar Button

This button allows player to set individual patrol zones to individual surface units within a formation, as well as setting a type of patrol zone.

To create a patrol zone, click a unit. Next, select the threat axis you wish to assign the patrol zone to. Then click the Patrol Zone button and then move your mouse cursor to the area you would like that zone to be. Click and drag to form the zone. When finished, release the mouse button. You will now be prompted as to how your selected unit will maneuver in your newly drawn zone; to this end a menu will be displayed, allowing you to choose between Sprint-Drift, Station Keeping, or Random.

To delete a patrol zone assignment, simply reassign the surface unit using the same procedure as described above. Surface units must always be assigned to a patrol zone or the AI will assign the ship to whatever it thinks it should be which could have some undesirable results.

### Sprint-Drift

This is a patrol pattern where units will race at full speed and then drift, allowing good usage of passive sonar. This is a typical ASW pattern used by modern navies worldwide. Great care must be taken with this type of zone, however; assign them in logical patterns (around 8 miles or longer) ahead of your group. Sprint-Drift Patterns that are too short or improperly oriented may consume your escort's fuel at an inefficient rate and slow your group down. Escorts assigned to this mission must have sufficient enough speed to keep up with your main body. If they do not, assign them to a Station Keeping patrol zone.

### Station Keeping

This will enforce a constant distance and heading relative to the center of the formation. The ship will always remain in the same zone and keep up with the rest of the group. A typical Station Keeping patrol zone should be no larger than 2 by 2 miles in size.

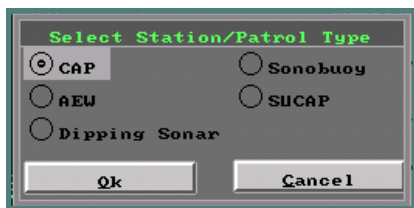
### Random

This setting causes the unit to select a random side of its assigned zone and travel to its midpoint to take up a station. Always use this setting with larger zones; in terms of distances and sensor detection, small zones may make this setting irrelevant.

### Air Ops Toolbar Button

As its name implies, the Air Operations button allows you to assign embarked aircraft to patrol zones within threat axes.

To assign aircraft to the formation's air patrols, first select the corresponding axis you would like to assign the aircraft to and then select the unit that hosts the aircraft you wish to assign. Click the Air Ops button and then click, drag, and release your patrol zone as with a standard ship patrol zone. When complete, click the Formation Air Operations button once again.



A new Select Patrol Station/Type menu will then be displayed. This allows you to choose from five different types of formation air patrol zones: CAP, AEW, Dipping Sonar, Sonobuoy, and SUCAP.

Once you select the mission you would like, click the appropriate radio button. When you do this the Sensors menu will be displayed; set the appropriate

emission controls for each type of sensors you have with your platform. When complete, click OK and you will be directed to the Assigned Aircraft menu.

### CAP (Combat Air Patrol)

This mission is generally associated with the AAW Threat axis. When issued, aircraft will launch from their host unit and engage any aircraft entering its associated zone. These aircraft are anchored to their positions and will act defensively unless an identified enemy contact moves into engagement range.

This is a very useful patrol zone but should be limited in use. The AI tends to be fairly liberal with the amount of aircraft assigned to this mission and will send them up in flurries. It is advised that you assign very few aircraft to these patrol zones; assign aircraft to AAW patrol missions and intercept missions in the Mission Editor to ensure that not too many are sent on CAP. The only aircraft that should be assigned to this patrol zone are those that have an AAW role. For best effect, be sure that the Formation Air Patrols option in the Staff Handles menu is off.

### **AEW (Airborne Early Warning)**

This mission is generally associated with the AAW threat axis, although it may be associated with others as well. When orders are issued, aircraft will launch from their host unit and survey the drawn patrol zone.

This function is very useful; however, ensure that only AEW aircraft are assigned to this mission (E-2 Hawkeyes, Sea King AEW, Helix AEW, etc.) to take advantage of their advanced sensors. Keep in mind that the position of these assets usually will give your opponent a good idea where your carrier battlegroup is (since most of them carry AEW aircraft), so great care must be taken in positioning.

### **Dipping Sonar**

This mission should be associated with the ASW Threat axis. Units ordered to this mission will take off and patrol their assigned zones with their dipping sonar. Upon detecting a contact, they will move to localize and attack it.

This is another useful function. This patrol should only be assigned to aircraft with dipping sonar and they should be placed in useful but efficient positions with sonar emissions turned on. 'Useful positions' include anywhere you think an attack submarine would be if it wanted to engage your HVUs, but not close enough to fire torpedoes. 'Efficient positions' are locations where they can be useful but where they would not be expending fuel at a rate that would prevent long on-station times. As a rule of thumb, 30 nautical miles is the maximum you would want to use.

### **Sonobuoy**

This mission should be associated with the ASW Threat axis. Units ordered to this mission will take off and begin patrolling their assigned zones, dropping patterns of sonobuoys. Upon detection of a contact they will move to engage. When sonobuoys or fuel is expended these units will return to base to reload.

Many navies have their units drop sonobuoy barriers, but not many as these are a finite resource to a fleet at sea. However, H3ANW has no logistics settings for sonobuoys so you can drop as many as you like.

Technically, use of this mission is a bit off doctrine. In most cases, navies will use host units with good sensors (e.g. towed arrays, VDS) to detect distant contacts. They will then launch ASW helicopters with sonobuoys to localize, identify, and prosecute submarines. As such, this patrol zone does not match that model. However, assigning a Sub Strike mission to embarked

helicopters in the Mission Editor does exactly that, so you would be better off using a Sub Strike mission rather than selecting a Sonobuoy air patrol zone mission. Use dipping sonar missions to carry out responsibilities within your groups.

If you do decide to use this type of patrol zone, ensure that assigned units are ASW types with sonobuoy load-outs.

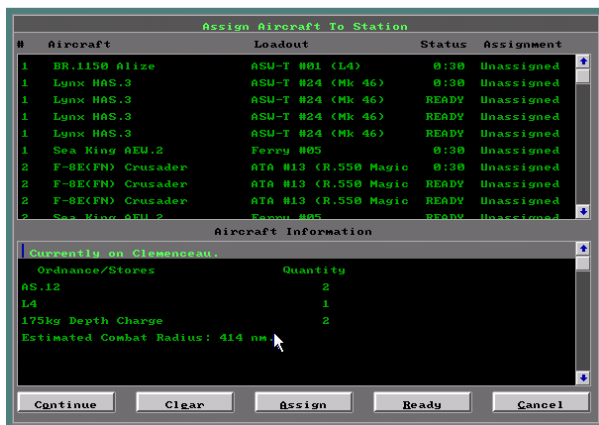
### SUCAP (Surface Combat Air Patrol)

This mission is normally assigned to the ASuW threat axis. Units assigned to this mission will launch and patrol their assigned zones. They will move to engage any identified surface threat detected along the ASuW threat axis.

This function should be assigned to aircraft with weapons capable of engaging enemy surface platforms.

The most valuable use of this mission is with helicopters armed with anti-shipping weapons against shipping platforms.

### Assign Aircraft to Station menu



To assign aircraft to your mission, select them from the Aircraft column. Next, click Assign and a mini menu prompting you for how many of the selected aircraft to assign will be displayed; enter the proper amount and click OK. You will be returned to the Assigned aircraft menu.

Note that the selected aircraft now has "O/T Station" under the Assignment column instead of "Unassigned."

This means that your aircraft has been successfully assigned to the mission. Continue clicking to finalize your assignment of aircraft if necessary. To delete an air patrol zone in the Formation Editor, select the unit and click the Air Ops button. The unit will then return to its base and the mission will be deleted.

### **Threat-Axes-Tracking Formation Editor Toolbar Button**

This is perhaps one of the most advanced features of the Formation Editor as it allows you to set a threat axis to a contact you wish to track. This means as the contact moves, the threat axis (and units assigned to it) will move with it.

To activate the threat axis tracking button, click the axis you would like to assign to a particular contact. Ensure that the threat axis type matches the contact type you want to track. Click your tactical display window and then double-click the contact you would like to track. Your axis is now locked on that target and will stay on it until you reassign or the target moves outside sensor range. If the target is lost, the axis will hold to the last known bearing of the target.

### **Detach Unit Formation Editor Toolbar Button**

This unit detaches a selected unit from a group. Select the unit you wish to detach by clicking it in the formation editor window, and then click the Detach Unit button.

### **CPU Formation Editor Toolbar Button**

This button allows you to set a unit of your formation to computer control. The Computer will then set appropriate zones and threat axes. The Computer will also gain control of all aviation units on that vessel. This is accomplished by selecting the unit and then depressing the CPU Button. To Remove CPU control you simply re-assign the stations and axes.

## **A Practical Example**

Now that you've got a good deal of familiarization with the interface, it is time to see a practical example.

For this example, we shall build a small SSG (Surface Strike Group) consisting of a CG, DD, and an FFG. Given that this group will be tasked in an environment where any type of threat (AAW, ASW, ASuW) is possible, all three ships and embarked helicopters will be given a specific tasking in the Formation Editor. We will assume that this is a coastal patrol with land to the east. Probable threats are air and surface from the east and submarine along the path of intended motion.



To start we have our CG centered and marked as flagship (note the little flag next to ship symbol) and is also selected (note the box around it). The DD is to the north and the FFG is to the northeast. You will notice the light blue lines protruding northward (0 degrees) from each ship; these are the PIM (Path of Intended Motion) lines. When building your formation, always orientate yourself in the direction your PIM lines are pointed. We will now

build our formation by clicking, dragging, and releasing the FFG and DD onto the CG to make sure the CG is in the center of group.

Once we complete this procedure, we now have a formation built. As you can see, the symbology has changed to note this. The information to the right indicates that we have named the formation SSG, that it has a heading of 000 degrees, and that it has a speed of 0 knots. We have not yet issued orders to the formation in the Formation Editor or the Mission Editor, which is why these values are zero.

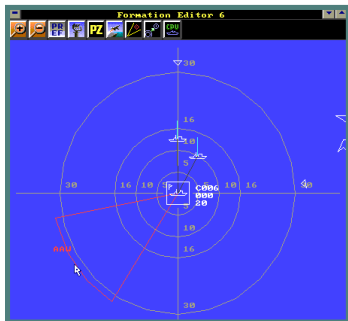


We have clicked on one of the units so all relevant information will be displayed. You will probably first notice the units we dropped in the first screenshot and that their positions have stayed the same. Also notice the circular plot which consists of four rings range marked in nautical miles.

It is now time to delve into the Formation Editor. To activate it, click the Formation Editor Toolbar button.



The AAW threat axis is the currently visible threat axis (you can only view one at a time). To access the others, there are clickable marker triangles for the other axes. To access the ASuW axis,



you would click the white marker triangle on the lower right portion of the screenshot. To access the ASW axis you would click the blue marker triangle at the top of the screenshot.

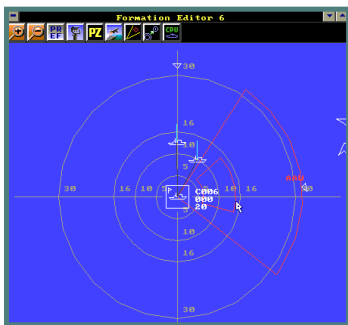
Now it's time to assign our first ship to an axis, so we must make some decisions and begin the process. We know that we will face all three types of threats in this scenario (AAW, ASW, and ASuW). We'll assign our CG to the AAW axis because its sensors and weapons seem most suited for this task. Looking over on the lower left side of the screen, we find the red AAW marker triangle and click it to bring

the AAW axis into view. Knowing that our air threat is mostly likely going to come from the east, we click the cone and drag it to the right side of the scope.



Now that our AAW axis is swiveled over to the appropriate direction, we must decide where we'd like to position the patrol zone. Looking at the circular plot, you can see that the farther the patrol zone is from the center of the plot, the farther the ship must travel if at some point we change the direction of the axis. For now, we'll play it safe and put the patrol zone closer to the center. Once we place this zone, it is locked in position within that axis. It is now time to create our patrol zone. To create our patrol zone, we follow these steps:

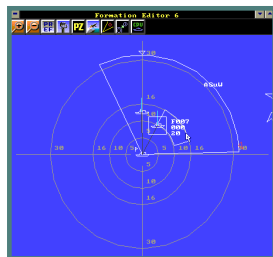
1. Click the ship assigned to the axis (ensuring a box is around it) and ensure the correct axis it will be assigned to is visible.



2. Click the Patrol Zone Formation Editor toolbar button and then click, drag, and release the zone to create. When we release, the Select Station/Patrol Type menu will be displayed with three options (Station Keep, Sprint Drift, and Random). Station Keep is the most appropriate in this case, so we'll select that and click OK. Our patrol zone now appears in the location we have selected; we can double-check this by noting that the color of the patrol zone matches the color of the axis it is assigned to. We have now successfully assigned the CG to the AAW axis. The screenshot above shows what this looks like when successful.

We'll now move on to assigning our other two ships to their appropriate missions.

Using the same procedure as above, we have assigned the FFG to the ASuW axis. We've oriented this axis towards the northeast as that is the direction we assume enemy surface forces will come from. If any are detected, the FFG will now move to engage them.





You will also notice that the red AAW marker triangle is now located on the right of the scope in the same position that we had moved the axis to. This is just a quick visual cue to remind the user where they had left an axis when not in view. We'll now move on the ASW axis.

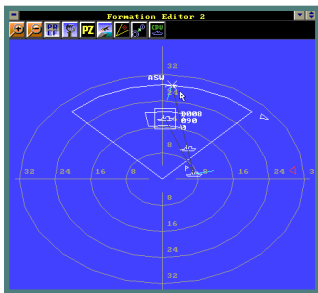
Using the same procedure as above, we have now assigned the DD to a patrol zone on the ASW axis. The group's Path of Intended Motion is north, so that is where the ASW axis is locked. We have set an ASW patrol station about 10-15 nautical miles from the center of the group (and the CG we would like to

protect) so as to hopefully detect, localize, and prosecute any submarine before it moves into torpedo range of the CG.

As mentioned before, setting ships to patrol stations on the ASW axis is the only Formation Editor related necessity to play the game. The axis is fixed on the Path of Intended Motion, so when you assign ships to patrol zones they will always stay in formation. So, if you are playing a game in which you do not wish to use the Formation Editor's features at all, you must at least enter once and set ASW patrol missions for each vessel.

We will now move on to the final lesson of this example – setting up an air patrol station within the Editor.

We'll assign an ASW helicopter from the DD to a Dipping Sonar air mission within a patrol zone in the ASW Axis. To accomplish this we complete the following:



1. Ensure that the appropriate axis is visible.
2. Click the Air Ops toolbar button and click, drag, and release the intended patrol zone.
3. The Select Station/Patrol Type menu is displayed; we select Dipping Sonar and click OK.
4. The Sensor menu is displayed; we'll set the unit to active to allow it to use its surface search radar to assist the group. Once we do this, the group's emissions condition will be reported as active because one radar is active. This is the only radar

the enemy will see. We'll then click OK to confirm this selection.

5. The Assign Aircraft To Station menu is displayed; we'll locate the helicopter which is hosted on the DD. We know this because the bottom portion of this menu gives us that information. Once located, we click Assign, enter 1 when asked how many, and click OK. We'll be returned



to the Assign Aircraft To Station menu, and can confirm the mission is assigned because the helicopter's entry has been marked with "O/T Station" under the Assignment column. We'll click Continue and the helicopter's assignment will begin.

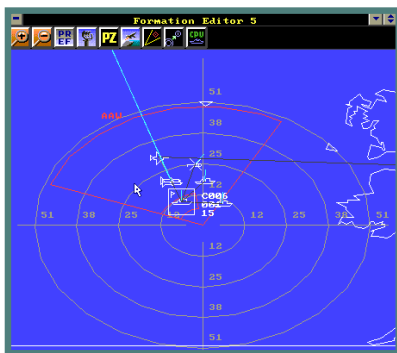


Aircraft that start on ships will not be visible until you run the simulation. Once this occurs, the aircraft should take off and immediately begin their patrol, provided they are ready. To be sure that the aircraft patrol zone has been assigned, simply select the aircraft from within the Formation Editor. When you do, you should see the patrol zone you have drawn and assigned it to; it should be the same color as the axis you have assigned it to.



We have now completed the Formation Editor assignments for this group. Let's see how we did by looking at two of the axes.

This is a screenshot of the final ASW axis. It is fixed to the Path of Intended Motion, so we cannot change it unless we change course of the group. Visually, we verify that the DD and helicopter we've assigned to it are within their patrol zones. The helicopter is selected so you can see that it has a drawn patrol zone and the color matches that of the axis it is assigned to, so it is correct. It appears thus far that we have successfully assigned our units in the Formation Editor. There is, however, one more check.



In this first screenshot of the AAW axis, we see that our CG is now within its defined patrol zone within the AAW axis. It appears we have successfully assigned it to a patrol zone within the AAW axis. However, it may be a good idea to double-check our work as well as give you a good visual example of the value of the Formation Editor. Let's say the ESM on our cruiser detects a distant air radar contact to the northwest of our group. We'll quickly click the red triangle of the AAW axis, drag, and drop it in that direction.

As you can see, we have shifted the AAW axis and the ship has followed, taking up its assigned patrol zone within the new axis. It is now successfully engaging the detected aircraft, fulfilling its AAW role.

This is the value of the Formation Editor: by assigning platforms to patrol zones within defined threat axis at the beginning of a session, you are able to quickly access, change, and reorient to meet a threat with only a quick click and drag. You are now able to concentrate on more pressing issues, knowing that your groups are well managed by the AI per your orders.

### Applying Changes

Close the Formation Editor window (do not just iconize it), and then plot a course out of the channel and northeasterly to the Good Guy's Port. Pull up a tracking window centered on the group to observe how the assigned units respond to their new patrol orders. The base to the south will be sending hostile aircraft to test your new formation. From here on out you are on your own. Good luck!

Because managing formations effectively may be the most challenging aspect of play in H3ANW, it is recommended that you refer to the Formation Editor section for further details.

### 5.13. TUTORIALS SUMMARY

Congratulations! Now that you have finished all of the Lesson scenarios, you should be ready to start the scenarios contained in Global Conflicts I. The Tutorial Lessons are always available for review in case you want to brush up on a particular aspect of the game.

## 6.0 MISSIONS

***A good Navy is not a provocation to war. It is the surest guaranty of peace.***  
**-Theodore Roosevelt**

Although missions are already covered somewhat in the tutorials, additional information and a more in depth look is necessary given their critical importance.

### 6.1. MISSION TYPES

- Anti-Air Warfare patrol (AAW)
- Air Intercept
- Area

### 6.2. CREATING A MISSION

A mission is a pre-programmed operation where a specified platform (aircraft, ship, or sub) can perform a variety of tasks. Generally this involves a task specified by the player or AI. A typical mission will involve the destruction of a series of specified targets, a patrol, or a recon mission.

