

# WAR — ON THE — SEA



Game Version 1.08e5  
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# CONTENTS

<b>CONTENTS</b> .....	<b>2</b>
<b>1. INTRODUCTION</b> .....	<b>3</b>
<b>2. MAIN MENU</b> .....	<b>4</b>
<b>3. TRAINING AND SINGLE BATTLES</b> .....	<b>4</b>
BRIEFING - (TACTICAL MAP) .....	5
COMBAT .....	6
MENU PANEL .....	7
ENDING COMBAT.....	7
ACTION REPORT .....	7
<b>4. UNIT VIEWER</b> .....	<b>8</b>
<b>5. MUSEUM</b> .....	<b>10</b>
<b>6. COMBAT INTERFACE</b> .....	<b>11</b>
MAIN TOOLBAR .....	12
CAMERA BEARING .....	12
MESSAGE LOG.....	13
UNIT ROSTER .....	14
UNIT/TARGET DATA .....	14
SECONDARY TOOLBAR .....	15
<b>7. TACTICAL MAP (MINI MAP)</b> .....	<b>16</b>
<b>8. UNITS &amp; NAVIGATION</b> .....	<b>18</b>
ORDERS PANEL .....	20
COLLISIONS.....	21
<b>9. SHIP WEAPONS</b> .....	<b>22</b>
SELECTING TARGETS .....	22
MAIN & SECONDARY GUNS .....	23
TORPEDOES & TORPEDO ROOMS.....	26
DEPTH CHARGES .....	28
TARGET SOLUTION & DIRECTORS .....	29

<b>10. SENSORS &amp; DETECTION</b> .....	<b>30</b>
ENVIRONMENTAL CONDITIONS .....	30
VISIBILITY .....	31
SMOKE SCREENS .....	31
RADAR .....	32
SONAR .....	33
<b>11. ARMOR &amp; PROTECTION</b> .....	<b>35</b>
BALLISTICS .....	35
SHELL PENETRATION .....	35
TORPEDO DEFENCE SYSTEMS .....	36
<b>12. DAMAGE CONTROL</b> .....	<b>37</b>
COMPARTMENTS AND SUBSYSTEMS .....	39
DAMAGE CONTROL PARTIES .....	40
<b>13. AIRCRAFT</b> .....	<b>42</b>
ATTACKING WITH AIRCRAFT .....	43
MANUAL ATTACKS .....	45
<b>13. BATTLE EDITOR</b> .....	<b>46</b>
<b>14. CAMPAIGNS</b> .....	<b>48</b>
EVENTS .....	48
STRATEGIC MAP .....	49
CAMPAIGN SUMMARY .....	50
LOCATIONS .....	53
RESOURCES.....	53
SHIPS & SEA GROUPS .....	54
AIRCRAFT .....	56
SCOUTING & SEARCH PATTERNS .....	58
PLOTTING COURSES .....	59
ENCOUNTERS.....	59
THE GROUND WAR.....	60
WEATHER .....	61
<b>15. OPTIONS</b> .....	<b>62</b>
<b>16. CONTROLS REFERENCE</b> .....	<b>63</b>

# 1. INTRODUCTION

War on the Sea will challenge you with the tactical and strategic of naval combat as you command submarines, ships and task forces along with use of aircraft in the South Pacific during the early years of WWII.

Following the devastating attack on the United States Pacific Fleet at Pearl Harbor, the Empire of Japan continues to expand unabated. A month after the indecisive Battle of the Coral Sea, the United States secures a major victory at the Battle of Midway, significantly weakening Japan's carrier strength in the Pacific. The stage is now set for Allied forces to go on the offensive and attempt to re-take Guadalcanal in the Solomon Islands.

## INTERFACE

**Red text** refers to key commands and references to in-game.

All interactions with the interface are performed with mouse **LEFT CLICK**, unless otherwise specified.

**Alpha** keys refer to numbers on the keyboard while **NumPad** keys refer to numbers on the number pad (Num Lock is assumed to be on).