In the more advanced scenarios this can be a very involved procedure, especially with aircraft logistics set to On. The Mission Editor is probably the single most powerful user tool in H3ANW with the Formation Editor, discussed in the previous section, a close second.

### 6.2.1. Mission Planning

***“In war every problem, and every principle, is a duality. Like a coin, it has two faces. This is the inevitable consequence of the fact that war is a two party affair, so imposing the need that while hitting, one must guard.”***

**-B.H. Liddell Hart**

War is not a set piece affair, in which contestants walk politely within striking distance of one another and then exchange blows according to a set of pre-ordained rules. War is a dynamic process without hard and fast rules to guide the combatants. Analysts tend to use maxims or principles in the discussion of warfare, but their usefulness lies not in being constants, as Mr. Liddell Hart so aptly pointed out, but rather in being malleable sources of inspiration that an enlightened commander can apply at a decisive point in the engagement.

All tactical thought, from Sun Tzu to the modern day, contains contradictory elements if viewed exclusively from an academic standpoint. To practitioners of the art of war, however, the dichotomy is easily held, because they understand that each part of the contradiction is equally true at different points in time. As such, it is more important to understand battlefield dynamics than to memorize lists of tactical axioms. Without knowledge of the former, it is impossible to know when the application of any of the latter is relevant.

### 6.2.2. Fire and Movement

Although many of the comparisons between ground and naval warfare tend to oversimplify the peculiarities of each to reach a common ground, the basic tactical precepts of fire and movement are equally important in each arena. The objective of the tactical commander is the delivery of firepower in support of the mission. Maneuver is the method that allows the commander to attain position to deliver that firepower.

Mobility is also significant to naval forces as an enhancement to survivability. Forces may strike decisively on a given day, avoid counter-detection, and mass for another strike hundreds of miles away the next day.

### 6.2.3. Intelligence Gathering

The ability to mass decisive firepower and move it quickly through the theater of operations is irrelevant if one cannot find a target to employ it on. Excluding land-based assets, which are all considered pre-targeted anyway, enemy forces enjoy the same degree of safety through mobility as your own forces do. As such, he who finds the enemy first while avoiding detection generally wins. Thus, from the initial stages of planning to post-mission egress, the primary focus of the commander must be on scouting.

Once located, the threat posed by an enemy force is diminished severely and not just because they have lost the element of surprise. If sufficient force exists, the commander may mass it against the threat to eliminate it. If you have limited resources against a superior threat, then

avoidance of the threat becomes the best option. If you know the enemy's whereabouts, and they remain uncertain of yours, then avoidance is not difficult to achieve.

In that latter example is a fundamental truth that must be internalized. Scouting and intelligence gathering are not one-sided propositions. As the commander attempts to gather targeting data on the enemy, it is also necessary to make every effort to deny him the same luxury. The approaches one considers in this struggle depend on the geography of the area of operations, his assessment of enemy capabilities, and the specifics of the mission.

### 6.2.4. A Lesson in Geography

The Naval Officer assesses the impact of geography on the area of operations a little differently than his counterparts in the other services. Conventional topography is important in two instances: first, when one will send airstrikes ashore and seeks to use this topography to advantage in planning ingress and egress routes of the strike elements, and second, when one is forced to operate close to the shore and the topography delays detection of outbound enemy airstrikes. Bottom topography is critical if the enemy possesses either a mine or subsurface threat or if your own force will employ these assets. Finally, other continental features are important whenever they compress the battle space afforded the commander.

Battle space is a theoretical bubble around a force in which the commander feels comfortable in detecting, tracking, and engaging threats before they can pose a significant danger to the main body. Whenever units are forced to operate in confined waters (e.g. the Tsugaro Straights off Japan or the Persian Gulf), the battle space has been compressed. Because the units are limited in the option of maneuver, the enemy can establish effective barrier patrols or minefields more easily. Also, the commander is constrained by physical borders, such as reefs or shallows, or legal borders like the 12 mile limit, in the positioning of pickets and screening units, which further reduces the reaction time allotted any threat which does materialize.

### 6.2.5. Know the Enemy

The significance afforded geographic features also varies based on the enemy's capability to capitalize on any of these areas. If, for example, one faced an adversary without a known subsurface or mine threat, then the only precautions necessary to sanitize a chokepoint prior to passage might be a surface or air sweep to identify and eliminate surface threats. Conversely, the possible presence of even an antiquated diesel boat in narrow, shallow waters is too deadly a contingency to be ignored. As such, the prudent commander must study the enemy Order of Battle and understand their capabilities. As one can never know enemy intentions with any acceptable degree of certainty, contingency planning must always remain focused on capabilities, no matter how remote their realization may seem.

This does not mean that the commander never enters the straits on the premise that a diesel boat might be lurking, as such timidity is tantamount to failure, but rather means that all prudent precautions are taken before risking the critical asset.

### 6.2.6. Laying the Course

Having invested considerable thought into the geographic anomalies of the area and the capabilities of the enemy Order of Battle (OOB), it is now time to plan intended movement. Keeping in mind that maneuver is the achievement of scouting and firing position over time, one must consider any time constraints imposed by the original mission on the ultimate objectives. Do the critical HVUs of the force have sufficient time to make a leisurely, cautious approach to the objective, or is it necessary to serve political expediency and rush to the fore? The answer to that question determines the degree of planning flexibility afforded the commander in determining the eventual timeline of engagement. Further, the timeline has a direct impact on tactics.

The geographic and navigational models of H3ANW allow unprecedented realism in performing these stages of mission planning. Players who are willing to invest the planning time to consider the specific geography of the area of operations will be rewarded with commensurate improvements in their tactical success rate. Consider the satisfaction of the commander who correctly anticipates the presence of enemy forces and develops a contingency plan to eliminate that threat compared to one who destroys them only after their weapons are expended. In the latter case, even if the enemy units inflict minimal damage, they have achieved a degree of mission success by attracting the commander's defensive weapons magazines, which could prove crucial in subsequent engagements.

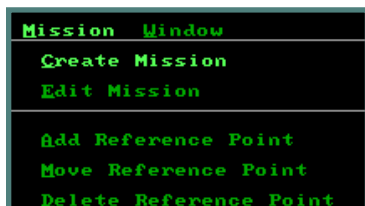
### 6.2.7. Summary

Once mission objectives are known, and the commander has identified the HVUs necessary to achieve those objectives, the next step is to plot the Path of Intended Motion (PIM) to achieve position and deliver the force necessary to complete the mission. In determining the PIM, it is critical that commanders consider the specific geography of the operational area and evaluate the enemy's ability to use that geography to their advantage.

## 6.3. UNDERSTANDING THE MISSION EDITOR

### 6.3.1. What is the Mission Editor?

The Mission Editor was an interface the developers provided in the scenario editor to get the AI to assign platforms to a range of behaviors. It is the principle tool the scenario editor/player uses to get their job done. It is composed of two parts: the Create Mission Menu, which allows you to create the basic characteristics of your chosen mission, and the Edit Mission Menu, which allows you to add units to the unit and make changes.



### 6.3.2. Where is the Mission Editor?

The Mission Editor is found under the Mission menu item. Within this menu are all the tools you need to create and edit your missions.

The Create Mission selection opens the Create Mission menu; the Edit Mission selection opens the Edit Mission menu; and the Add/

Move/Delete Reference Point selections allow you to manipulate the reference points you'll need to successfully create and edit missions.

### 6.3.3. Player Usage of the Mission Editor

This is kind of a potato/potatoe issue, in that some players will use it and some will not. Remember that the AI is constricted to do what the code tells it to do, so you may not get "what you would do" out of it. It can be used to handle some of the menial or routine tasks such as AEW patrols or ASW work while the player handles everything else, freeing you up for more important matters.

### 6.3.4. Scenario Writer Usage of the Mission Editor

This is a must for any scenario writer to get the AI to do anything besides sit there.

Learning the usage of it opens up a new world for the scenario author, giving him tools to create a challenging and/or realistic environment for the player. It is the only way to get the AI to fight well and create a fun game for players to enjoy. Learning the Mission Editor is perhaps the most important thing a scenario writer can do. *See the Advanced Manual for details.*

## 6.4. BASIC OPERATION OF THE MISSION EDITOR

### 6.4.1. Create Mission Menu

The Create Mission Menu is the starting point for creating any mission you wish to generate within the game (with the exception of the Plotted Mission). You can access it by selecting the Mission pull-down menu. It is composed of several fill-in fields, check boxes, and radio buttons which must be completed to successfully create a mission. Only in this manner will your choices be entered into the Edit Mission dialog window.

### Fill in Fields of Mission Menu

**Create Mission**

Operation: GOLD SEA

Transit Mission: Delay Time: D 0 H 0 M 0

☐ Transit

☐ Ferry

Strike Mission: Emissions: Pas Int Act

☐ Air Intercept RAD ☐ ☐ ☐

☐ Ground Strike SON ☐ ☐ ☐

☐ Ship Strike ECM ☐ ☐ ☐

☐ Sub Strike

Settings:

☐ Edit now

Area Mission: ☒ 1/3 Rule

☐ Patrol AAU ☒ Weapons Free

☐ Patrol ASU ☐ Focused Strike

Pursuit Radius: 0

Ok Cancel

First we will explore the “fill in” fields: Operation, Delay Time, and Variation:

The Operation field is fairly intuitive, as you just need to fill in the name of the mission. A random name will automatically populate this field.

The Delay Time and Variation fields are key tools designed for dealing with timing. Filling in these fields (Day, Hour, and Second) gives you total control of when things happen. The Delay Time fields are intuitive as you set the time when your mission shall occur. Variation is a neat little feature allowing you to change your timing a little bit as missions are undertaken. Most players recognize that the AI is a creature of habit and by changing your 10 p.m. strike to 10:10 p.m. the next day may challenge the player's expectations a bit. Remember how that F-117 was said to have been shot down over Serbia? All it took was a nice watch and knowing when the aircraft were spotted the previous day.

### **Radio Buttons and Check Boxes of Mission Menu**

Next we'll look at the radio buttons and check boxes provided in the interface. They are the mission selector radio buttons, the emissions control radio buttons; the 1/3 check box, and the Edit Now check box.

The Mission selector buttons allow you to choose the specific type of mission you would like to create. Your choices are as follows:

- Transit Missions (Transit or Ferry)
- Strike Missions (Air Intercept, Ground Strike, Ship Strike, Sub Strike)
- Area Missions (Patrol AAW, Patrol ASuW, Patrol ASW, Support, Recon Ground, and Recon Ship)

You must select one of these to successfully create a mission by clicking the appropriate radio button next to each specific mission choice. All of these mission types will be explained in detail in the Understanding the Missions that Can Be Assigned section of this manual.

The emissions control buttons allow you to choose the emission status (Passive, Intermittent, and Active) of each sensor type (Radar (RAD), Sonar (SON), and ECM).

Select the radio button next to the setting you would like your sensor type to be at when the scenario begins. By default, all sensors are set to Passive initially and should be changed if you wish a sensor to be Active or Intermittent.

The 1/3 Rule check box activates a rule that allows you to assign groups of aircraft to a mission in multiples of three, with one in each grouping of three launching at a time. For example, if you apply this rule to a grouping of three aircraft, one will launch at a time and another of that grouping will launch when the first aircraft that launched returns to base. Likewise, if you apply the rule to a grouping of six aircraft, two aircraft will launch initially and likewise be replaced by two more when the original two return to base. This is incredibly useful when creating

continuous air patrols as aircraft with expended ordnance or fuel will be replaced with the same number as long as replacements exist.

One caveat with the 1/3 Rule is you do not have to assign numbers divisible by three to have continuous air missions. As long as you add a number within each multiple of three you will get the same effect.

So, applying the 1/3 rule to a mission with two aircraft assigned will yield one aircraft assigned to actively fly the mission at a time. A mission with four aircraft assigned will yield two aircraft assigned and a mission with eight aircraft assigned will yield three aircraft assigned.

If you do not wish to apply the 1/3 Rule to a mission, leave the box unchecked. This will cause all aircraft assigned to any mission you created to be launched at the same time. This is the default setting for all missions.

The Weapons Free check box, if selected, releases all weapons. Allows units to fire immediately on enemy targets.

The Edit Now check box, when selected, allows you to continue editing the mission in the Edit Mission menu after you click OK in the Create Mission Menu. Leaving this box unchecked will exit you out of the Mission Editor completely but will save the mission you've created thus far; it can be accessed again by clicking Mission and Edit Mission.

When you feel you have successfully created a mission, click OK to continue. If you selected the Edit Now option, the next menu in the Edit Mission Menu. If you do not wish to save this mission, click Cancel to cancel the mission you have created.

### 6.4.2. Edit Mission Menu

The Edit Mission Menu is slightly intimidating at first glance. However, once you get the idea of how it works, it becomes very simple. You have three large lists to work with. From left to right they are Missions, Assigned Units, and Unassigned Units. There is also a large collection of buttons at the bottom as well as several radio buttons. *Please see page 102 for a screenshot of this menu.*

Select your mission name by clicking it in the Missions list. Look at the Unassigned Units list for a listing of units to choose from for that mission. When you find the unit you would like to assign, double-click it and it will be moved to the Assigned Units field. This is the method to assigning ships, submarines, or other units to a mission; more than one may be assigned.

If you want to assign an aircraft to the mission, click Add AC. This will bring up an inventory of your aircraft; select the aircraft you would like to assign, the number you would like to assign, and click OK. When you return to the Edit Mission menu, the aircraft you assigned will be displayed in the Assigned

Units list in the assigned unit field and you are done.



The mission's sensor settings are there to allow you to change your EMCON status of the mission if you want to do so. Selecting the Intermittent setting (Int) on any sensor will bring up the Mission Sensor Intermittence window; this is where you set up your timings and variances for your sensor settings.

The Weapons Free check box, if selected, releases all weapons.

### **Mission Sensor Intermittence**

Sensors set to Intermittent will go passive and active at set time intervals. This is determined in the Mission Sensor Intermittence menu, displayed when any of the mission's sensor settings are set to Int.

The rest of the buttons and radio buttons are fairly straightforward. They give you the opportunity to go back and change anything you set in the prior mission or delete the mission altogether. When you are ready to continue, click OK and your mission will be created. You can always return to this menu later. Just remember to click the actual mission you would like to change before enacting your changes as you may inadvertently make changes to the first mission on the list.

#### **6.4.3. Chained Missions**

Chained or linked missions allow the user to set up a series of connected missions for platforms to complete. When a mission is completed the platform assigned, will commence the next mission in the sequence or chain.

To create a chained mission and link it to the next in the sequence:

1. Select or create the first mission in the Edit Missions dialog.
2. Select an existing mission in the Secondary Mission field.

It is vital to understand that, a mission must be capable of completion for chained missions to function correctly. Here are some examples of situations where the game engine may consider a mission to have reached completion, or not:

- Strike Missions - When the specified target(s) has been destroyed (for focused strikes) or there are no further available targets for the mission to act against.
- Patrol, Recon, Support, and Transit Missions – These mission types will never complete unless a “sequential” Mission type is selected as the Base Parameter. A “looped” Base Parameter should never be selected.

#### **6.5. UNDERSTANDING THE MISSIONS THAT CAN BE ASSIGNED**

H3ANW offers many specific missions (13 total). They are: Plotted, Transit, Ferry, Air Intercept, Ground Strike, Ship Strike, Sub Strike, Patrol AAW, Patrol ASuW, Patrol ASW, Support, Recon Ground, and Recon Ship.

Keep in mind that any unit which can hold at least one aircraft is subject to a certain nuance within the editor. When the host platform, such as a ship or airbase, is assigned to a mission the aircraft that it holds are assigned to it as well. This is not beneficial in most cases. The

reason for this is that the mission assigned to the aircraft may not be its logical or efficient usage of their 'talents.' In fact, you will see that if the parent is assigned to a mission that requires it to reach a Reference Point, the aircraft which has been assigned as well will launch and attempt to reach this Reference Point. There is some value to this if you want the aircraft to scout ahead, but in most cases another mission will put better use to said aircraft.

You can avoid this by unassigning the aircraft from the mission (using the U key) and then assigning it to a mission of its own. You may also use the Formation Editor to give this aircraft another mission with it.

Also understand that, at the start of the game, any unit that carries any sort of weapon(s) will strike the first identified enemy unit if it is not assigned a mission. Tomahawk carriers in particular are guilty of this and may salvo them off at the first land unit detected. This may be a problem if you don't want to waste the ordnance on the target it finds. Assigning them a mission will prevent this behavior from taking place as will starting the scenario with your Weapons Tight setting activated.

### 6.5.1. Plotted Mission

This is perhaps the most common mission you can create. It is not done within the Mission Editor, but instead with the toolbar on your display window (particularly the Navigation button.) To create this mission, select the unit to assign, assign its speed with the Speed/Altitude tool, assign its course using the Navigation tool, and assign the EMCON using the Sensor tool. Once again, plotted missions are considered missions per se but they are not created within the Mission Editor.

The platform you select will then follow the course you have assigned. You will notice that as you click on your map a line will be dropped and a small triangle will appear where you clicked. These work like waypoints; as you drop them, you may also change the speed and EMCON of your plotted unit which will change as you reach these Points.

### Aircraft Assigned to the Plotted Mission

Aircraft can only be assigned this mission if they are airborne (if you dropped them into your game using the Add Unit selection from the Scenario Editor). These units cannot be assigned this mission independently if they are parked on a ship or at a land facility.

Aircraft assigned to the Plotted mission will follow the course and speed you give them, provided that fuel constrictions allow. They will engage any hostile platforms in their path, but will not deviate to engage.

Also keep in mind that their sensor arcs are pointing on the course they are traveling. When aircraft reach the end of its Plotted mission, it will hold at Loiter speed at its last assigned altitude. Assigning aircraft to this mission is not recommended if you wish to have a repeatable mission (e.g. patrol).

### **Ships Assigned to the Plotted Mission**

Ships assigned to the Plotted mission will follow the course and speed you assign them, provided that environmental conditions allow (navigation paths are clear of land, the weather is agreeable, and there is sufficient fuel to make the trip).

Ships will engage any hostile unit along their path with any weapon they have available; however, they will not go out of their way to engage. For example, if you have Harpoon missiles with a range of 75 miles, the ship is not going to maneuver to engage a target 80 miles away. Also keep in mind that if a ship must activate its radar, the radar will remain active for the duration of the scenario. When a ship reaches the end of its Plotted mission, it will set its speed to 0 knots and will be facing in its last ordered direction.

### **Subs Assigned to the Plotted Mission**

Subs assigned to the Plotted mission will follow the course, speed, and depth you assign them provided that environmental conditions allow (navigation paths are clear of land, the weather is agreeable if traveling on the surface, and there is sufficient fuel to make the trip).

Subs will engage any hostile along their path with any weapon in their tubes; however, they will not go out of their way to engage. For example, if you have a target at 25 miles and your torpedo range is 22 miles, they will not go out of their way those three extra miles to attack. They will not load a tube with a Harpoon missile to reach the target, either.

You must also keep in mind that the sub will change its depth if the sea gets shallower. It will retain this depth through the rest of the transit even if the sea gets deeper again. When a submarine reaches the end of its Plotted mission, it will set its speed to 0 knots and will be facing in its last ordered direction.

### **Land Facilities Assigned to the Plotted Mission**

Land Facilities use this mission when they are assigned an EMCON. Anytime you assign a sensor state using the toolbar, the facility will be marked as being in a Plotted mission. It will engage targets if they come into range. If you select the Intermittent setting for any radar/sonar, there is an extra step involved; this was described above in the Basic Operation of the Mission Editor.

It should, however, be noted that land facilities currently do not move in game!

### **Strategy: Plotted Mission**

The Plotted mission offers no attack/defense AI enhancements, but is a good general navigation order. It allows you to assign any course, speed, or altitude to a unit. You can therefore create circular paths, zigzags, transit doglegged waters, or any other path that the environment allows. Think of this mission as a Navigation-type only, with no attack or defense emphasis.

You can use this mission with aircraft to design your own strike groups. For example, if you attempt to create a regimental-sized Backfire raid using another mission, your aircraft are often bunched up or on parade. You can use the Plotted mission to make each aircraft independent, timing their moves with others. Keep in mind, however, that this takes very careful planning.

The Plotted mission is also the only way to implement two missions per scenario for one unit or group. The basic idea is that missions other than Plotted that can be assigned within the Editor can be delayed by a time specified by the user. This allows the Editor to then add a Plotted mission that will occur until the delay time for the original mission comes to pass; this can involve for some fairly complex assignments.

### 6.5.2. Transit Mission

The purpose of a Transit mission is to move a unit from one point to another. This is accomplished by placing a Reference Point (preferably at your intended destination), selecting the Reference Point (which will make it into a triangle), opening up the Mission Editor, and then creating the mission. Ensure the unit you want to Transit is selected and click OK. Your unit is now assigned to a Transit mission.

#### **Ships Assigned to the Transit Mission**

Moving ships is the primary reason this mission was designed. Ships will always default to a Cruise speed. Keep the number of Reference Points low (preferably to a single one), otherwise, if you need a more complex path, use the Plotted mission instead.

#### **Subs Assigned to the Transit Mission**

Moving subs is another reason this mission was designed. It again is a way to move a submarine from a start point to a destination point. Submarines will always default to a Creep speed and go to the deepest possible depth. Again, use one Reference Point instead of multiple Reference Points; otherwise, if you need a more complex path, use the Plotted mission instead.

#### **Aircraft Assigned to the Transit Mission**

Aircraft cannot perform this mission. If an aircraft is airborne and assigned to this mission, it will simply return to base. If an aircraft is grounded and assigned to this mission, it will not launch.

#### **Land Facilities Assigned to the Transit Mission**

Land Facilities cannot perform this mission.

### **Strategy: Transit Mission**

To create variability in this mission, always set a delay of one minute. This way the actual path will be subject to change every time the scenario is started. When using this mission, always create and assign one Reference Point; it is possible to assign more but it is more efficient with fewer.

Keep in mind that once your unit or group reaches the Reference Point, it will not stop. It will continue trying to reach the Reference Point but will start a series of turns all around the compass constantly trying to reach it. It will not move more than a mile from it and will appear to be twisting and turning. It is, in effect, circling (“loitering”) the reference point.

This is actually beneficial as it lets you anchor units to it. Hence, if you have a ship in port or a unit which must remain still, it is an excellent anchor to do this with while not keeping it as an inviting, stationary target.

#### **6.5.3. Ferry Mission**

The Ferry mission is specifically designed for the movement of aircraft from one air capable unit to another. To do so, selecting the destination unit (an airbase, aircraft carrier, or frigate), create a Ferry mission within the Mission Editor, and select the aircraft to send.

### **Aircraft Assigned to the Ferry Mission**

Moving aircraft from one aircraft capable unit to another is the reason this mission was designed. The aircraft will always travel at Cruise speed and at High altitude. Ships, Submarines, and Land Facilities cannot be assigned to the Ferry Mission.

### **Strategy: Ferry Mission**

This is an excellent mission type for neutral units, including airliners and airlift assets. You can assign replacements to be flown out to a carrier using this mission but they must be assigned to the carrier in its Formation Editor before the AI will make use of them.

Aircraft sent on a Ferry Mission will, if necessary, use all of their fuel to reach their destination, but it may reach a point of no return. For example, take a Qantas 747SP flying LAX to Melbourne non-stop. At some point the aircraft passes the point of no return because it will require too much fuel to return to its origin point and instead must continue on to its destination.

The destination facility or installation must have hangar space available for the mission aircraft. If hangar space is not available then the aircraft may park on the runway and be more vulnerable. If there is nowhere to park the aircraft then the mission craft will not launch.

#### 6.5.4. Air Intercept Mission

The purpose of an Air Intercept mission is to intercept enemy aircraft. To do so, select the Intercept mission in the Mission Editor, click OK, and select the unit that you would like to accomplish this mission.

The only nuance with this mission is that the target must be detected and identified it as hostile first. An undetected or unidentified aircraft will not trigger this mission.

#### Aircraft Assigned to the Air Intercept Mission

Aircraft assigned to this mission will fly at High altitude at their fastest speed, and with the EMCON as you set by you until they reach weapons range. If no target is present, the aircraft will conduct a search. This makes AI aircraft very aggressive. Multiple aircraft may be assigned to the same Air Intercept mission.

#### Ships Assigned to the Air Intercept Mission

**Edit Missions**

Missions	Assigned Units	Unassigned Units
Plotted		F001 Lewis B. Puller

Units plotted manually.

**Behavior Settings**

☒ Weapons Free

☐ Focused Strike

Pursuit Radius: 0

Delay Start Time: Days: 0, Hours: 0, Minutes: 0

Base Parameters: MissionDefault\_Plotted

Secondary Mission:

Selected Reference Points

Add Remove

Change Mission Name

Ok Add AC Remove AC Delete Cancel

**Mission Sensor Settings**

☒ Radar Off    ☐ Radar Int    ☐ Radar On  
☒ Sonar Off    ☐ Sonar Int    ☐ Sonar On  
☒ ECM Off    ☐ ECM Int    ☐ ECM On

Assigning a ship to an Air Intercept mission has no effect. The ship will stay assigned to it, will engage enemy aircraft or ships in its engagement envelope, but will not move to intercept any enemy aircraft. The ship's course and speed will remain constant, which is the default course and speed set when the unit is placed. The ship also keeps the EMCON state assigned to it in the Mission Editor until an enemy aircraft enters its SAM range, when it will go active to engage.

### **Subs Assigned to the Air Intercept Mission**

Assigning a submarine to an Air Intercept mission has no effect. In fact, assigning one to this mission is detrimental as the submarine will remain at periscope depth. Subs with SAM capability will engage enemy aircraft, but only if the air craft are within the maximum engagement altitude. Submarines will not maneuver to intercept.

### **Land Facilities Assigned to Intercept Missions**

Assigning a facility (such AAA or a SAM unit) has no effect. The facility will stay assigned to it and will engage enemy aircraft that enter its engagement envelope, but no further benefit is granted.

### **Strategy: Air Intercept Mission**

This mission is perhaps the best way to produce a very aggressive AI air force, particularly with an enemy AI that has a lot of detection assets available to it. Provided an enemy is detected and identified, the air units assigned to this mission will attack relentlessly. Their sensor arcs will always point in the proper direction. As mentioned above, it is not without limitation, as enemy aircraft must be identified as a hostile before any intercept is triggered.

#### **6.5.5. Ground Strike Mission**

The purpose of the Ground Strike mission is to destroy Land Facilities. There are two types of Ground Strike missions that can be performed: against a known target or against an unknown target.

The first, against a known target, is simple. Since this target is visible, select it, create the mission, select Ground Strike, and then assign the units you would like to strike it with.

The second, against an unknown target, is executed just as easily. All you need to do is create a mission, select Ground Strike, and assign units. The strikes will launch as new Land Facilities are detected and will not end until there are no more ground targets, weapons are all expended, or the scenario has ended.

### **Aircraft Assigned to the Ground Strike Mission**

In H3ANW, you have the ability to create your own strike packages. As you assign attack aircraft and/or bombers to a Ground Strike mission, you also have the ability to assign supporting assets with it, including covering fighters, jammer aircraft, and suppression of enemy air defenses (SEAD). However, as these missions are launched, each type will be broken up by aircraft type

and weapon type. For example, fighters will be one group, attack aircraft in another group, and so on. Supporting aircraft will, however, support the Ground Strike forces assigned.

The only limitation is aircraft speed; fighters may arrive much more quickly than lumbering bombers to a target area. Careful planning and mission mixing can help alleviate this. These missions will continue until the assigned target is destroyed or the scenario ends.

### **Ships Assigned to Ground Strike Missions**

Ships can be assigned to Ground Strike missions as well. As above, you can strike either known or unknown targets. These missions are assigned as described above.

However, keep in mind that if a ship assigned to a Ground Strike mission has a long ranged weapon, such as a Tomahawk missile, they may fire it at the first enemy ground facility it detects regardless of the assigned mission. They will then attempt to engage the assigned target with whatever weapons it has left to it. So, your ships may expend valuable weapons at targets you do not consider high-priority; to avoid this ensure you assign a specific target or ensure the target you want to attack is the first one the ship detects.

### **Subs Assigned to a Ground Strike Mission**

Subs can be assigned to Ground Strike missions as well. Again, the same method is used to assign them to this mission as described above and they can engage both known and unknown targets. Submarines will, however, need to go to Periscope depth to engage an enemy ground target, which makes them vulnerable.

Just like with ships, a submarine may strike the first ground target that they detect if they have weapons available to do so. And, as with ships, ensure either that the submarine has an assigned target or the target you want it to attack is the first one it detects.

### **Land Facilities Assigned to a Ground Strike Mission**

Land Facilities can be assigned to a Ground Strike mission as long as they have a weapon that has the range to reach the enemy target. If they do not have a weapon with sufficient range, the friendly Land Facility will do nothing. These missions are assigned in the same manner mentioned above.

### **Strategy: Ground Strike Missions**

When planning a Ground Strike mission against an enemy Land Facility, it may be wise to assign a specific target within that Facility; if you do not, the AI will choose for you, and may strike something you don't hold in the highest of priorities. In fact, given that runways of an enemy airbase are nearly indestructible, it may not be a wise idea to waste munitions on them.

Ungroup the enemy base and specifically target hangars, revetments, ammunition dumps, and fuel dumps as your first priorities. This will guarantee an airbase's destruction without wasting munitions and aircraft on targets that won't affect the base's operations as much. Ground Strike



missions are generally straightforward, but planning for them pays in big ways. Simple Time on Target calculations are available on various web pages to assist in this. Also, keep in mind that you do not always have to assign support aircraft and/or units to the same mission; you can create separate missions within the Mission Editor to accomplish your tasks. Creativity is key to success.

If you have a strike passage that has aircraft of different types and different numbers, you have another challenge to deal with. A small number of aircraft will launch faster than a large group of them. So, if you have a strike package that includes one Prowler and four Intruders with the same bomb load, the Prowler will launch much faster than the Intruders. Remember that due to the nature of the Ground Strike mission, the Prowler will launch independently and the Intruders will launch as a four plane group. This means that the Prowler may be well on its way before the Intruders can begin their journey. This would obviously leave the Prowler exposed. To overcome this problem, separate your Ground Strike missions with similar number compositions and make careful calculations of the times required for each aircraft to reach the target. Keep in mind that these missions do not allow you to create waypoints, so your attacks will always be on a direct line from their home base.

If a situation arises where many enemy units are detected at once and you have a Ground Strike mission assigned to an unknown target, the AI will tend to strike enemy units in the order that they were detected.

Always keep in mind that Ground Strikes against known targets will continue until the target is destroyed.

## **Land Damage Model**

Targets on land are separated into two fundamental types: Facilities and Runways. Each type handles damage differently:

**Facilities** - Facilities do not take cumulative damage like ships. If a land object (other than runways) takes 50% or more of its damage rating in a 180 second period, it is at risk of destruction. The chance of destruction is proportional to the percentage of its damage taken up to 100% chance of destruction at 100% damage.

Damage reporting for land objects is done via a status system where an object can be reported as "Operational" or "Hit". "Hit" indicates the object has taken damage within the past 180 seconds and will be checked for destruction in the near future. "Operational" means it's OK. Destroyed land objects go away immediately; there is no special status indicator.

**Runways** - Runways only take critical damage that reduces their operational size. However, they are destroyed if in the surface destruction radius of surface or air burst nuclear warheads. EMP, FAE, Frag, and Guns less than 80mm will not damage the runway, but will damage parked aircraft (over-capacity bases put their extra planes on the runway/flight line for damage purposes...). Other damage may inflict cuts on the runway, reducing its effective size (usable length for takeoff and landing) for supporting operations. Runway critical hits (for purposes of

cuts and destroying parked aircraft) are 1 per 50 Damage Points 50DP of warhead (after armor effects, if any) rounded up. Note that FAE, Cluster Weapons and Nukes will do much more damage to parked aircraft.

### 6.5.6. Ship Strike Mission

The purpose of the Ship Strike mission is to destroy enemy ships. There are two types of this mission that can be performed: against a known target or against an unknown target.

The first, against a known target, is simple. Since this target is visible, select it, create the mission, select Ship Strike, and then assign the units you would like to strike it with.

The second, against an unknown target, is executed just as easily. All you need to do is create a mission, select Ship Strike, and assign units. The strikes will launch as new surface platforms are detected and will not end until there are no more surface targets, weapons are all expended, or the game has ended.

### Aircraft Assigned to the Ship Strike Mission

In H3ANW, you have the ability to create your own strike packages. As you assign attack aircraft and/or bombers to a Ship Strike mission, you also have the ability to assign supporting assets with it, including covering fighters, jammer aircraft, and suppression of enemy air defenses (SEAD). However, as these missions are launched, each type will be broken up by aircraft type and weapon type. For example, fighters will be one group, attack aircraft in another group, and so on. Supporting aircraft will, however, support the Ship Strike forces assigned.

### Ships Assigned to Ship Strike Missions

Ships can be assigned to Ship Strike missions as well. As above, you can strike either known or unknown targets. These missions are assigned as described above.

Ships will travel at Full speed to reach their weapon's launch range. As with other Strike missions, they will attack the first target identified as hostile.

### Subs Assigned to Ship Strike Missions

Subs can perform this mission and can engage known and unknown targets. They will run at periscope depth and run at a speed of Full at their assigned EMCON to attack targets. This is very dangerous, as subs are detectable at such a high speed and at periscope depth. Be aware of the submarine's surroundings before assigning this mission to it.

### Land Facilities Assigned to Ship Strike Missions

This mission works well with Land Facilities as long as they have weapons that can engage ships. Land Facilities can perform this mission against both known and unknown targets.

### Strategy: Ship Strike Missions

This mission is perfect for small surface ships, aircraft, and Land Facilities.

### 6.5.7. Sub Strike Mission

The purpose of the Sub Strike mission is to destroy enemy submarines. There are two types of this mission that can be performed: against a known target or against an unknown target.

The first, against a known target, is simple. Since this target is visible, select it, create the mission, select Sub Strike, and then assign the units you would like to strike it with.

The second, against an unknown target, is executed just as easily. All you need to do is create a mission, select Sub Strike, and assign units. The strikes will launch as new submarines are detected and will not end until there are no more submarine targets, weapons are all expended, or the game has ended.

#### **Aircraft Assigned to the Sub Strike Mission**

Aircraft are probably best suited for this mission. Upon detection of a target, they will launch and attempt to engage the sub target. If the submarine's location is not pinpointed, the assigned aircraft will begin a search pattern based on the information it has to pinpoint the sub and attack it. This pattern is always based on the detection diamond or circle and will systematically drop sonobuoys until they are expended or the contact has been lost.

#### **Ships Assigned to the Sub Strike Mission**

Ships can perform the Sub Strike mission also. As soon as a submarine is detected and identified, the assigned ship will run at a speed of Full towards the target and attempt to engage. The ship will launch its weapons when in range and will hunt the submarine until the contact is lost. This mission is highly recommended for ASW-type ships. They will behave as they do in real life in their pursuit of enemy submarines.

#### **Submarines assigned to the Sub Strike Mission**

Submarines will wait at Periscope depth until they detect an enemy submarine; once they do, they will run at a speed of Full towards the target and attempt to engage. This mission is not recommended for submarines, as they are extremely vulnerable at those speeds and depth.

#### **Land Facilities Assigned to the Sub Strike Mission**

No known Land Facilities have been built to perform this mission.

#### **Strategy: Sub Strike Missions**

Aircraft and ASW ships perform this mission well. All others can perform the mission, but the detriments to assigning them outweigh the benefits.

This mission is perfect for dedicated ASW aircraft. This is because they are programmed to follow naval doctrine; when a submarine is detected, aircraft will be launched to localize and prosecute the contact.

### 6.5.8. Support Mission

The Support mission involves units supporting each other. This is a mission that would be assigned to all support ships, aircraft, and submarines to help another unit in its mission. Usually, Support missions involve “covering” another unit while it conducts some kind of Strike mission; an F-14 Tomcat protecting an A-7 Corsair from enemy fighters is a good example of support. To assign this mission, assign Reference Points, select them, create the mission, select Support, and click OK. You then assign units to this mission.

#### **Aircraft Assigned to the Support Mission**

This is the most useful application for the Support mission. All aircraft assigned to this mission will fly at a speed of Cruise and at High altitude. Once they reach the designated Reference Point, they will remain at this speed and altitude. If there are multiple Reference Points, the assigned aircraft will loiter momentarily at one before continuing on to the next Reference Point.

#### **Ships Assigned to the Support Mission**

This mission works with ships, but has no applicable use other than to act as an anchor. If you assign a ship to this mission, it will travel to the Reference Point at a speed of Cruise. Upon reaching this Point, it will stay there.

#### **Subs Assigned to the Support Mission**

This mission works with sub platforms, but has no applicable use other than to act as an anchor. If you assign a sub to this mission, it will travel to the Reference Point at a Shallow depth and at Creep speed. When it reaches the Reference Point, it will remain in place.

#### **Land Facilities Assigned to the Support Mission**

There is no value in assigning a Support mission to a Land Facility.

#### **Strategy: Support Mission**

Support aircraft are best assigned to this mission. AEW and tankers are preferred as the Reference Points in this mission will anchor them, preventing their wandering into enemy AAW range or aimlessly around the map.

### 6.5.9. Recon Ground Mission

The purpose of the Recon Ground mission is to identify any Land Facilities along a path marked by assigned Reference Points. To assign a unit to the Recon Ground mission, create a Reference Point (or points) at specific locations you want to reconnoiter, select them, create a mission, select Recon Ground, click OK, assign the aircraft you wish to assign this mission, and click OK again.

### **Aircraft Assigned to the Recon Ground Mission**

These are the units this mission was designed for and therefore should be the only unit types assigned.