Key Bindings:

Two sets of default keys are may be used based on steering with WASD controls or using the NUMPAD.

This manual is based on the NUMPAD key layout (see Section 16).

**LEFT CLICK** padlock icon next to Main Toolbar to lock/unlock UI, then **LEFT CLICK** and drag to move panels about as desired.



**CONFIRM**: some permanent actions, such as deleting files, or ending combat, require confirmation.

**LEFT CLICK** the **CONFIRM** button to execute the command or **LEFT CLICK** the original button again to hide the **CONFIRM** button.



## 2. MAIN MENU

<b>TRAINING</b>	Tutorial missions teaching you how to play the game
<b>SINGLE BATTLE</b>	Stand alone combat missions based on actual engagements
<b>BATTLE EDITOR</b>	Create, save and load your own battle scenarios
<b>CAMPAIGN</b>	Dynamic campaigns
<b>MUSEUM</b>	View and control any ship or aircraft in the game
<b>OPTIONS</b>	Edit game settings
<b>CREDITS</b>	List of contributors to War on the Sea
<b>QUIT</b>	Exit War on the Sea

## 3. TRAINING AND SINGLE BATTLES

For your first time playing War on the Sea we recommend doing the Training missions.

To play a Training or Single mission, select **TRAINING** or **SINGLE BATTLE** from main menu.

### MISSION LIST

Arrows at top can be used to switch theatres.

Note that no missions are available for the ATLANTIC and MEDITERRANEAN theatres at this time.

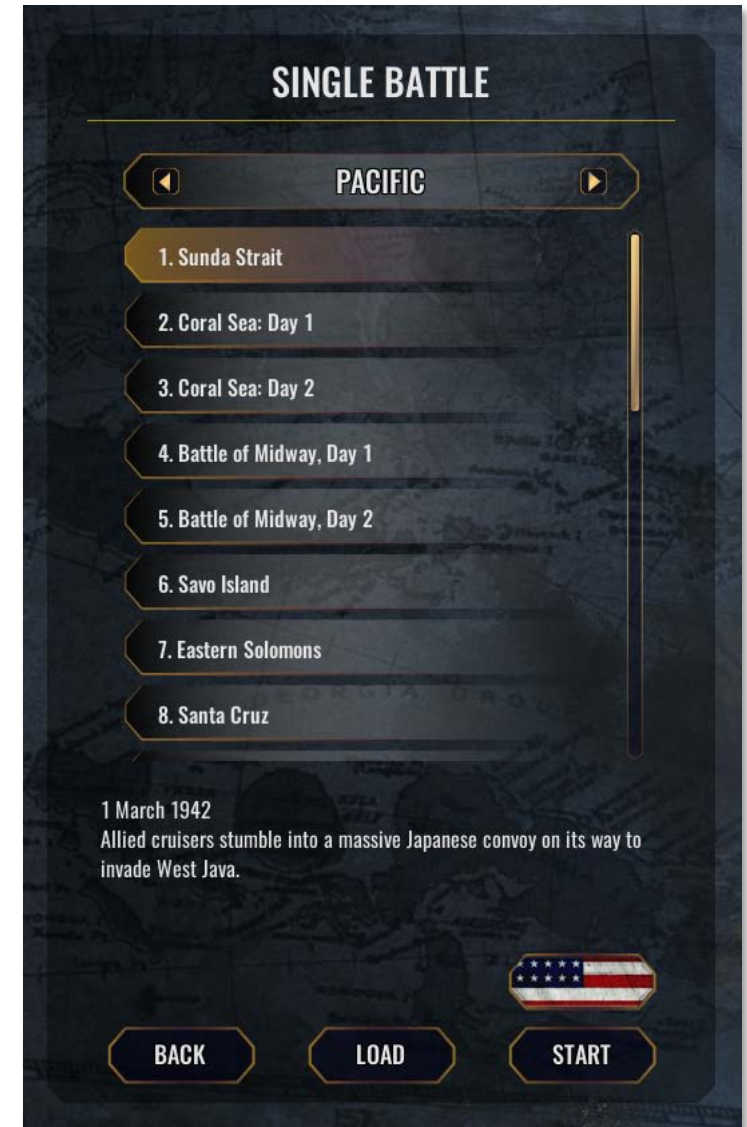
Select a mission from the list. A brief summary of what the mission entails is provided.