When you assign an aircraft to this mission, it will fly to the Reference Point(s) in the order they were assigned.

Aircraft altitude will change during this mission. Initially, an aircraft will fly at Medium altitude and at Cruise speed. When it closes in on the first Reference Point, it will drop to Low altitude. Once it reaches the final Reference Point, it will move to return to base at High altitude.

This mission is perpetual. The aircraft will rearm/refuel and then will go out on the same mission again. This continues until the aircraft is destroyed or the game ends. Only one aircraft can be assigned to each particular Recon Ground mission you assign. If more than one is assigned, the excess aircraft will not launch.

### **Ships assigned to the Recon Ground Mission**

Ships cannot be assigned to this mission.

### **Subs assigned to the Recon Ground Mission**

Submarines cannot be assigned to this mission.

### **Land Facilities assigned to the Recon Ground Mission**

Land Facilities cannot be assigned to the Recon Ground Mission.

#### **6.5.10. Recon Ship Mission**

The purpose of the Recon Ship mission is to identify detected ships. To assign this mission to a unit, create a Reference Point (or points), select them, create a mission, select Recon Ship, click OK, select the unit you would like to assign to the mission, and click OK again. If you delay the mission by one minute, the first destination Reference Point will change each time the mission is run.

### **Aircraft Assigned to the Recon Ship Mission**

Aircraft assigned to a Recon Ship mission will fly out to the assigned Reference Point(s). Upon detection of an unknown ship (through any means), the aircraft will change course to investigate; once they achieve identification the aircraft will (if fuel allows) return to its assigned Reference Point(s).

Assigned aircraft will fly at High altitude and Cruise speed. Aircraft assigned to this mission will continue traveling to Reference Points and identifying contacts until they run low on fuel and return to their airbase.

### **Ships Assigned to the Recon Ship Mission**

Ships assigned to the Recon Ship mission will transit out to the assigned Reference Point(s). Upon detection of an unknown ship (through any means), the ship will change course to investigate; once they achieve identification the ship will return to its assigned Reference Point(s).

Assigned ships will travel at Cruise speed. Ships will continue traveling to each assigned Reference Point and identifying contacts until they run out of fuel and the scenario duration ends. Ships will only act in self-defense while assigned to this mission.

### **Subs Assigned to the Recon Ship Mission**

Submarines assigned to the Recon Ship mission will transit out to the assigned Reference Point(s). Upon detection, the sub will change course to investigate; once they achieve identification the sub will return to its assigned Reference Point(s).

Subs assigned to this mission always transit at Shallow depth and travel at Creep speed. If a new contact is located, the sub will accelerate to Cruise speed in an attempt to move into range to identify. Once identification is made it will return to Creep speed and return to its assigned Reference Point(s). Subs will only act in self-defense while assigned to this mission.

### **Strategy: Recon Ship Mission**

Assign more than one Reference Point to this mission, close to expected enemy activity, to ensure the assigned unit covers a lot of ground.

The kind of EMCON to use is up to the player. Active and passive settings have their advantages and disadvantages. Notably, if you're using active settings the enemy can detect and identify your unit faster than it would otherwise. If you're using passive settings, your unit must move closer to identify.

#### **6.5.11. Boarding and Takeover**

Boarding is the process of selecting, intercepting, and putting personnel on another craft or facility. Takeover is the process of gaining control of a target unit.

### **The Process of Boarding and/or Takeover**

#### **Selection**

- A contact may be selected as a target for boarding if the mission craft is capable of doing so. Helicopters may board ships and facilities. Ships may board other ships.
- A contact may be selected as a target for boarding if it is the type of target of the boarding craft's mission focus. i.e. ASuW Patrols focus is surface vessels.
- A contact will not be selected for boarding by a unit if another unit is already boarding it on the same side.

**Intercepting**

A craft will not try to intercept another if it is impossible to navigate to the target unit. The unit attempting to board another must intercept the craft by matching its speed and bearing, and approaching alongside the target. Once the unit is alongside its target it may attempt to board.

**Boarding**

There is a 50% chance of success for boarding. Any attempt will take time at the rate of one minute times the sea state.

**Takeover**

If a mission is set to take over craft it boards then it will always be successful on successfully boarding. Takeover attempts require ten minutes to complete. On successful takeover both the boarding and target unit will be assigned their mission's secondary mission.

## 7.0 SENSORS

***Sighted sub, sank same.*****-AMM 1st Class Donald Francis Mason**

Sensors are a key element in H3ANW. Without them, your units would be unaware of their surroundings and quickly fall prey to the enemy. Sensors modeled in the game range from a pair of binoculars to sophisticated radar sets, and covering everything in between.

To change the sensor settings of a unit or group, select a unit, group, or base and click the Sensor toolbar button. Doing so will bring up a dialog window with several options, including Radars, Sonars, ECM and Comm Link. These sensors can be set to Active, Passive, or Intermittent. Below is a short description of the main sensor types.

### 7.1. ACTIVE SENSORS

An active sensor is a radar or sonar that has been powered and is emitting either electric or sound energy. Active radar sends out an electronic pulse that is reflected off of a target and interpreted by the radar and displayed on the screen. The same is true for active sonar, which uses sound energy instead of electric energy in the pulse.

#### 7.1.1. Radar

Radar locates objects by sending electromagnetic energy out into the atmosphere and receiving energy reflected back. Radar is mostly used for detecting aircraft and surface vessels; however, very sensitive "look down" radar types can be used to detect the periscope or snorkel of a submarine.

#### 7.1.2. Active Sonar

Sonar makes use of the fact that water is a very good medium for sound propagation. Active sonar works in much the same way as radar. By sending out sound energy into water and analyzing what is reflected, it is possible to locate and even identify objects in the water. Warships are typically equipped with at least a basic sonar set, while submarines are generally

given the most efficient sonar systems possible as they often have to rely on sonar as their sole means of situational awareness. Submarines rarely, if ever, use their active sonar, instead relying on their very sensitive passive sonar. Aircraft can be equipped with dipping sonars and sonobuoys, which are of variable efficiency and quality.

### 7.1.3. Electronic Counter-Measures (ECM)

ECM equipment can be used to degrade enemy sensors. Select Active from the Sensor dialog window to activate the ECM. Remember that in many cases using ECM will degrade your side's sensors as well. When a unit or group is being jammed, a small "X" will be displayed in the upper-right side of the unit or group symbol. If a unit or group on another side is using jammers, a small "Q" will appear in the upper-right side of the symbol for the unit or group using the jammer.

### 7.1.4. Communications

If you wish to cease datalinks and communications with your other units, you can turn your communications off. Turn them back on to re-establish communications.

## 7.2. PASSIVE SENSORS

### 7.2.1. Electronic Support Measures

Electronic Support Measures (ESM) work on the principle that the energy broadcasted by a radar emitter travels much further than the useful range of the radar set. These signals can be detected by a specialized receiver and analyzed by computers and electronic warfare technicians to provide information on the emissions received.

ESM sets are employed on nearly all modern military aircraft and warships, and range from basic radar warning receivers (RWR) which reveal only the presence of radar energy to extremely sophisticated

ELINT (Electronic Intelligence) systems, which can interpret the emissions received to not only show the presence of an emitter, but also its exact location and type. If a detection is made by ESM, the contact will be displayed as an "ESM cut" on the map as a line or wedge radiating from the detecting platform in the direction of the contact. The location of the contact is somewhere on the line or within the area represented by the wedge.

A unit symbol will appear in the center of the ESM cut; this is not the exact location of the contact. As a contact's location contact is solidified, the area or line representing the ESM cut will decrease and the contact symbol will be closer to its exact location. Selecting the contact and clicking the Report button will list the type of emission being detected.

### 7.2.2. Passive Sonar

Passive sonar listens to the ocean attempting to detect the sound of an enemy ship or sub (engine screw noise, active sonar, etc.). Many ships and subs have both a hull-mounted and a towed sonar array (comprised of very sensitive microphones). The quality and range of passive sonar is affected by noise in the water. If a ship or sub using passive sonar is moving through the water at a high speed, the quality and range of its passive sonar is diminished by the noise created by moving through the water. In H3ANW, passive sonar is always turned on for platforms that are so equipped



### 7.3. INTERMITTENT SETTING

When Intermittent is selected, the sensor will become active for a certain duration and then passive for a certain duration. Numerical values are entered to determine the active sensor duration and its variance and the passive sensor duration along with its variance. If for example you enter a value of 10 for passive, a % variance (for passive) of 50, a value of 20 for active, and a % variance (for active) of 75, the sensor will be active for 10 minutes plus or minus 50% (or, 5-15 min.) and then will go passive for 20 minutes plus or minus 75% (or, 5-35 min.). Once the sensor has been active once and then passive once, the AI generates another number randomly within the range for each and begins the cycle again.

### 7.4. OTHER SENSORS

#### 7.4.1. Sonobuoys

Anti-submarine aircraft, both fixed-wing and helicopters, use sonobuoys to detect submarines. Sonobuoys are dropped in the water from the aircraft and transmit to the aircraft what they sense in the water. There are basically two types of sonobuoys: active and passive. A passive sonobuoy listens to the ocean and transmits any passive detections it makes directly to the aircraft. An active sonobuoy remains passive until it is turned on.

To turn on an active sonobuoy, select it and then click the Sensor toolbar button. Set the Sonar selection to Active. Sonobuoys have a service life and will eventually cease to function and sink. The three most common types of sonobuoys used in H3ANW are:

- DIFAR: A passive sonobuoy that provides directional information on a contact. A contact will appear in an uncertainty region in the direction it is located from the DIFAR.
- DICASS: Both a passive and active capable sonobuoy. This sonobuoy provides directional information when passive and both directional and range information when active. A passive contact will appear in an uncertainty region in the direction it is located from the DICASS. A contact made with the active setting will appear with range and directional information.
- LOFAR: A passive sonobuoy that only indicates a detection has been made within its passive sensor range. No range or directional information is provided on a contact. A contact will appear with an uncertainty region around it when detected by a LOFAR.

#### 7.4.2. Dipping Sonar

Some ASW helicopters have a dipping sonar capability. A dipping sonar is a sonar set (on a long cable) that is dipped into the ocean from a hovering helicopter and activated. A contact will appear with both directional and range information. Dipping Sonar is deployed automatically by equipped ASW helicopters that are operating on an assigned mission or as part of a formation air patrol.

To manually deploy Dipping Sonar, set the helicopter to hover at Very Low (VLow) altitude, press the Sensor toolbar button, and select the Active sonar selection.

# 8.0 WEATHER

***Admiral Clark addressed the Naval War College on June 12, 2002...In this address; he explained that the United States Navy must build upon its strengths, thus enabling an asymmetric war fighting advantage over its adversaries. One of these strengths is the Navy's ability to apply Oceanography to its battle problems and challenges in order to leverage the environment for an advantage.***

**-U.S. Naval Meteorology and Oceanography Command**

The weather model in H3ANW is more complex than might appear on the surface. When a scenario is first created, the weather model is run on its map. This generates a set of low and high pressure cells based on a set of environmental rules. The map itself has a set of meteorological information that represents the base values for the map region and season depicted by the scenario. When the game is run, these low and high pressure cells interact with the base values present on the map, producing pressure changes and thus cell "movement" across the map. The interaction of these cells produces boundary effects along their edges, including various types of cloud cover and precipitation. The relative movement of these pressure cells also generates wind speeds, which affect the sea state for that area.

One of the most important things about weather in H3ANW is its effect on sensor performance. Radar and other electromagnetic sensors (including eyes) are affected appropriately by precipitation and visibility levels. Sea State is another example; it has a terrific effect on sonar performance, both passive and active. Sea State is a general measure of ocean conditions, both in terms of wind speed and wave height, and is represented by a number from 0 to 9. A Sea State value of 1 would represent a light breeze with flat, calm (maybe rippled) seas, while a value of 9 indicates almost fifty foot waves and wind strength of over sixty-five knots! Each increase in Sea State reduces passive sonar ranges by about 15%, depending on the operating frequency of the sonar. High and medium frequency sonars are affected more severely than low frequencies. Active sonars are affected even more by Sea State. Rough seas tend to fill the ocean with tiny air bubbles, even at great depths. Since air bubbles reflect sound, the reverb effects make active sonar almost useless above Sea State 5. A similar effect can be demonstrated by turning on your automobile high-beam lights in a dense fog bank.

The Unit Status window displays weather conditions and lighting conditions for friendly units. If the bottom of the Unit Status window is not fully extended, this information will not be visible. Extend the bottom of the window to view the additional data or press REPORT for a full sized screen display.

## 9.0 ORDER OF ENGAGEMENT

*This ship is built to fight. You had better know how.*

**-Admiral Arleigh Burke**

If you have developed a flawless plan, which the enemy resolutely cooperates with, then the topic of this section is moot. You will already be engaging the enemy in the order desired. War, even simulated war, is not a Hollywood script. As stated previously, war is a dynamic process. As such, you must be capable of altering the existing battle plan on the fly and redefining the order of engagement instantaneously. To do so, you must evaluate the threat of each new contact in terms of potency and immediacy.

Potent threats are those forces which, if left unchecked, are capable of precluding mission accomplishment.

Naturally, there are varying degrees of potency within this grouping. Some units may be eminently capable of executing the threat, others only noteworthy on a good day with a lot of luck.

Either way, it is the commander's task to examine every new contact against the enemy Order of Battle and assess the degree of threat it offers to friendly forces. Immediate threats may or may not be capable of precluding mission accomplishment, but they do pose a clear and immediate danger to friendly forces, usually stemming from the fact that they have already attained weapons launch positions.

Remembering that the commander has already been cautioned to know the enemy, platform specific guidance as to the level of threat will not be presented here. Indeed, the number of variables inherent in such an analysis would require volumes for all the ships, aircraft and submarines depicted in H3ANW. Instead, the player should employ their knowledge of sensors and weapons ranges to categorize each contact within the following threat class hierarchy:

### **Class A: Potent and Immediate**

This represents a threat of the highest order, requiring all personnel to immediately drop what they are doing and respond immediately as needed. This type of threat is a great danger to the ship, and can include anything from multiple inbound sea-skimming anti-ship missiles to a spy trawler shadowing the ship or fleet.

### **Class B: Immediate Only**

This classifies threats that, while dangerous, do not pose an immediate impediment to the current mission. However, they still should be dealt with quickly. These types of threats can include the discovery of an unknown light airplane or small boat approaching the fleet. One should prosecute them without pulling assets off the main tasks at hand, if possible.

### **Class C: Potent Only**

This type of threat poses no immediate danger, but has potential to elevate to a higher Class level. In this category, there is some time to gather the necessary elements to conduct a strike against this threat, or if it is determined to be too powerful, to avoid it entirely.

### **Class D: Neither Potent Nor Immediate**

This type of threat essentially covers everything else, and is considered to both not be a danger nor a mission-critical target. These are considered to be 'targets of opportunity,' which may or may not be worth expending resources against; this is up to the commander based on their current situation.

Please note that firepower is not the only criterion for threat classification. An ocean-going tug can be a class "A" threat if it is providing targeting data to one or more shooters somewhere over the horizon. Similar concerns must be exhibited with flag merchants of the hostile nation. Remember to assess enemy capabilities rather than intentions.

## **10.0 FORMATION AND STATIONING CONSIDERATIONS**

***There are only two absolute rules of thumb at sea: Don't let the people in the water tank, and don't let the water in the people tank.***

**-Unknown Sailor**

### **10.1. DISPERSAL VS. CONCENTRATION**

Once the Path of Intended Motion (PIM) is established, the commander must determine the general disposition of the force. Naval warfare differs from its ground counterpart in this respect, because the geographic proximity of unit placement is a function of defensive strength versus offensive strength. Thanks to passive targeting and over-the-horizon missile capability, it is no longer necessary to form a line of battle to concentrate force on the enemy. With proper command and control, widely dispersed units can put their missiles on target within seconds of one another, as evidenced in Operation Desert Storm. These same units, however, are less capable of defending themselves as individuals when compared to their ability to support one another in a well-designed formation with overlapping missile coverage. Given that condition, you would expect the use of supporting defensive formations to serve inferior and superior force equally well. Reality does not bear this out, however, and the use of defensive formations is actually more critical for the superior force. Consider the rationale that supports this conclusion by examining the following hypothetical conflict between big water navy Blue and coastal nation Orange.

Blue sacrifices superiority if their forces are divided such that they might be engaged piecemeal. Yet, by massing the forces to support one another defensively, Blue simplifies Orange's

targeting once the force is located. Orange is better off to disperse their units in the face of Blues superiority. Why? This dispersal forces Blue to detect, classify, and engage each individual element of the Orange force, which precludes simultaneous action against all of them. While the first elements are being engaged, Orange is buying time to get his other units into position to conduct a coordinated offensive strike against the Blue Force.

By adding names to the faces, astute players will note that the classic example of the aforementioned discussion is the war that never was. U.S. war games focused on how they would use Carrier Task Forces to project power on the Soviet mainland, while their Soviet counterparts built their bastion concept around the very approach illustrated for the inferior player. The lesson to learn and apply in all mission planning, regardless of the nationalities involved, is that unit concentration universally favors the superior side and dispersal is the tactic of choice when outnumbered or outgunned.

### 10.2. THE THREAT AXIS

The threat axis is the commander's estimate of the likely direction from which an attack can originate. The threat axis always exists, whether it applies to a single unit or a group of units, but it is really most significant in formation planning for groups. Although this sounds simple to understand, there are nuances to the establishment and operational use of a threat axis that must be clarified from the outset to alleviate later confusion.

### 10.3. FORCE COMPOSITION



The major factors in determining station assignments in a formation, other than the location of the threat axis, are the capabilities of the platforms themselves.

Although virtually all modern ship designs emphasize multi-mission capability (i.e.: the ability to conduct Anti-Air Warfare (AAW), Anti-Submarine Warfare (ASW), and Anti-Surface Warfare (ASuW), the reality is that each class has a specialty within the three warfare areas and some limited ability to conduct the other missions.

Commanders must analyze their force mix and categorize ships accordingly before proceeding deeper into stationing considerations. Because of the aforementioned emphasis on the defensive nature of formations, and the knowledge that ASuW is primarily offensive in nature, this categorization should focus on AAW and ASW abilities.

### 10.4. FORMATION STRUCTURE

A formation is a method of layered defense. Picket ships, Combat Air Patrol (CAP), and Airborne Early Warning (AEW) aircraft provide surveillance to 200 nm and beyond. The outer screen typically occupies sectors between 12 and 24 nm from the main body. The inner screen is stationed within visual contact of the High-Value Units (HVUs), usually under 10 nm from the formation center.

Since the employment of detached action groups (such as surface action groups and surface action units or picket ships) are specialized tactics, the placement of these assets will be excluded from this discussion. The circumstances for their use, as well as the proper stationing in relation to the threat axis, will be addressed in the appropriate warfare section of this manual. At this stage, it is important for the commander to focus exclusively on the functions of the inner and outer screens. Standard placement of the High Value Unit(s) in the center of the screen is assumed.