**START** will begin the mission.

**LOAD** to continue a previously saved combat mission, including custom missions made in the Battle Editor (not available for **TRAINING** missions).

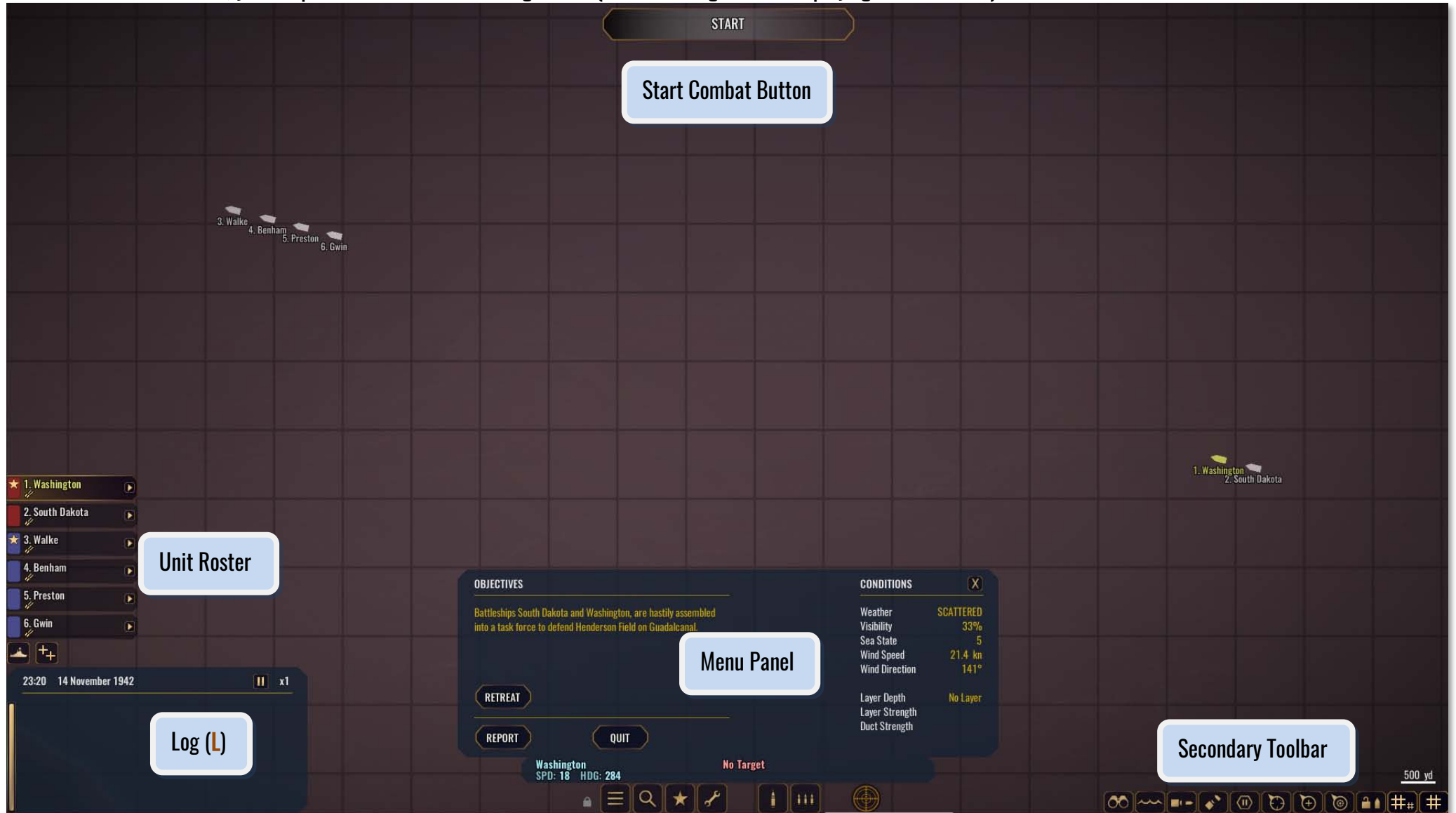
**BACK** returns to the main menu.

**Switch Side** toggle to swap forces you control (not available for **TRAINING** missions).



# BRIEFING - (TACTICAL MAP)

Prior to the start of combat, you are presented with the following screen (unless loading a battle or playing most tutorials).



Most **TRAINING** missions bypass the briefing for convenience but for all other battles and campaign engagements it is presented. Combat is paused during the briefing and may be started using the **START** button.

The briefing is the full screen Tactical Map. See Tactical Map section for more details.

Here you may modify placement of units, set up formations, navigation waypoints and issue some initial basic orders.

Until combat begins, any modification of unit positions and formations is immediate.

Use **(F5)** or Menu icon to open the Menu panel and view the current weather and other environmental conditions.

**LEFT CLICK** on the **START** button in the upper centre to begin.

Combat will not begin if:

- 2 or more ships are too close to each other.
- A ship is in shallow water (or on land).
- 2 or more aircraft are too close to each other.
- Any ship or aircraft is outside of its initial deployment area.

You will be prompted to move the unit or units into a more appropriate starting position.

## COMBAT

Combat enters you into the 3D game world where you take command of one or more ships and aircraft.

During tutorial missions, you are presented with a panel providing instructions how to play War on the Sea.

## MENU PANEL

Use **F5** or Menu icon in Main Toolbar to open the Menu panel. Here you may view the Action Report for the engagement, Retreat or Quit the battle.

Environmental conditions are also shown.

## ENDING COMBAT

Use **F5** or **Menu** button to open the Menu panel.

Use **RETREAT** button to order your units to cease all hostile action and prepare to leave the combat area.

- 1) If the enemy is already retreating, use **LEAVE** followed by **CONFIRM** to retreat and end the battle.
- 2) If the enemy is not retreating, a timer will appear prior to being able to use the **LEAVE** button. Any hostile action by any of your units will reset this timer. The result of combat counts and the Action Report is displayed to summarise the battle outcome.

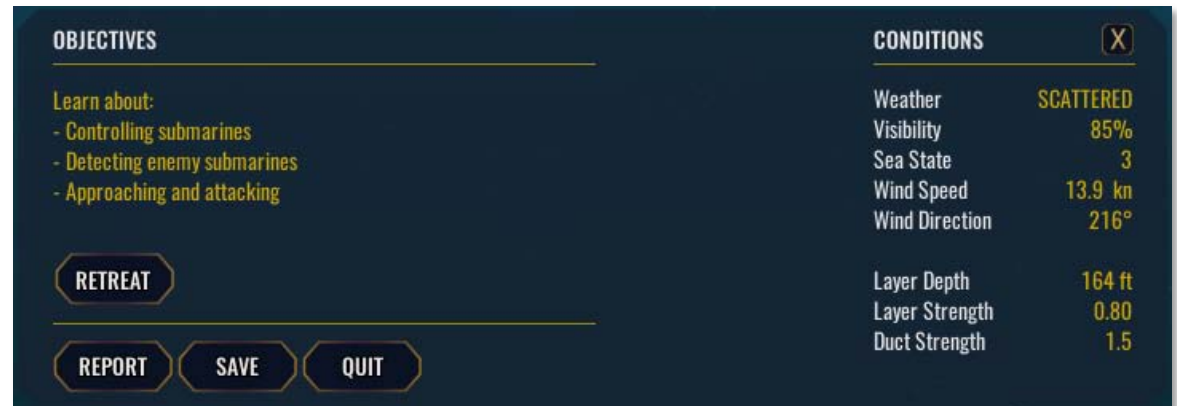
**WARNING:** Ships burning at combat end may automatically be scuttled based on overall flooding and number of fires. Extinguish as many fires as possible prior to leaving a combat engagement.