### 10.5. THE OUTER SCREEN

The function of the outer screen is to detect and engage any units that have leaked through the pickets and threaten the main body. To accomplish this mission, the outer screen must be capable of performing in all the mission areas. ASuW is a given, so the composition of the outer screen should be equally capable in the other mission areas, skewing any advantage toward ASW. Also, the ASW platforms chosen for the outer screen should have the best passive sonar detection suites and the capability for stand off engagement of contacts with helicopter assets.

ASW assets are more effective in the outer screen because their separation from the ambient noise generated by the main body is critical to passive detection of submarines. Also, because the sizes of the sectors in the outer screen are so much larger, ASW assets can sprint to the forward corner of their area and drift at bare steerage back through the sector. Their vulnerability is increased while sprinting, but they are extremely effective on the return leg. A ship like a Spruance with a towed array sonar, operating at five knots or less, is virtually undetectable to submarines.

AAW assets are present in the outer screen for two reasons: to provide covering fire for the relatively vulnerable ASW platforms, and to engage short range ASuW missile equipped aircraft before they reach their launch points against main body assets. In evaluating platforms for this role, maximum effective range of the SAM battery is more important than salvo rate. Aircraft are slower than missiles, and by employing greater range missiles, the outer screen AAW asset can conduct more engagements within the fixed amount of battle space. The more engagements, the greater chance the strike will jettison ordnance and go home.

### 10.6. THE INNER SCREEN

ASW units selected for the inner screen should have the best active sonar suites to allow for delousing (combing the area beneath the HVU) and an immediate targeting solution on any contacts that have penetrated the outer screen. Helicopter capability is important, but only if two or more inner screen assets are helo-capable. This restriction is due again to the need for immediate and decisive action, which negates the effectiveness of a helicopter asset chocked and chained to the deck. With one helo always in the air in an ASW configuration, the commander can use it to “pounce” on any contacts generated by the inner screen.

The emphasis for assignment of AAW assets to the inner screen should be rate of fire, rather than range. It is assumed that any air contacts penetrating to the inner screen will be missiles. As such, they will be traveling faster than the platforms that launched them and there will be more of them as well, as each aircraft generally launches more than one missile. The more

defensive firepower you can put in the air, the more inbound missiles will be attrited, and the smaller the burden of point defense systems like Phalanx becomes.

Aegis is the premier AAW suite for inner screen defense because of its all-aspect engagement ability and lack of launcher limitation for Vertical Launch-equipped Systems (VLS). Because of this fact, no modern U.S. CVBG puts to sea without a VLS cruiser tethered on a 4,000-yard leash to the carrier. Cruiser skippers who were used to the relative independence of picket duty prickle at the current situation, but it is a reality of modern tactical doctrine.

## 11.0 ELECTRONIC BATTLEFIELD CONSIDERATIONS

***No matter how enmeshed a commander becomes in the elaboration of his own thoughts, it is sometimes necessary to take the enemy into account.***

**-Sir Winston Churchill**

### 11.1. ELECTRONIC SCOUTING

Any serious student of military history will point out countless examples of how technological improvements have driven changes in tactics. Throughout it all, however, the commander's prime objective of delivering firepower in support of the mission has remained unchanged. Further, in order to accomplish this objective, the commander must still locate the enemy, track him, and target him. The effort to do so involves all methods of surveillance, from visual sighting to electronic intercept of emissions, known collectively as scouting. Scouting involves gathering data, both active and passive, from all friendly forces for use by the tactical commander. The degree of effectiveness of scouting is a function of the area covered per unit of time. Command and Control functions, for the purpose of this discussion, are those which allow the commander to correlate scouting information on enemy force strength and disposition and disseminate that information to his own forces for exploitation in a battle plan.

As technological improvements have driven the envelope of engagement from the visual horizon out to 600nm, the scouting problem has been complicated exponentially. Why? Simply because of the increased area that must be covered for the commander to feel safe that any units within striking distance have been discovered. Also, because of the increasing lethality of weaponry, the Battle of the First Salvo is a realistic consideration. The commander who finds the enemy first and gets off an effective attack, while precluding the opponent from doing the same, will ultimately succeed. As such, the electronic battlefield, once referred to as the battle of the airwaves, holds the key to victory.

### 11.2. THE ELECTRONIC WARFARE TRIAD

Electronic Warfare (EW) is actually composed of three distinct subsets: Electronic Support Measures (ESM), Electronic Counter Measures (ECM) and Electronic Counter-Counter Measures (ECCM). All legs of the triad are modeled in H3ANW, but the commander will have varying degrees of control over each portion. ESM will afford the greatest degree of user specified

doctrine, while ECM offers a lesser degree of selectability, and ECCM efforts are modeled almost exclusively within the algorithms which control combat resolution. It is assumed that forces will employ all ECCM capabilities they possess, so the results of these efforts will be displayed automatically without user intervention.

### 11.3. ESM

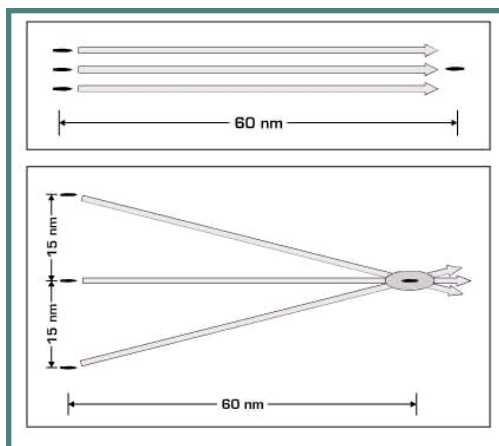
ESM involves the passive reception of enemy electromagnetic emissions. By processing these emissions against a database of known emissions, and comparing the frequency, pulse repetition rate and other details too extensive to cover here, modern ESM suites like the SLQ-32 are capable of identifying the class of emitter which produced the transmissions. Some emitters are unique to a single class of ship, aircraft, or submarine; as soon as that emitter is detected, the commander will be able to classify the threat exactly. Most emitters, however, are carried on numerous platforms. As such, a single emission may only produce a list of possibilities as to the originating platform. When this occurs, prudent commanders must assume the worst possible case of all the potential threats.

Subsequent emissions of other radar types from the same bearing may allow one to narrow the list of possible threats, by excluding those platforms which do not have both emitter types, but formations of many vessels may still make this evaluation unreliable. Indeed, it is possible for far-sighted commanders to radiate emitters on two separate ships in proximity, possibly leading the enemy to believe a third, stronger vessel is present.

A unit which radiates, and is subsequently classified by the enemy, is not necessarily targeted or even located with any degree of certainty. If a single unit in the force receives the transmission, a line of bearing to the source is generated. If multiple units in the force receive the intercept, they may correlate their bearings to define an ellipse known as the area of probability, within which the radiating unit must be.

This technique is known as passive cross-fixing. See Figure 3. The greater the physical separation between the units coordinating for the passive cross fix, the greater their bearing separation will be and the more accurate and narrow the area of probability.





**Figure 3: The effect of geographic separation on generation ESM cross-fixes.**

One thing should be readily apparent already: for ESM efforts to be effective, the enemy must cooperate by radiating their emitters. Given the potentially deadly effect of a passive, over-the-horizon missile attack in which the first warning is illumination by missile seeker heads in their terminal phase of flight, one might reasonably question if it is ever worthwhile to radiate and risk this possibility. The answer is yes, but radiating must be done when it is tactically advisable to do so and avoided when it is not. As the battlefield is a dynamic environment, the situations which dictate changes in emission posture are also fluid. As such, a thorough understanding of subsequent material in this section is essential to success in H3ANW.

#### 11.4. DETECTABILITY VS. SURVIVABILITY

The manner in which commanders determine who may radiate, and under what circumstances, is known as the Emissions Control (EMCON) posture. The tactical commander, even in periods of unrestricted emissions, must consider the impact of that decision in terms of the targeting data provided any potential adversary. In the U.S. Navy, EMCON posture is typically generalized in operations orders as follows.

Emission Control Conditions:

- EMCON A – No Emissions
- EMCON B – Limited Emissions
- EMCON C – Unrestricted Emissions

It is important to understand, however, that different components of a force may be in different EMCON conditions. Consider a carrier battle group (CVBG), for example, that desires to remain

untargeted but wants a good surface picture out to 250nm. The task force commander may opt to keep the surface units of the task force in EMCON Alpha, while launching an E-2C to conduct an active surface search. If the E-2C is detected by enemy forces, its presence will denote that a carrier is somewhere within the area of operations, but the enemy will be denied specific targeting data on the location of the carrier as long as the E-2 is not radiating, on the deck (flying very close to the surface), or in close proximity to its parent.

This example brings up the common problems with the quality of information obtained through ESM. The quality of an ESM fix is directly related to the separation of the detecting units, as denoted in earlier in Figure 3, and the duration of the enemy emissions. The longer the enemy complies by radiating, the higher quality fix one may obtain. In general, the following classifications are applied to ESM fixes.

Classification of ESM Fixes:

- Detected – The unit has emitted long enough that its presence is known, but it cannot be attacked with any degree of certainty.
- Tracking – The unit has emitted long enough for opposing forces to establish an area of probability and possible course and speed. Attack is possible but with a decreased chance of success due to the degree of uncertainty.
- Targeted – The unit's position, course and speed are known. Detecting units may attack at will.

Commanders must realize that the enemy seeks to target them in the same fashion. As a result, determination of an active or passive posture falls to other considerations.

### 11.5. INFERIORITY VS. SUPERIORITY

Consider the earlier example of an inferior vs. a superior force. In that discussion, we determined that a superior naval force should mass to provide mutual defensive support, while an inferior force should disperse, both to divide the offensive capability of the opponent and to increase survivability of the remaining assets until they reach firing positions. Examining that model in terms of EMCON posture might lead one to conclude that logic would lead the superior force to radiate without restriction and the inferior force to favor stealth and surprise.

Taking the place of the superior force commander, hereafter referred to as Orange, your defenses are massed, but they are only effective if any incoming enemy raid is detected. This would mean that the defensive posture adopted by a close formation is only effective if one elects to do so, then the dispersed adversary, which we will call Blue, has a geographical separation which makes passive cross fixing very effective, and he may conduct a coordinated first strike, which could prove decisive. Conversely, if Blue is denied targeting data because Orange remains in a strict EMCON Alpha configuration, he may be forced to conduct an active search, which could lead to defeat in detail of his dispersed assets by Orange's massing of force.

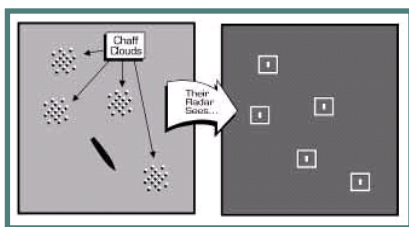
Herein lies the tactical dilemma faced by all naval commanders. The struggle to obtain a targeting solution must be weighed against the enemy's ability to do the same. The answer lies in your estimate of whether or not he has already been detected. As the superior force commander, if you have reason to believe that you are undetected and, more importantly, untargeted by the enemy, then you should continue to pursue offensive operations against them without hesitation. If, however, you are reasonably certain that your position is known, a shift to active emissions is necessary to increase survivability.

### 11.6. ECM

Electronic Counter Measures (ECM) involves all techniques designed to deny the enemy specific targeting data. Some of these techniques are actually mechanical, such as Chaff and Soids, but they are classified within this subset of warfare nonetheless. ECM can be both offensive and defensive, and the fluent tactical commander must understand the role of each.

Chaff canisters contain thousands of thin metal strips which are exploded into a cloud after deployment from the firing ship. These strips fall slowly to the ocean, drifting with the wind and expanding as they do to provide a large, reflective radar signature to active missile seeker heads. Chaff may be employed as either a deceptive or seductive countermeasure. To act as a deception, it must be deployed prior to the launch of the inbound missile group, so that more targets appear than actually exist. (See Figure 4.) Once missiles have been launched, however, chaff clouds only exist to seduce missile seeker heads away from their eventual target. (See Figure 5) Soids, which are floating flares, are only effective in the terminal phase of missiles with infrared signature seeker heads.

**In H3ANW the employment of Chaff and Soids are automatic functions which reduce the effectiveness of inbound missile groups. However, these are point defense systems and cannot be launched in any other mode.**

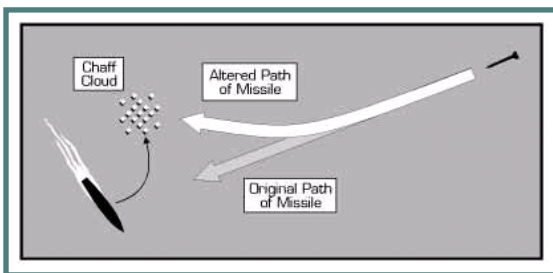


**Figure 4: Deceptive Chaff- One ship surrounded by Chaff Clouds which the enemy sensor detects as multiple ships.**

Offensive ECM involves the use of jamming in support of strike operations to preclude the enemy from determining the composition of the strike and targeting specific elements with

counter-battery fire. In H3ANW, the player will note that inbound air strikes escorted by ECM-capable assets appear only as electronic noise on their tactical displays. This denies targeting of the missile-equipped strike aircraft until the jamming platform is destroyed. Further, a savvy tactical opponent will strike from several directions, complicating the AAW effort with jamming decoy groups and chaff corridors. The H3ANW commander will also be able to employ ECM in strike planning.

Defensive ECM includes the employment of Blip Enhancement, Chaff, Soids, and jamming of terminal homers. Blip enhancement is a selectable tactic employed by properly equipped helicopters to produce a radar signature equivalent to an aircraft carrier for missile terminal seeker heads. Similarly, Chaff and Soids are employed to provide larger, more attractive targets to missile seekers than their real world counterparts. Eliminating a missile through any of these countermeasures is termed a “soft kill”, as opposed to a “hard kill” in the form of a traditional intercept.



**Figure 5: Seductive Chaff:** The ship has been locked on to by a missile seeker head, so if fires a seductive chaff cloud which draws the missile away.

### 11.7. ECCM

Electronic Counter-Counter Measures (ECCM) involve manipulative techniques designed to seduce a missile seeker head that has locked-on away from its intended target and toward an imaginary target at another point in space. The use of this and most other defensive ECM functions are handled internally in the H3ANW tactical model.

### 11.8. COMMAND & CONTROL

Communications transmissions are also electromagnetic emissions subject to detection and exploitation by the enemy. Again, however, some types of transmissions are more detectable than others. Data links, which are used extensively by U.S. Forces, are line of sight transmissions that are virtually undetectable unless an enemy unit is between the transmitting and receiving units. In H3ANW, data links are modeled as connecting webs of lines between the units in contact. Only one unit, such as the E-2C used in the earlier example, may be radiating and therefore targetable by the enemy, but all units connected to the web are capable of using the targeting data provided by the link for any subsequent attack.

Satellite communications, because they are also directional in nature, are difficult to intercept. Traditional radio frequencies, such as UHF, VHF and HF are progressively more susceptible to intercept, and HF transmissions have been localized from thousands of miles away. As a result, the prudent commander must balance the need to disseminate targeting data to his forces with the corresponding intelligence he reveals to the enemy in his method of doing so.

# 12.0 SUBMARINE WARFARE

***Of all the branches of men in the forces there is none which shows more devotion and faces grimmer perils than the submariners.***

**-Sir Winston Churchill**

## 12.1. COMMANDING SUBMARINES

*"The San Luis was at sea, and at times in the area of the British force, for an estimated 36 days. The threat from the Argentine submarine was a continuous concern for the British Task force commander, and numerous attacks were made against suspected submarine contacts, with a large number of ASW weapons being expended. In any event, San Luis survived all British ASW efforts."*

-From the briefing prepared for the Secretary of the Navy, The South Atlantic Conflict Lessons Learned

What the H3ANW commander should garner from this observation on the Falklands War is not only that ASW is difficult, which should already be internalized, but that a single undetected submarine can complicate the battle plans of the adversary considerably. Also, similar to mine warfare, the suspicion of the threat is sufficient to force the commander to commit large numbers of resources to eradicating it, resources which would otherwise be available to support his primary mission.

Thus far, the focus of this guide has been on countering the submarine threat to your own force. In this section, we will reverse tack and become the threat. By learning the optimum employment of submarines from a commander's perspective, one will not only possess a potent new force multiplier, one will also gain further insight into how enemies will attempt to use this platform to advantage.

### 12.1.1. Out of Sight, but Not Out of Mind

The first major leap of faith required of those who will utilize subs on the battlefield is that they cannot be micro-managed to the degree that other forces are. Although versions of HARPOON allowed the commander to issue orders to submarines whenever the commander wished, this is inconsistent with real-world constraints. For submarines to be in constant communication, they would have to remain at periscope depth all of the time with their communications mast raised. Naturally, such a posture would eliminate virtually all of the tactical advantages a submarine possesses. The trade off in letting a submarine remain out of touch and therefore stealthy is in not being aware of the sub's activities at all times. The most important thing to understand is that, in the case of missions with extended durations, the commander will not know for certain until the battle is over if the sub is still active; the only indication will be the loss of contact. After the scenario ends, casualties will be updated to reflect actual losses of friendly submarines.

### 12.1.2. The Special Case: SSNDS

In some instances, a commander will have a submarine in direct support of a task force (or, SSNDS). This asset is usually stationed in a distant sector on the Formation Editor as an ASW barrier patrol.

Because of special communications gear contained in the active sonar suites of surface ships, submarines operating directly with the battle group may be alerted to come to communications depth at any time. Again, if the submarine skipper is not in contact with an enemy sub (which would now be alerted to the presence of the friendly, if not its precise location), he will come to periscope depth for communication. There is a delay based on the actual time it takes to change depths, but once the sub is there the commander may alter the rules of engagement (ROE), mission tasking, and movement orders as above.

**Because the special sonar transmission used to call SSNDS assets to the surface is recognizable to the enemy, it is sometimes beneficial for a commander without an SSNDS asset to radiate it anyway, making any enemy subs in the area think another sub is present.**

### 12.1.3. Submarine Missions

Excluding SSNDS, most missions assigned to submarines reflect their ability to operate independently and respect their ability to strike effectively without additional guidance. As such, the prudent commander will consider the need for stealth and surprise and capitalize upon the strengths of submarines in mission planning without placing them in unwarranted risk.

Prior to the commencement of hostilities, submarines should be the platform of choice to conduct reconnaissance of enemy strength and disposition, as well as conduct offensive operations like the mining of enemy sortie routes. From this inshore position, these same submarines can act as back-up for their minefields, conducting follow-up attacks on enemy assets transiting the area. Also, if the sub is missile equipped these same submarines can either conduct preemptive strikes on enemy airfields or ports, or lay in wait to strike in conjunction with air elements of the main task force.

Additionally, when the enemy has limited ASW capability, as is the case with many coastal nations, a submarine may be positioned close ashore with its periscope raised to report the movements of enemy air groups coming offshore against the main force. This is a new method of passive airborne early warning that has been used with success by Sixth Fleet assets in the Mediterranean. Also, as a scout, submarines can provide ESM cross fixes and visual surface searches from their area of operations.

The latter can be critical in monitoring traffic through congested areas like straits and narrows and identifying contacts of interest to preclude fire on neutrals. Finally, submarines are also capable of performing battle damage assessment when used in conjunction with other forces in a joint attack.

With hostilities in progress, submarines may be used in their traditional role of hunter-killers. Submarines are the most effective platforms at locating and destroying enemy submarines, so they should be considered for all ASW plans. Do not discount the diesel-powered submarines;

the Batfish located and destroyed 3 of 4 Japanese submarines operating around the Philippines in as many days in WWII. Modern diesel boats are much more capable than their predecessors and are a match for the most capable SSNs if handled properly. Also, submarines may seek and destroy enemy warships or cripple the war effort of the adversary by pursuing a *Guerre de Course*. A commerce war on merchants and auxiliaries is a great fear of western nations, as these assets are in much shorter supply than during WWII, when Nazi U-boats almost succeeded in breaking the Allied back in the North Atlantic.

***"If we would have had more U-boats, we would have won the war!"***

**-Admiral Doenitz, Commander of the German submarine forces in WWII from his book, *The Modern Diesel Boat***

Though some analysts would point to Germany's Type 209 diesel boat as an example of modern technology, this very quiet submarine still requires six hours of snorkel time to charge its batteries, is limited to about 100 meters of depth and must patrol at one to two knots to retain its stealth advantage.

The Russian Kilo design, on the other hand, is capable of going without snorkeling for as many as two to three days at a two or three knot patrol speed. As such, it is a much more capable adversary.

Despite the ability of the diesel boat to be a devastating threat, U.S. analysts discount their effectiveness in the hands of third world crews due to a lack of training. Whether these assumptions would prove true in the real world or not remains to be seen, but the H3ANW commander can learn from the reasoning behind this assumption and employ the antithesis to make his diesel forces stronger.

The presumption is that these crews will expose their masts much more than necessary, because they do not know how to conduct a passive plot correctly. Further, there is a great deal of skepticism that they are capable of making a deep submerged approach on batteries, the most advantageous tactic, because of a constant need to refine their position estimates in relation to the target. It is also assumed that diesels resting on the bottom would snorkel at least once a day to preserve the amount of battery power they would need to escape after an attack. This line of reasoning reflects a dangerous tactical arrogance. Whether or not these potential adversaries are currently capable or not, they could become so in short order under the right circumstances. The prudent commander can never discount this threat on the presumption that it will be improperly employed.

#### **12.1.4. Summary**

If used properly, with forethought and patience, the commander of submarine units possesses a powerful force multiplier. Further, in the correct tactical placement, submarines can contribute to all of the warfare mission areas, including Strike, AAW, and EW, not just ASW and ASuW as in the past.

## 13.0 ANTI-SUBMARINE WARFARE (ASW)

***Soviet ASW forces have long emphasized active acoustic detection. This is effective against submarines regardless of how quiet they might be...***

**-The Naval Institute Guide to the Soviet Navy (1990)**

Because of their inherent capability for stealth and surprise, submarines are the most deadly adversary faced by modern naval commanders. Until recently, the bulk of U.S. ASW doctrine focused on countering a Soviet submarine threat out of the Norwegian Sea and the Greenland-Iceland-United Kingdom (G.I.U.K.) Gap, intended to interdict the sea lines of communication (SLOC) in support of a ground war in Europe. With the dissolution of the Soviet Union, this possibility has virtually evaporated. In its place, however, looms a broader, potentially more devastating threat.

With the loss of an obvious challenger for open ocean supremacy, and a political climate emphasizing budget reduction, the U.S. maritime structure is being incessantly whittled away. Further, the naval hierarchy is shifting mission emphasis away from strategic control of the oceans to support of joint operations in coastal conflicts. In this capacity, the blue-water turned brown-water navy is viewed as a method of quick power projection ashore, via air and missile strikes as well as amphibious ground forces. Astute naval commanders are aware that, in order for power projection operations to be undertaken with an acceptable degree of risk, sea control of the objective area must first be obtained. Therein lurks the new danger.

The former Soviet Union (Commonwealth of Independent States or CIS) is strapped for cash and its most readily available export commodity is hardware from its once-mighty military machine. Although their arms sales efforts have already extended to all platform types short of nuclear weapons, we will focus exclusively on their support of submarine proliferation. Most notable amongst current negotiations are the purchase of several Kilo-class submarines by Iran. These boats represent some of the most advanced diesel electric technology in the world, which gives them a very quiet acoustic signature. One need not be a military analyst to appreciate how the presence of such platforms would complicate naval operations in any future Gulf conflict. Additionally, Libya, Syria, and Algeria, all of whom already operate Soviet submarine designs, may obtain additional modern boats.

When you add these developments to the fact that shallow-water ASW is the most difficult type of ASW to conduct, one develops an appreciation for how any new maritime strategy must place additional emphasis on this warfare area. In the remainder of this section, you will find detailed briefings on the impact of oceanographic conditions on tactics, area vs. local ASW, how to assess your own force's capabilities, and other topics of vital importance to battlefield survival.

### 13.1. THE ENVIRONMENT

Sound propagation in the ocean is affected by temperature, pressure, and salinity. Of these, temperature is the dominant characteristic. The ocean temperature varies greatly with depth, but somewhere between 100 and 300 feet there is usually an abrupt change between the relatively warm surface waters and the cold, still depths beneath. This rapid change in

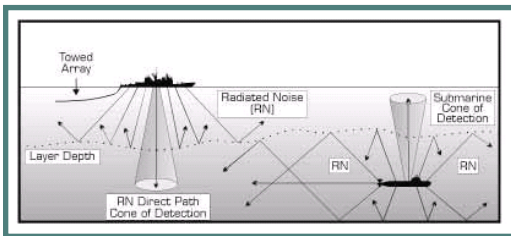


temperature is known as the thermocline, or sometimes ‘the layer’. Beneath the layer the water temperature tends to be isothermic, or relatively constant. The layer is tactically significant for several reasons. First and foremost, sound emanating from a source on one side of the layer (either above or below) tends to remain trapped on that side of the layer. Simply put, the sudden change in water temperature causes sound waves to bounce back from the layer. It is not an impenetrable barrier; there is some leakage, particularly with very high frequency noises like cavitation (the effect where bubbles produced around propellers collapse noisily in the wake) and active sonar transmissions. A general rule of thumb, however, is that most noises will be greatly attenuated (reduced) if they must pass through the layer. You will therefore hear noises made on your side of the layer much easier than those emanating through it.

In reality, layer depth varies from location to location and submarines try and stay comfortably beneath it to help hide from surface ships. In H3ANW, the thermocline always defines the boundary between the Shallow and Intermediate depth bands.

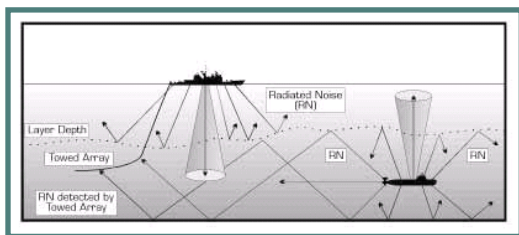
### 13.2. ACTIVE VS. PASSIVE

Commanders must constantly assess whether their sonar emissions policy should be active or passive, based on the tactical situation. To understand the basics, it is important to first illustrate the influence of the layer in a generic encounter between a surface ship (Blue) and a submarine (Orange). In the first case, (Figure 6) Blue is operating at 5 knots towing a passive sonar array above the layer. Orange is also operating at 5 knots below the layer. Note that the sound waves emitted from both platforms are minimal, so only those crossing the layer at an acute angle (e.g. straight down or up) will penetrate, while the bulk of the sounds will be reflected or refracted. Those sound waves that do penetrate directly through the layer form a narrow cone of sound. In this case for either Blue or Orange to detect the other, they must physically pass through the direct path cone, which means they would virtually be on top of one another, and detection would be almost simultaneous.



**Figure 6: The effect of the layer on sonar detection.**

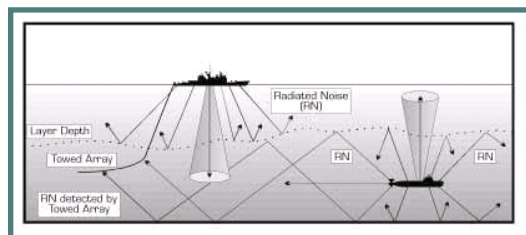
In our second example, (Figure 7) Blue is towing his passive sonar array below the layer. All other conditions remain the same. Blue is now able to directly receive any sound waves emitted by Orange, which means that he would detect Orange at a considerably farther range, while remaining undetected himself. The actual detection ranges will vary with the amount of noise emitted by Orange, as well as the sensitivity of Blue sonar suite. Base noise levels will also differ from platform to platform (some subs are quieter than others) and will be increased by noisy activities such as moving quickly or firing weapons.



**Figure 7: The effect of a towed array below the layer.**

In our third example we'll look at how Convergence Zones (CZ) work. As you go down into the ocean depths, the pressure steadily increases. This change in pressure also equates to a change in the speed of sound, which rises as the water becomes denser. Different depths end up having a different speed of sound. Sound waves which travel down into these depths are bent by this effect and slowly refracted back towards the surface in a long sweeping curve, surfacing many miles away. If conditions are right, these sounds will bounce off the surface and start back down into the deeps again on another long curve. The locations where these sounds reappear near the surface are called the convergence zone. CZs occur about every 66,000 yards (33nm), centered on the location where the sounds originated. They form an annular pattern of concentric circles around a noise source. Sounds traveling on a direct path from A to B might fade out relatively quickly (after a few miles perhaps), but sounds caught in a convergence zone might propagate for over a hundred miles with much less attenuation. Sensitive sonars capable of recognizing CZ signals are very important sources of tactical information.

The picture in figure 8 shows a Blue surface ship using its active sonar. Modern active sonar transmissions are extremely powerful (about 250 dB) and are capable of literally boiling the seawater surrounding the transducer. Power outputs any higher than this are useless because boiling seawater makes for a lousy conductor of sound. Generating this much noise in the water makes this ship counter-detectable at ten times its own range. As such, Blue is considered to have surrendered the initiative to any subsurface threat within 100nm, as his transmissions act like a giant homing beacon.



**Figure 8: The effect of a hull mounted active sonar.**

Blue will get reflections (detections) from his active sonar out to about twenty miles. The submarine in this figure is hiding beneath the layer however, and is still relatively safe from the bulk of Blue's active

sonar signal (which is bouncing harmlessly off the layer). Some of Blue's sound energy will penetrate through layer and travel down into the deep sound channel. There it curves back towards the surface and reflected down once again. Eventually, some of the noise that Blue is making finds its way to the surface ship in the second CZ. While Blue is deaf to anything but the short range echoes of his active sonar, the possibility exists that this other surface ship will hear him from many miles away.

Note that some of Blue's sonar energy does penetrate the layer at an angle which might allow for a direct path detection, were the submarine close enough. In this case however, the angle of incidence is not enough, and the submarine will escape detection, so long as he stays away. Active sonar is good for immediately localizing a near target, especially one on the same side of the layer with you. For more information on how H3ANW models sonar and convergence zones, see the technical notes at the end of your manual.

Let us consider now another case, where Blue possesses a variable depth sonar (VDS) in conjunction with his towed array. By putting the combination of active and passive capability on the same side of the layer as Orange, Blue can listen for Orange as before, but as soon as he feels Orange is within striking distance, he may selectively go active for one or two transmissions from the VDS and obtain an immediate targeting solution on Orange. The range at which a return echo is strong enough to provide this solution is again variable, depending on the type of sonar, the aspect of the target, the presence or absence of anechoic coatings, and numerous other factors. While listening below the layer as noted above, the hull mounted sonar is still capable of passive or active operations above the layer. This configuration is optimum for the conduct of blue-water ASW.

### 13.3. SHALLOW-WATER OPERATIONS

Earlier, it was indicated that shallow water operations are the most difficult to conduct; it is now important to explain why. In the examples just presented, you may have noted that as a rule, passive detection ranges far exceed active ranges. When an active contact is held, both parties are usually within striking distance of one another. Naturally, the commander would prefer to expand his battle space and engage the enemy before he gets within striking distance. As such, passive operations are the norm in most cases. Shallow water operations are an exception to this rule.

Although biological noise sources are present throughout the ocean, and are frequent sources of false contacts (i.e.: whale blowing sounds like ballast tanks being blown), the highest concentration of biological activity is in shallow water. Further, wave and tidal action, the influx of rivers and estuaries, and other natural phenomena combine to make passive ASW virtually impossible for either side, although submarine sonar operators are a little more adept at sorting out background noises than their surface counterparts.

The second factor to consider is that shallow waters have a minimal thermal gradient and none of the aforementioned layer of CZ effects. As such, both surface and subsurface units are always on the same side of the layer. Although no sub commander would ever surrender his only advantage (stealth) by using active transmissions to search for contacts, surface forces are virtually required

to use active sonar whenever a shallow water submarine threat exists. Again, while this must be done with counter-detection ranges in mind, the task force commander obviously must have some other reason to sacrifice strategic mobility and operate close ashore. Therefore he must assume he is already detected, if not targeted. Given that, the logical choice is to adopt the best defensive posture for the force and hope his surface search radars pick up any periscopes from lurkers setting up a shot. What we have not explored up to this point, however, are the measures he may have taken to minimize that threat during his transit to the area of operations.

### 13.4. JOINT ASW

For a theater level ASW campaign to be successful, the commander must correctly employ all available ASW assets: surface, air, and subsurface. Each component of the ASW triad has strengths and weaknesses that must be clearly understood for proper tactical use. Of the three, submarines are the most effective at finding and killing other submarines. The root of their strength lies in stealth as well. A low self noise means they can hear sound just as well as their prey. Because submarines can best accomplish this mission area as solo players, the use of SSNs as Hunter-Killers will be discussed separately, in the section below entitled “Commanding a Submarine”. Here we will focus on the interplay of surface and air assets attempting to detect, localize, and target submarines in a layered defense. These phases of an engagement are analogous to the aforementioned qualities of passive cross fixes, and understanding their meaning is critical to subsequent discussion.

#### **ASW Phases of Engagement:**

- **Detected**— Regardless of the source of data, active or passive, the commander has reason to believe that the presence of a submarine is possible (PossSub) or probable (ProbSub).
- **Localized**— The submarine contact has been localized to a small enough area of probability to allow attack with a reduced chance of success.
- **Targeted**— The range and bearing to the target as well as the target’s aspect, course and speed are known with sufficient certainty to attack with a high expectation of success.

### 13.5. AREA ASW

Area ASW has several applications, but the specific platforms and tactics used to conduct it remain constant throughout the range of applications. The platforms of choice are maritime patrol aircraft (MPA), like the P-3 Orion, and towed array equipped surface ships, because each possesses endurance and potency, in terms of weapons load. SSNs also conduct area ASW, but, again, their use will be explored later. Of the two, towed array assets cover a greater area, but require more time to do so, while MPA assets cover more area per unit of time, providing a quicker search of a smaller area. An alternative choice for area ASW involves carrier-based aircraft. Although they have a shorter endurance and lighter weapons and sonobuoy loads, they make up for it by being close to the action and having shorter transit times.

Area ASW is the coordination of search efforts ahead of the main force on specific areas of ocean holding tactical significance. The objective of Area ASW is to detect and localize any submarines

within the area as a minimum, and to destroy them should the tactical situation and rules of engagement allow. Within the concept of layered defense, area ASW provides the first opportunity for a commander to attrite enemy submarines.

Examples of area ASW would be the sanitization of chokepoints, such as straits and narrows, by a ship equipped with a towed array operating 30-50nm ahead of a task force along the PIM. Also, a task force required to transit at high speed is less vulnerable to subs closing in from behind the force, but much more vulnerable to subs laying ahead and to the sides of the PIM. These task forces may use patrols of MPA assets 150nm in advance of the force and on either side for the duration of the transit.

In the conduct of area ASW in H3ANW, the commander may specify the area of interest for the MPA asset to prosecute by laying out a patrol area bounded by reference points.

### **13.6. LOCAL ASW**

Once submarines have penetrated past the units conducting area ASW, their next obstacle to overcome would be the outer screen. As was discussed briefly in the section on unit positioning, outer screen assets should consist of ASW and AAW platforms, to allow for mutual defense in conjunction with their picket duties. Assets of the outer screen should be passive and conducting search operations above and below the layer.

Because of their separation from the main force (12-24nm with a preference for even more distance), any contacts generated by units of the outer screen will generally pose an immediate threat only to those units and not to the main body. Cruise-missile-equipped submarines may be an exception to this rule; though if the main body stays in strict EMCON Alpha (no betraying emissions), it is likely the submarine does not have enough information to fire on them. Still, prudent commanders will turn the main body away from the contact while the screening units attempt to prosecute it.

Screening units should jump all over the submarine contact with helicopters. With at least two ships and a helicopter holding passive contact, the targeting solution should come rapidly enough to conduct a torpedo attack with aerial delivered weapons. A stand-off weapon, such as an ASROC, may be used if the submarine is in too close. Alternately, if the passive contact is of sufficient strength that the on scene commander believes the submarine is within his active envelope, then he may elect to go active with the sonar and conduct an immediate over-the-side shot. Whether this attack is effective or not (and it generally is one of the least effective methods), it does succeed in putting the submarine on the defensive, buying the commander time for a more thorough follow-up attack.

The tactic just discussed is also the tactic of choice should a submarine be fortunate enough to penetrate to the inner screen. Because it has already achieved firing position on the HVU of the force, any and all efforts must be made to distract that submarine from attacking. Time is of the essence in getting weapons in the water, even if they are not accurately targeted. Concurrent with

these attacks, the commander must execute all appropriate torpedo evasion maneuvers based upon his knowledge of the loadout carried by the class of submarine contacted.

### 13.7. TASK FORCE DEFENSIVE TACTICS

The scenario of a prowling submarine inside the boundaries of a formation is the nightmare of every task force commander. As such, there has evolved a body of doctrine that may be selectively employed by the H3ANW commander to complicate enemy efforts to achieve this position. Obviously, all of the considerations relative to EMCON posture and counter-targeting still apply, but the commander may also decide to invoke a zigzag plan. A submarine commander may not wish to risk sticking a periscope out of the water or using active sonar, so he must perform a passive Target Motion Analysis (TMA). Simply put, a submarine commander will determine the course and speed of his targets by observing them passively and calculating relative motions from the bearing changes he sees. Since passive sonar consistently gives a direction to a target, but no other information, the submarine must perform this TMA on targets for several minutes before they are certain of their information. If the target suddenly decides to zigzag, all this careful work goes right out the window and the submarine must start all over again. Once the submarine commander has a working solution on his targets however, he may fire modern homing torpedoes or missiles. This targeting solution is what the task force commander is trying to deny the submarine commander.