Alternatively you may use **QUIT** and **CONFIRM** to end combat immediately (not available in during a Campaign).

## ACTION REPORT

A summary of the battle listing all ships, their current level of damage and flooding, tonnage of those sunk (or scuttled) along with aircraft present and the number shot down by both sides. Enemy units are shown only if their presence was detected.

To open the report during combat, use **F5** or **Menu** button to open the Menu Panel, then select **REPORT**. The Action Report is automatically presented at the end of combat when using **RETREAT**, **LEAVE** and **CONFIRM**.



## 4. UNIT VIEWER



The Unit Viewer is an encyclopaedia of the various sea and air units in War on the Sea and plays multiple roles:

**COMBAT:** acts as a Recognition Manual for identifying and classifying enemy ships.

**MUSEUM:** used to jump to the various units.

**BATTLE EDITOR:** used to add ships and aircraft to the engagement.

**CAMPAIGN:** used to recruit ships.

It is a valuable resource for detailed statistics and characteristics about each of the ships and aircraft in each of the above roles.

### SWITCH, SELECT CLASS & FILTERS

The **Switch** toggle changes between viewing sea units and air units.

**Select Class Dropdown** can be used to directly view a unit by selecting its class or model from the list.

**Filters** toggle class dropdown to only show units based on nation or ship type.

### PREVIOUS, SELECT & NEXT UNIT

The **Previous** and **Next Unit** buttons (**Comma** and **Period**) are used to cycle through the units.

**Select (Return)** may have a different name depending on the usage and does the following:

**COMBAT:** classifies an enemy unit as being the class displayed.

**BATTLE EDITOR:** adds the ship or aircraft to the group being edited.

**CAMPAIGN:** pays the COMMAND POINT cost to add the ship displayed to a new task force.

**MUSEUM:** spawns the displayed unit for player to control.



## DATA TABS

4 data tabs are available to display additional information about a unit. Air units only have the Statistics tab.

## STATISTICS

Images of unit are shown along with physical size, weight, speed and crew.

For sea units, the number of ships in class dropdown may be used to view the names of class members or to specify the name of an individual ship in a Campaign or Battle Editor. Merchant ships (and oilers) are considered to be unlimited and number in class information is not shown.

## WEAPONS

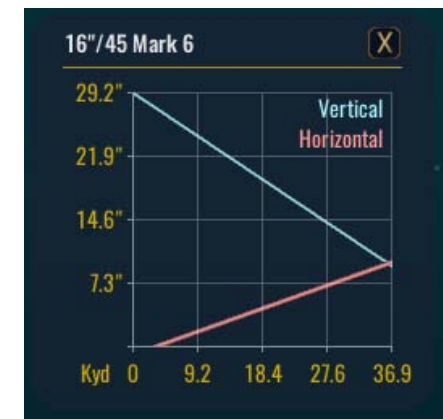
Lists all available weapon systems on a ship along with detailed statistics such as range and reload times.

Dual Purpose refers to guns that can shoot at both surface targets as well as aircraft.

A non-dual purpose gun can shoot at surface targets only.

**LEFT CLICK** on the shield icon next the range of a gun to open chart of armor penetration characteristics.

Chart shows the thickness of armor penetrated, up to maximum range for both Vertical (belt) and Horizontal (deck) armor thicknesses.



## ANTI-AIRCRAFT

Displays the various anti-aircraft gun firing arcs for the ship.

## SENSORS & ARMOR

See Sensors & Detection Section for more information about the parameters listed under Visibility & Radar as well as Sonar & Acoustics.

Armor values listed are the maximum armor thickness at various locations around the ship.



## 5. MUSEUM

Here you can examine and take control of all ships, submarines and aircraft currently available in War on the Sea. Enter the Museum from the Main Menu.

Use **F5** or the Recognition Manual icon in the toolbar to open it.

Use the **Examine Previous** and **Examine Next** buttons (**Comma** and **Period** ) to cycle through various units.

Use **Switch Sea/Air** toggle to switch between viewing ships and aircraft.

Use **Select Unit** button (**Return**) to go to that unit.

Pan Camera: either use **Mouse1** or **Left Arrow, Right Arrow, Up Arrow** and **Down Arrow**.

Zoom Camera: either use **MOUSEWHEEL** or **Equals** and **Minus**.

When viewing ships, damage control and weapon systems for each ship can be examined using the buttons in toolbar or **F8** and number keys.

### LEAVE MUSEUM

Use **F5** or **Menu** button to open the Menu panel and use **QUIT** to leave the Museum and return to the main menu.

# 6. COMBAT INTERFACE



## MAIN TOOLBAR

Broken into 3 sections from left to right:



### MAIN

Menu Panel (F5)

Unit Viewer (F6) - named Recognition Manual when in combat.

Orders Panel (F7)

Damage Control (F8) - Sea units only

### WEAPONS

For Sea units, **LEFT CLICK** on the icon (or use corresponding key) opens the weapon panel for that particular weapon.

For Air units, **LEFT CLICK** on the icon (or use corresponding key) to immediately fire/drop that weapon. **LEFT CLICK** again to cease firing for weapons such as aircraft guns.

### SENSORS

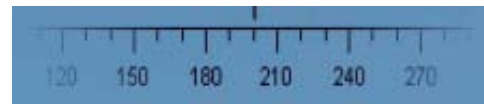
Radar (Semicolon)

Active Sonar (Quote) - Note passive sonar is always on whenever Active Sonar is not in use.

## CAMERA BEARING

Indicates the direction (true bearing) camera is facing.

0 North, 90 East, 180 South, 270 West.



## MESSAGE LOG

Displays events as they occur.

Bearings are given relative to the Controlled Unit.

Use **L** or **LEFT CLICK** in the log header to minimise/maximise Message Log.

**LEFT CLICK** on message Arrow moves camera to that unit. If a player unit, assumes direct control.

**LEFT CLICK** on message Arrow while in Targeting Mode will set that unit as the target of the Controlled Unit (as long as that target is currently detected).

## TIME CONTROLS

At upper right is pause combat and time compression buttons.

**LEFT CLICK** the pause button or use **(Space)** to pause or un-pause combat.

Time compression can be toggled on/off by **LEFT CLICK** on the time compression value or using **(F9)**.

Time compression is automatically suspended and no longer available if;

- any shells are in play
- any aircraft is attacking a target

## NAVIGATION PREVIEW

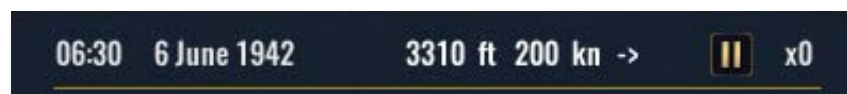
When controlling a unit, changes in steering, speed or altitude/depth are briefly shown in the Message Log header to provide a preview of navigation settings.

In this example, an aircraft is at 3310 ft doing 200kn in a very gentle right turn.

In some cases, navigation input is ignored and the following is displayed:

**FORMATION:** when attempting to adjust speed or height/altitude of a unit already in formation. However applying any steering input will break formation.

**MANEUVER:** when performing a maneuver and no navigation input is allowed until finished. For example a dive bomber in a dive or an aircraft in a break turn during a dogfight.





## UNIT ROSTER

A list of all friendly units in the battle. Sea and Air units are listed separately. Switch between friendly Sea and Air units by using the **Switch Sea/Air** toggle. Use **Select/Deselect All** button to select/deselect all units at once.