H3ANW does not include any preset zigzag plans, but the user can easily create them via the navigational plotter. Occasionally introducing a zigzag in your group's course will further complicate any submarines attack against you.

### 13.8.SUMMARY

Submarines pose the greatest sustained threat in the multi-threat environment. Commanders must consider their ASW posture as an integral part of all mission planning. To successfully prosecute submarines, one must have an understanding of the tactical elements of the environment they operate in, and use every ASW asset at hand to counter their inherent advantages of stealth and surprise.

## 14.0 AIR-TO-AIR WARFARE

***Fight on and fly on to the last drop of blood and the last drop of fuel, to the last beat of the heart.***

**-Baron Manfred von Richthofen**

In H3ANW, air to air combat is covered generally, a direct result of the tactical level of the simulation involved. The game will calculate combat results based on the Air-To-Air rating (ATA) of the different aircraft involved. Combat involves a comparison of the ATA between the incoming weapon and the target; a difference is obtained between the two ATAs and this difference is added to the base percentage to hit (PK) to obtain a final PK value. A random number generator then generates a value; if this is at or below the PK number the weapon is considered to have hit. This also applies to Air Combat Maneuvering (Dogfighting).

Damage sustained during air to air combat is not modeled in H3ANW. The plane is considered removed from play should it sustain a hit.

## 15.0 STRIKE WARFARE

***My fellow Americans, I am pleased to tell you I just signed legislation which outlaws Russia forever. The bombing begins in five minutes.***

**-President Ronald Reagan**

Strike Warfare is the heart of power projection. The commander ensures that sufficient force exists to accomplish the mission while husbanding limited resources.

Understanding the strengths and limitations of the enemy IADS, as well as the strategic placement of those forces, is essential to strike planning. There may be some application of force prior to the main strike, but the prudent commander will always plan the main effort to arrive simultaneously (Simultaneous Time On toP (STOP)).

Careful Strike planning is essential to ensure the success of Strike Warfare. It is usually composed of several steps. The commander must progress through each of these in the formulation of a viable plan. In order of execution, the elements requiring consideration are as follows:

- **Target Value:** The target value is a measure of the targets strategic importance.
- **Target Composition:** A target (an airbase for example) may consist of many different parts (SAM and AAA sites, weapons storage bunkers, fuel and oil storage facilities, hangers, runways, etc.) The Target Composition needs to be considered carefully when planning a Strike mission.
- **Strike Composition:** After considering Target Value and Target Composition the Commander needs to decide which of his assets he should commit to the planned strike.
- **Ingress and Egress:** Plotting ingress and egress routes to ensure survivability of retrievable assets is a critical part of strike planning. One of the simplest methods of doing so is to plot ingress and egress routes for the strikes to avoid ancillary defenses, remain undetected for as long as possible, and minimize the time spent within the enemy zone of engagement.
- **Strike Timing:** Strike timing is a necessity in larger strike packages, dividing forces into distinct groups and elements, and assigning each a mission that supports the concerted effort. The objective of Strike timing is to achieve a condition known as Simultaneous Time On toP (STOP).
- **Battle Damage Assessment (BDA):** Battle damage assessment (BDA) is the name given to reconnaissance performed to assess the effectiveness of an attack and determine the need for any follow-up attacks on the same target.

Remember that although each topic is different, none of them operates exclusively of the others. In the formulation of a plan, if you are unsatisfied with your assessment of any of the planning steps, then it is generally wisest to scrap the plan until the limiting factor that gave you pause has been eliminated.

### 15.1. TARGET VALUE

The Target Value is a measure of the targets strategic importance. Estimating the target value is the first step of strike planning. For the commander to be willing to commit portions of his force to the destruction or reduction of a target, the target must have some significance to the achievement of mission objectives. While this may seem a moot point, in reality neglecting the mission objective in Strike Planning is a common mistake.

The conduct of war is never static; while one is attacking, one must also guard. With this axiom in mind, consider astute opponent Blue, who offers a sacrificial lamb to the strike planner, Orange, who is closing Blue's coast to attack a port or airfield. This offering might take many forms, but we will consider it to be an attractive Surface Action Group (SAG) surface action group that is out of position to contribute to the immediate tactical situation. As Orange nears his primary objective, Blue directs the surface action group to radiate and make its presence known. Blue hopes that the SAG, though not an immediate threat to Orange, will prove so tempting a target that it cannot be passed up. If Orange complies with Blue's deception and commits a significant portion of his strike package to the target of opportunity, he has unwittingly shifted the tactical advantage of initiative to Blue.

As a minimum, Blue will delay the attack on the prime objective and attrite portions of Orange's strike package directed at the SAG. This reduces the number of missiles and aircraft available for Orange's subsequent efforts against the primary target, which increases Blue's chance of survival. In the optimum case of this deceptive effort, however, Blue is now in position to strike Orange's main force first, while his attention and the bulk of his forces are directed elsewhere. Blue could be decisive in this action or, even if marginally successful, his efforts could reduce the Orange force to the point that its commander deems it unwise to continue operations against the Blue base. While this case illustrates a potential use of strategic deception, the required lesson for the strike commander in H3ANW is to ensure that the target of your efforts support the mission objective; don't attack something just because it seems to be an easy target.

### 15.2. TARGET COMPOSITION

In H3ANW, bases possess discrete targetable components. There are individual SAM and AAA sites, ground radar installations, command and control bunkers, weapons storage bunkers, fuel and oil storage facilities, hangars, runways, and other support facilities. The destruction of any of these targets will impede the enemy commander in performing the relevant functions until repairs are affected.

Strike planning requires the commander to divide components of the striking force to deal with each of these elements in turn. Although it may seem that this complicates the strike planning process (and it does to some degree), it also provides greater realism and flexibility in terms of tailoring strikes to support specific needs. For example, if one is attempting to preclude a secondary base from supporting the object of a main attack, it isn't necessary to strike that base's runways to keep aircraft on the ground. The naval commander will seldom have enough aircraft and missile resources on hand to conduct a simultaneous attack on two or more land facilities. The strike package aimed at the secondary base may consist exclusively of jamming and fighter aircraft. The jammers can confuse the command & control of the base's



radar picture, engage active radars with home-on-radiation missiles (HARM) and distract airborne interceptors away from the main group. The fighters can conduct an offensive sweep of the interceptors, again to preclude their efforts to support the base which is the object of the primary attack.

Another example of this approach would be a strike targeted specifically at the weapons bunkers of an installation. If destroyed, the enemy would have only those assets at the SAM sites or already on the hardpoints of aircraft to conduct further offensive or defensive operations. Plus, there is always the chance of some beneficial secondary explosions.

Although strike planning against fixed targets like port facilities and airbases is simplified due to the target's lack of mobility, location and composition of the target and its environment still require analysis. The location of a target is important because it determines both the line of demarcation of the striking force and the envelopes of engagement of supporting forces. The line of demarcation is the maximum range at which a strike commander can begin to employ force on the intended target. Because this line reflects the extended ranges of attack aircraft at reduced weapons loads, it is most often not the effective strike range. To obtain the maximum effective strike range, the commander must consider the feasibility of in-flight refueling for all of the fully loaded strike elements he has determined necessary to conduct the strike. The inverse of the line of demarcation is the maximum engagement envelope of enemy long range air assets and land based surface-to-surface missile systems. Within this context, it should be apparent that the strike commander must not only be concerned with the capabilities of the targeted base, but must also consider the proximity of other bases to the target which could multiply enemy defenses.

As you can see, the possibilities are endless. As a strike commander in H3ANW, the important thing to remember for this phase is to match the specific target types to the mission requirements and to always remain aware of both the line of demarcation and the enemy's zones of engagement.

### 15.3. STRIKE COMPOSITION

With a firm grasp of the first two factors in Strike Planning, the commander may now analyze what elements of the force are best suited to conduct the mission and what weaponry they will carry to do so. In discussing these dispositions, one will hear references to the strike force, the strike group, and the strike element. Understanding their relationship is important. A strike element is a single sortie group of one to six aircraft of the same type. Strike elements may be larger, but it is generally not advisable, as this simplifies enemy intercept and counter-targeting efforts. Strike groups are composed of all strike elements, regardless of type, originating from the same unit. A strike force is all of the assembled strike groups that will attack the same target, regardless of their point of origin.

Some targets may be prosecuted by a single strike element, such as a pair of Harpoon-equipped A-6 Intruders engaging a group of missile patrol boats operating outside the enemy air defense envelope. In this scenario, since the weapons of the strike aircraft outdistance the range of the enemy's best AAW weapon, and the strike planner need not be concerned with enemy air intercept, a small aircraft group is sufficient to deliver decisive force. Other targets may require

the coordination of all aircraft and Tomahawk Land Attack Missiles (TLAM) within one or more CVBG's to penetrate and saturate enemy defenses. The more sophisticated the Integrated Air Defense System (IADS), the more diverse the approach must become.

Consider the approach adopted by the Coalition Command at the outset of the air war against Iraq. Iraq's IADS at the commencement of hostilities was estimated by Intelligence to be seven times more lethal than the one deployed around Hanoi at the height of the Vietnam War. Hanoi's concentration of SAM sites virtually precluded low-level precise delivery of munitions throughout the war due to unacceptable loss estimates, yet Iraq's system exacted 1/3 the casualty rate per 1,000 sorties during Operation Desert Shield/Desert Storm. The reason behind this seeming inconsistency between expectations and results lies in the systematic reduction of Iraq's IADS through proper strike planning.

Major General John Corder, U.S. Air Force, Director of Central Command Air Operations, employed a comprehensive, yet easy-to-understand, approach. H3ANW commanders should use it as a guideline in their planning of major coordinated strikes by diverse elements. The precursor of the attack was a massive barrage of communications and radar jamming by coalition aircraft. The jammers remained in position to engage and destroy enemy radar sites with HARM, ALARM and other anti-radiation homers as they went active. From behind the wall of electronic noise emerged 100 TLAM's directed at fixed radar sites and command & control facilities. F-117's supplemented the TLAM's against the most hardened facilities and succeeded in severing the head from the IADS structure. Lacking central coordination and targeting information, the remaining pieces of the IADS were left to operate independently against the successive waves of strike aircraft operating with supporting fighter escort. With their eyes and ears destroyed, however, all shots fired at aircraft by these facilities were unguided and, therefore, inaccurate. The results of successful planning, timing, and coordination are telling: one F/A 18 lost on the night of the strike for virtual destruction of an entire nation's air defense system.

### 15.4. INGRESS AND EGRESS

Plotting ingress (insertion/entry) and egress (exiting) routes to ensure survivability of retrievable assets is a critical part of strike planning. One of the simplest methods of doing so is to plot ingress and egress routes for the strikes to avoid ancillary defenses, remain undetected for as long as possible, and minimize the time spent within the enemy zone of engagement.

Although it is not always possible, due to the overlapping nature of defensive air networks, the strike planner should strive to avoid entering the weapons envelopes of units other than the primary target, and avoid theirs as well if sufficient stand off weapons exist. To do so, refer frequently to the tactical overlays provided for the H3ANW map.

Plot air group movement to avoid overlapping circles of enemy air coverage. Further, if you must pass through these circles, do so as close to tangentially as possible. This approach presents the enemy with a long range crossing shot, the least effective possible engagement posture.

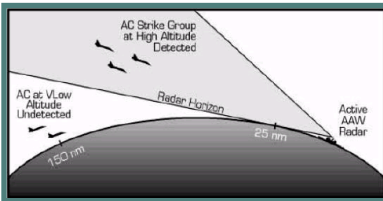
Also, one may note that many coastal facilities now have ecliptic cones of radar coverage versus circles to more closely reflect their real world counterparts. For an equivalent signal strength, a directional radar has much greater range than an omni-directional radar. Since a

threat is perceived to be coming from outside the country's borders, as opposed to within, the focal point of these radars will be directed off shore and the portion of the ellipse behind the installation may be tens of miles deep rather than hundreds. When this occurs, if the strike planner has the opportunity to cross the enemy coast elsewhere and strike these targets from behind, it is always a sound tactical move to do so with at least one strike element, if not more.

When the transit phase is complete and forces are in position to conduct the attack, then the planner should allow for a direct path from the edge of the enemy weapons envelope to the launch range and back again. This approach minimizes the time during which strike elements may be counter-attacked. Further, by adopting a multiple-axis attack (some of which can be deceptive groups), the strike planner spreads the enemy defenses among the strike elements, which again increases the chance of success.

Remember also that, to be targeted, one must be detected. The longer the strike planner can delay that detection, the more survivable the strike elements become and the greater chance of success for the strike force as a whole. The primary methods of influencing these variables in the H3ANW model are via altitude assignment and EMCON posture.

Radars are essentially horizon dependent when it comes to maximum range. This fact explains why a surface search radar has very limited maximum range in comparison to an air search radar, some of which are capable of detecting inbound aircraft at hundreds of miles, provided the aircraft are above the radar horizon. To understand the importance of the radar horizon, consider the following example:



Both elements are from the same strike group and are 150nm from their intended target, represented by the generic surface ship. Note that the higher aircraft are already detected by the air search radar of the target, because, by being at high altitude, they are above the radar horizon. The other aircraft, however, are operating at very low altitude. As a result, they will not cross the radar horizon until about

25nm from the target, minimizing enemy reaction time and allowing for a more effective attack. If the lower aircraft were cruise missiles instead of aircraft, this range could be even shorter, on the order of 15nm, because of the extremely small radar profile and sea skimming altitude of the missile.

Note that the radar horizon generally extends beyond the visual in the lower atmosphere, particularly at sea level. This phenomenon would be insignificant if it did not have tactical implications. Remembering that radar requires the reflection and return of the transmitted signal to the antenna, the strongest returns are generated in the center of the transmitted waves. Argentine A-4 pilots utilized this knowledge to perfect low level approach patterns during the Falklands War. In essence, what they did was adopt a very low profile similar to the lower aircraft in the preceding example. As soon as the ESM threat warning gear lit up, however, to indicate their crossing of the radar horizon, they would drop in altitude. The

momentary exposure was insufficient for British radar operators to discern the contact and skilled Argentinean pilots were able to conduct this maneuver up to three times on a standard approach at progressively closer ranges. The technique came to be known as “pecking the lobe”, and it was employed with great success to compress the battle space and reaction time afforded the British commander. Were it not for fusing delays associated with the Iron Bombs carried by the A-4s, it is very likely that many more hulks of British warships would litter the ocean bottom around the Falklands.

### 15.5. STRIKE TIMING

Strike Timing is a necessity in larger strike packages, dividing forces into distinct groups and elements, and assigning each a mission that supports the concerted effort. This practice increases the survivability of individual elements, as the enemy's counter-targeting is complicated and decreases the amount of ordnance lost due to jettisoning when the enemy does intercept, but it also complicates the coordination effort of the strike planner. As noted in the beginning of this section, the strike planner is analogous to an orchestra conductor. In that role, if even one element of the whole fails to show up on time, or plays out of concert with the others, the entire movement is jeopardized.

The easiest method of establishing the timeline for the strike is to work it backwards, from the moment the last weapon would be delivered to the launch times for the various elements. The planner can discount flight deck limitations to a degree in the H3ANW model, as the staff assistant allows for the assembly of each strike element in loiter before proceeding to target. The critical considerations will be missile time of flight (if one is using these assets as a part of the strike package), aircraft time of flight (which can vary between strike elements if the planner has implemented circuitous maneuver or a multiple axis attack), and weapons time of flight for the aircraft armament packages selected. Naturally, if one is using point weapons like free fall bombs and munitions canisters, this latter consideration can be discounted. Otherwise, with guided or precision munitions, their time of flight must be considered.

By starting with a time of impact and considering weapons' flight time, including TLAMs, from the selected launch points, the commander knows what time the launch platforms must arrive at those points. When this is known, the commander can again work backward along the plotted movement leg for each aircraft element and determine when they must clear the deck to commence the mission.

The objective of all this number crunching is to achieve a condition known as Simultaneous Time On toP (STOP), the equivalent of strike planner's nirvana. When STOP occurs, it means that all of a strike's ordnance arrives at the same instant, which is guaranteed to saturate the most cohesive enemy defenses.

### 15.6. BATTLE DAMAGE ASSESSMENT (BDA)

BDA is the name given to reconnaissance performed to assess the effectiveness of an attack and determine the need for any follow-up attacks on the same target.

If manned aircraft were part of the initial strike package, then an initial assessment of the damage inflicted will be provided. This assessment may be inaccurate, and the commander can refine its authenticity (in the case of ASuW attacks) by including a reconnaissance aircraft

as one of the last elements to enter the target area. In strikes against land based targets, the commander may obtain accurate satellite data on the effectiveness of his strikes after a period of a few hours.

### 15.7. ANTI-SURFACE WARFARE (ASuW)

ASuW is slightly more difficult than AAW, because one must invest more time establishing hostile intent and refining the over-the-horizon targeting solution. Several factors must be considered when one is contemplating an ASuW strike, including target composition, delivery platforms, which ordnance package(s) will best accomplish the job, and timing. Because surface units begin with a limited number of ASuW weapons, it is generally advisable to husband these resources if air groups are available to prosecute the attack.

Not just any air group constitutes an appropriate strike, however. Proper strike planning requires the player to consider the enemy's defenses and the amount of ordnance that must be delivered to achieve the objective of the strike. Weapon types must be matched to target types, but, more importantly, the strike aircraft must be given a reasonable chance of reaching their launch points.

In the previous section, the player viewed an ASuW strike from the receiving end, with the goal of destroying that strike before it could prove decisive. In this section, we will reverse roles and capitalize upon this new found AAW expertise to exploit it for our own purposes. The H3ANW commander must learn how to evaluate enemy defenses and develop a plan to overwhelm them in support of the ASuW mission area, first through air assets and then with surface ships.

#### 15.7.1. Over-The-Horizon Targeting

Since enemy surface task forces are mobile, the first step to prosecuting them is to find them. Some guidance has already been provided on passive cross-fixing, which is a form of Over-The-Horizon (OTH) targeting, in the section on electronic warfare. As such, this section is designed to supplement that information by discussing the role of ship based helicopters in OTH targeting.

As a stand-alone search platform without any initial locating information on the enemy force, the helicopter has limited effectiveness. Armed with even a single ESM detection of a sensor on a platform of interest, however, the helicopter can begin a line of bearing search to attempt to acquire that target. If the helicopter flies out the line of bearing to its maximum radius and doesn't discover anything, it was not a wasted journey. At least the tactical commander has good reason to assume that the enemy platform is beyond that maximum range.

Helicopters are best employed, however, when a rough area of probability has been obtained on the enemy force, such as when they are radiating intermittently. In this instance, the helicopter approaches the area of probability from off axis, so as not to provide the enemy a line of bearing to its launch platform should it be discovered. Once the pilot estimates that he could be above the radar horizon (see the strike warfare section for a full explanation of this concept) of the enemy group should they radiate, he must slow down and reduce elevation.

For the duration of the approach, the helicopter should fly slowly and under 50 feet to make detection difficult, using their small radar and visual cross section to remain undetected, even when within sight of the formation being targeted, and while maintaining a directional data link

back to the parent platform. If these same helicopters are also ASuW missile capable, such as the British Lynx, then the commander may use them to conduct the first pulse of his strike package from their undetected position at short range. Indeed, such tactics proved devastating to the Iraqi Navy during Operation Desert Storm, which has prompted considerable open debate by policy makers in other purely coastal navies.

Alternately, the helicopter may conduct a search tactic known as jumping jacks. From the standard search profile of 150 feet at cruising speed, the helicopter pops up to between 500 and 1000 feet, does a visual scan and a couple of quick radar sweeps; if nothing is spotted, then it dives down to the deck again. The process is repeated about every 7-9nm during the search at the pilot's discretion. This tactic puts the helicopter at greater risk but increases the scouted area.

### 15.7.2. Evaluating Enemy Defenses

Commensurate with the effort to refine the targeting solution for the conduct of an ASuW strike, the commander must also classify the composition of the enemy force to the best of his ability. The more accurate this assessment, which is based on the correlation of sensor and bearing information (as explained in the Electronic Warfare section), the more correctly the commander may determine the defensive power of the formation to be targeted.

When several asset types are possible, the prudent commander always assumes the worst case scenario. Applying this logic to all of the discrete platforms that have been detected, the commander comes up with a composite picture of the enemy force. Using the H3ANW database and the formula presented to calculate a ship's AAW capability, the commander can reliably estimate the required saturation level for the intelligence composite he has developed. Armed with this knowledge, the commander may begin strike planning in earnest. One note of caution must be mentioned, however: The saturation estimates are only as accurate as the classifications of the target types. It is possible to overestimate, wasting precious weapons, or underestimate, endangering the strike elements themselves.

### 15.7.3. The ASuW Strike Group

Once the target has been classified and targeted, the commander must have a strike package ready to assign to the threat. We have already noted that it is best to conduct ASuW strikes with air assets, whenever possible. Bearing that advice in mind, let us consider a strike against an enemy Carrier Battle Group (CVBG), to illustrate one possible composition and approach. First, you should launch 4-8 fighters in two groups on patrol missions in the area you expect to encounter enemy Combat Air Patrol (CAP). You cannot launch these fighters on strike missions because their ordnance does not match the target type. Immediately following this, the commander should launch all ARM or HARM capable aircraft to engage any air search radars that go active in the target group. If these units succeed in blinding the enemy, the remainder of the air groups will have a milk run. Follow this with the main body of the strike force, employing stand-off and guided munitions. Iron bombs should be reserved strictly to mop up critically wounded ships after the main attack or, in the case of limited air resources, as weapons of last resort. Concurrent with the fighter sweep, but as a discrete group, the commander may also commit electronics support aircraft, such as the EA-6B, increasing the survivability of the strike as a whole. If several types of strike aircraft will be used, each should be launched as a

separate group, to complicate the enemy's AAW effort and maximize the chances of the strike achieving its objective.

#### 15.7.4. Ship-to-Ship ASuW

When air assets are unavailable to prosecute the target, surface forces must consider other factors to maximize their attacks. It is important to ensure that you have a refined, complete targeting solution prior to committing the limited assets in the magazine. Further, you must be certain of the composition of the target group. Do you know they are hostile? Will the number of weapons you are about to employ ensure saturation, based on the intelligence you have at that point? If the answer to either of these questions is no, then hold off on the attack. If you are certain that conditions are right to proceed, the next step is to establish both the timeline and the axis of the attack.

The timeline is easy to calculate using the method delineated in the Strike Warfare section. As noted there, when coordinating multiple firing platforms, the objective should be to obtain simultaneous time on top to saturate the enemy defenses. In considering the axis of attack, firing straight down the bearing to the target may be the fastest method of getting ordnance on the target, but it also allows the enemy to shoot a bearing only attack down the reciprocal course of the inbound missiles once he detects them. This is known as a "quick shot" and it is an exercise practiced routinely by surface ships. It is rarely a conclusive attack, but if fired down the correct bearing (i.e.: the original shooters did not fire off axis), it can force the enemy ships to bring up the AAW radars. This tactic would allow surviving members of the original target group to quickly counterattack with any remaining ASuW missiles.

#### 15.7.5. Composition and Employment of Surface Action Groups (SAGs)

If enemy forces have equivalent launch ranges for ASuW weapons, then prudent commanders will dispatch a Surface Action Group (SAG) instead of endangering their HVU. SAGs are good for taking the battle to the enemy. As a rule, they can transit faster than the entire battlegroup and prosecute the attack more quickly. The commander must ensure, however, that SAG composition is adequate both to accomplish the mission and to defend itself against potential threats.

A strong SAG should be capable of posing a viable threat to a CVBG. To do so, it should include at least four medium range ASuW shooters, one long range AAW shooter, one medium range AAW shooter and, if an ASW threat is present, a couple of helo equipped platforms to counter the subs and provide OTH targeting services. Towed array assets are not important because SAG transit speeds render this sensor useless. This composition ideally means four ships of proper capability, not eight total, because each ship class should be multi-mission capable. Two- and three-ship SAGs may also be used against smaller groups or less capable ships with a corresponding expectation of success.

The optimum formation for a surface action group is a scouting line abreast with 10-12 nm spacing between units. This allows for maximum swept coverage of the scouted area, covert communications via flaghoist and semaphore relay, as well as optimum separation for passive crossfixing, as described in the section on Electronic Warfare. Also, when the target group has

been located and classified, this formation provides an inherent multiple axis for your ensuing missile attack.

### 15.7.6. Summary

Effective ASuW requires passive cross-fixing and other over-the-horizon targeting techniques. Once forces have been detected, classified, and targeted, the commander must conduct a detailed estimate of the salvo size required to achieve saturation. Finally, in the prosecution of the attack, make every effort to conceal the origin of the attack to avoid counterattack.

## 16.0 ANTI-AIR WARFARE (AAW)

*I saw the lightning's gleaming rod.  
Reach forth and write upon the sky  
The awful autograph of God.  
-Joaquin Miller, 'The Ship In The Desert'*

AAW posture should be a constant concern of the naval commander, as a missile threat can materialize from all types of contact: surface, subsurface, or air. Further, with anti-surface missile speeds ranging from subsonic, in the case of sea skimmers like TASM, to Mach 4, like the HARM, an AAW threat may present an attack window with engagement time measured in seconds. If the commander has not invested the forethought and planning to be in position to take advantage of the period of vulnerability, the missile strikes home and further actions, even the destruction of the launch platform, are academic.

In determining the AAW force posture, the commander must remember the tactical axiom to "Shoot the Archer, not the Arrow", whenever possible. If the Rule of Engagement (ROE) and other constraints allow, it is always better to engage the firing platform before it reaches its launch point, thereby killing many missiles with a single attack, instead of attempting to deal with groups of multiple inbound missiles. Although this is the optimum case, it is not always attainable. As a result, the prudent commander balances the effort and resources committed to the outer air battle just described, with those necessary to provide cohesive mutual support in the inner air battle.

To illustrate the conduct of the inner and outer air battles, we must return to our earlier comparisons of the inferior and superior force. In the case of an inferior force, which has adopted dispersal as the best tactic, AAW defense is a single unit or small group proposition. In essence, it is every man for himself, and the best chance for survival in the face of enemy air superiority is to avoid detection in the first place. Conversely, remember that superior forces favor concentration and massing for mutual defense, which fits the more complicated model of integrated AAW at sea.

For the remainder of this section, the case of the superior force commander is assumed.



### 16.1. AAW WEAPON BASICS

Before examining the flow of events that occur in the outer and inner air battles, the commander must become fluent in the technical constraints which govern the employment of Surface-to-Air Missile systems (SAMs). The majority of the world's surface-to-air missile systems employ semi-active homing for in-flight guidance and course corrections. Semi-active homers require the firing platform to actively illuminate the target throughout the intercept with a missile fire control director. The number of directors a ship possesses governs the number of intercepts that may be simultaneously prosecuted.

Thus, as a rule, director assignments are more limiting than launcher cycle rates in evaluating engagement potential. If the guiding radar shuts down for any reason, such as attempting to avoid an inbound HARM or being struck by the same, then all defensive missiles in flight self-destruct.

The exception to the aforementioned limitations is the Aegis fire control suite employed by the Ticonderoga and Arleigh Burke class ships. The SPY-1 radar system employs phased-array and timesharing technology to allow simultaneous tracking and targeting of hundreds of contacts and each of the four array faces can manage three missiles in flight. This means that the Aegis platform suffers none of the delays associated in switching between targets and can manage 12 missiles in a 360 degree area of coverage at any instant. Further, as an intercept is completed, if other targets remain, the system can automatically and instantaneously put another missile in the air from the vertical launch system to refill the engagement queue.

Also, because the SM2-MR missile possesses an inertial mode, if the guiding radar shuts down for any reason, all missiles in flight will continue on their last course until an intercept occurs or fuel is expended. Maneuvering aircraft can, as a rule, escape this "death gasp", but non-maneuvering missiles will generally still be intercepted. Given these capabilities, it is not surprising to see why Aegis is referred to as "The Guardian of the Fleet".

### 16.2. AIRBORNE EARLY WARNING (AEW)

The first consideration for proper AAW management is Airborne Early Warning (AEW). If you cannot see them coming outside their launch points, then the outer air battle is already lost, and the commander is forced to play catch up in the inner screen. The premier platform for AEW is the E-3 AWACs, but it is constrained by being a land-based asset. If they are available, use these aircraft to the maximum extent possible. If not, E-2 Hawkeyes are the weapon of choice to keep savvy CVBG Commanders apprised of the air threat. A well positioned E-2 eliminates the need for the CVBG to use active emissions altogether, thereby confounding the enemy's targeting efforts. He will know you are in the area, because E-2s don't materialize out of thin air, but he won't be able to localize your ships well enough to attack them without resorting to methods other than ESM.

To employ one of these AEW assets, station it in a race track loiter pattern covering the area of interest. In the case of a rapidly transiting CVBG, for example, this might be 100 nm ahead on the PIM. Also, since there are a limited number of these valuable aircraft, and they are very vulnerable to enemy intercept, it is always prudent to also provide one or two fighters to escort the AEW platform.

### 16.3. THE OUTER AIR BATTLE

The primary player in the outer air battle is the fighter/interceptor aircraft on a Combat Air Patrol (CAP) mission. CAP may originate from a CVBG or a land base. Further, CAP may protect their unit of origin or any other unit. CAP assets stationed to protect units other than their home base are known as Long Range Combat Air Patrol (LORCAP) assets.

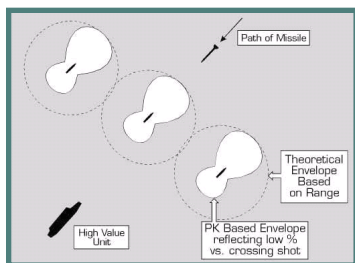
The proper positioning of CAP or LORCAP is to either side of the expected threat axis at 160-180nm from the units to be protected. Use the loiter command to prolong their time on station and reduce the amount of relief CAP that must be launched. From this vantage point, with AA missiles, destroying portions of strike elements and possibly causing others to jettison their ordnance to increase maneuverability and survivability. The pilot's dictum is that it is far better to flee and fight another day than press forward with a suicidal or non-decisive attack. When this latter case occurs, it equates to a "mission kill", even if the CAP does not succeed in eliminating any of the inbound aircraft.

Players must watch these engagements closely and dispatch relief CAP to the units on station as soon as they occur, so that follow up waves of attack aircraft are met with full weapons loads. Once inbound aircraft have penetrated the outer defenses, the player may have a second opportunity to engage them with CAP aircraft in ready- 5 (ready to launch quickly) status, but the bulk of them will become the responsibility of formation AAW assets.

### 16.4. THE INNER AIR BATTLE

In this area, the player has a little latitude tactically. Within the main body, shooters should be positioned such that they can provide a layered defense and overlapping coverage to protect the high value unit(s) (HVV), which is usually the aircraft carrier (CV), amphibious assault (LPH), command (LCC), support ships, or merchant groups. Each class of AAW ship usually has several methods of defeating inbound aircraft or missiles, including either long or medium range missile systems and point defense systems like the Phalanx. They also have electronic countermeasures, which provide a "soft kill" on missiles by luring them away from their actual targets to explode harmlessly over the ocean.

To protect the HVV, the optimum position for the firing platform is directly between the HVV and the inbound missile group. The reason for this constraint relates to the probability of kill (Pk) for the missile as a factor of the aspect of engagement. Although the ship is plotted with a circle denoting maximum effective range of the AAW weapon system, when viewed with Pk in mind, the circle becomes an ellipse. The highest percentage shot is against a directly inbound missile (Figure 10). As one nears the tangent or closest point of approach of a missile flying past the ship (known as a crossing shot), regardless of range, the Pk drops under 20%, as a rule. This reduction is because the relative motion of the intercept is at the peak speed, and most AAW missiles cannot do course trajectory changes fast enough to complete the intercept for a crossing shot as just described. As the missile continues toward other ships in the formation, the defenders may obtain an opportunity for one more attack on the missile. These tail chase engagements have a slightly higher Pk than crossing shots, but they are still below acceptable standards.



**Figure 10: PK based weapons envelopes.**

be interspersed with the ASW units of the outer screen and also affords a greater degree of protection from AAW attacks somewhat off the main threat axis. Naturally, the more reliably you predict the axis of attack, the more effective your units will be in the subsequent inner air battle.

### 16.5. SPECIAL TACTICS: THE ROLE OF THE AAW PICKET SHIP

More sophisticated tactics involve the use of AAW picket ships in either a missile trap or silent SAM configuration. When the tactical situation dictates that the main body adopts an active emission posture (i.e. their detection and localization is assured to enemy forces), positioning one or two cruisers 100-150 nm from the main body on the threat axis in total emission silence is ideal. In this configuration, the cruiser(s) can act as a missile trap, going active with their air search radars only when the incoming raid has been detected by other means and is within their engagement envelope. The hazard to this tactic is that, once these assets go active and are detected, they lack mutual defensive support and become vulnerable to individual attack.

Silent SAM is similar in terms of stationing distance, but it is a tactic that never requires the shooter to illuminate the target. Cruisers equipped with the New Threat Upgrade (NTU) SM2ER missile can receive targeting data from other sources and shoot inbound aircraft silently 75-90nm from their position, which equates to 175-240nm from formation center depending on their station. Because these assets remain electronically silent throughout the attack, their survivability in an extended picket station is greater than the conventional cruiser employing missile trap tactics.

### 16.6. CALCULATING DEFENSIVE AND STAYING POWER

Occasionally, it is beneficial for the force commander to calculate the defensive power of a unit against missile attack, particularly when making stationing decisions. A reasonably accurate, yet simple to obtain, method of obtaining these figures follows.

Take each ship of the force and examine its AAW weapons systems. Assign numeric values to the following attributes based upon factors listed in the H3ANW database.

- A = The maximum number of intercepts per engagement cycle
- B = The number of engagement cycles based on maximum range
- C = The base Pk value of the missile system

D = The effective number of engagements

Manipulation of these variables yields the equation:

$$A \times B \times C = D$$

Assign B a value of 1 for short range shooters (i.e.: 25nm or less), 1.5 for medium shooters (30-45nm) and 2.5 for long range shooters like the SM2 ER used in the earlier example. Continuing that example here, let's assign a value of 4 to variable A, to reflect the number of directors and a base Pk to the missile of 80%. By inputting these numbers we arrive at the following value:

$$4 \times 2.5 \times .8 = 8$$

Thus, we have determined that an SM2 ER unit should be capable of engaging 8 inbound targets with its missile system alone. As a rule of thumb, if the unit is the subject of the attack, one may be added to D for the presence of a point defense system, such as Phalanx, one may be added for chaff, and one may be added if the unit has defensive ECM capability such as that provided by the SLQ-32. Thus, a Leahy or Belknap class, if optimally positioned, could increase force defensive posture by 8 kills, yet has a higher saturation value of 11 in defending against an attack on itself. Beyond that, any surviving missiles will strike their target.

AAW gun systems are discounted for all classes when considering missiles, as the constraints related to proximity fusing make such employment a low Pk proposition. Their effectiveness is higher against manned aircraft, provided the latter are cooperative enough to fly within the relatively short zone of engagement.

Finally, the commander must understand that these estimates assume early detection of the threat, so that the first engagement occurs at the maximum effective range of the SAM system. When the enemy succeeds in compressing the battlespace using one or more of the tactics discussed throughout this manual, reaction time and the maximum number of AAW engagements are reduced considerably.

### 16.7. SUMMARY

The AAW commander must constantly update the threat axis to reflect the most reliable intelligence available. In formation considerations, invest the time necessary to actually analyze the capability of your own force's units. Balance resources between the outer and inner air battles, but strive to shoot the archer, not the arrow, whenever possible. Finally, station assets relative to the threat axis with Pk-biased weapons envelopes in mind. This tactic will increase your chances of living up to the Aegis motto: "If it flies, it dies."



# COMMAND CARD

COURSE TRACKS DATA BLOCK  
ALL/SEL/OFF

NUM LOCK	/	*	-	DECREASE TIME COMPRESSION
7 Home	8	9	+	INCREASE TIME COMPRESSION
4	5	6		
1 End	2 Pg Dn	3		CLEAR OLD CONTACT 1:1 TIME
0 INS	DEL	Enter		

RENAME UNIT/  
GROUP/CONTACT/  
NAV ZONE

DISPLAY  
GROUPS/UNITS

TOGGLE  
RANGE/BEARING  
ON/OFF

ADD REF  
POINT

DEL REF  
POINT

GROUP SELECTED UNITS



WEAPONS FREE



SPACE

SELECT NEXT  
GROUP/UNIT

SELECT PREVIOUS  
GROUP/UNIT



UNASSIGN



MARK AS HOSTILE



MAP SCALE



SSK RECHARGE COMMAND



LAT/LONG OVERLAY



## MOUSE CONTROLS

- Left Click to Select
- Right Click to Center Map
- Shift+Click to Select/Deselect Multiple Units/Groups

SONOBUOY RELEASE



PASSIVE



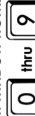
ACTIVE



DROP SONOBUOY LINE BEARING ONLY ATTACK



ZOOM WINDOW HOTKEYS



AWW-A-117 June 2010

SPEED

ALT

DEPTH

ATTACK

FORM-  
ATION

NAV

MODE

LOGIS-  
TICS

AIR

OPF

NAV

ZONE

EDITOR

WIN-  
DOW

PREF

SENSORS

WINDW

NEW

PAUSE/  
ZOOM

RESUME

HELP

## FUNCTION KEY

## TOOLBAR BUTTON

FORMATION EDITOR	COMPUTER CONTROLLED UNIT	PATROL ZONE	THREAT AXIS

## WINDOW CONTROLS

NEW ZOOM WINDOW	ZOOM IN	EXPAND OUT	TRACKING WINDOW ON/OFF	PR EF

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