**LEFT CLICK** Arrow icon on a unit tab to switch control to that unit.

**LEFT CLICK** the unit tab itself to select or deselect a unit for issuing commands to multiple units.

The current Controlled Unit is always selected (yellow).

Highlighted/selected units are shown in green.

Star icon indicates leader of a group.

Colored tab shows all members of a group.

**LEFT CLICK** colored tab to select all units in that group.

Small guns icon under ship names indicate they are in "Fire At Will" mode and will automatically attack.



Switch Sea/Air

Select All

## CONTROLLED UNIT

The unit currently under direct player control. It is always highlighted.

## LEAD UNIT

A unit with one or more others following it is a Lead unit as indicated by the star below the unit name.

Units without the star icon are in formation or following another unit.

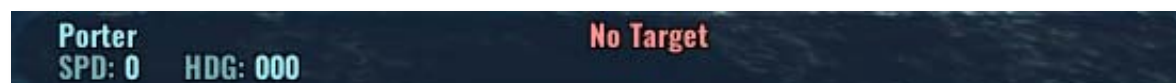
## DESTROYED UNITS

Roster tabs for destroyed units are darkened and are no longer able to be used to select that unit.

## UNIT/TARGET DATA

Displays the Controlled Unit's name, speed, heading and depth/altitude if applicable.

If Controlled Unit has a target, the target Name (or identifying number), speed, heading, bearing (direction to) and range are also shown.



## SECONDARY TOOLBAR



From left to right:

### Binoculars/Periscope (B)

Enter zoomed view.

Use **MOUSEWHEEL** or **Equals** and **Minus** keys to zoom in and out.

Use **MOUSE1** and drag or Arrow Keys to pan the view about.

Magnification level is shown at bottom of Unit Roster.

### Switch To Underwater (MOUSE2)

Moves camera to underwater view.

### Chase Camera (C)

Moves camera behind Controlled Unit and holds position there.

### Look At Target (F)

Moves camera to aim at Controlled Unit's target.

Can be used while using Binoculars/Periscope to track target.

### Freeze Camera (Backquote)

Toggle camera to camera ceases/resume following focused unit.

### Target Mode (T)

Toggles target mode (may be cancelled by **Escape**).

While in target mode, **LEFT CLICK** on a map icon or message log icon will set that unit as the target of Controlled Unit.

### Select Mode (S)

Toggles selection mode (may be cancelled by **Escape**).

While in select mode, **LEFT CLICK** on a map icon will select/deselect player unit.

Selecting multiple units allows issuing of commands to all at once.

### Navigation Mode (N)

Toggles navigation mode (may be cancelled by **Escape**).

While in this mode, **LEFT CLICK** on anywhere on the map to place one or more navigation waypoints for the Controlled Unit to immediately follow.

Any steering input will immediately cancel the following of waypoints.

### Lock Map (X)

Focused unit remains centered on the map.

### Minimap (M)

Toggles the minimap on and off.

### Open Map (Tab)

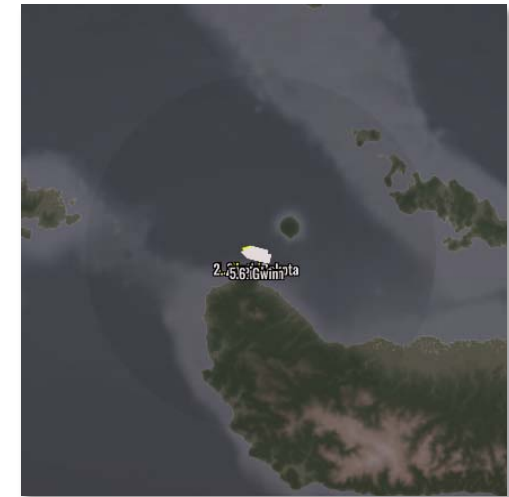
Toggles full screen map on and off.



## MAP BOUNDARY

The shaded circle shows the limit of the combat zone.

While it is possible for other vessels, aircraft or weapons to move into this region, navigating any friendly units out of the shaded circle will eventually remove them from the engagement.



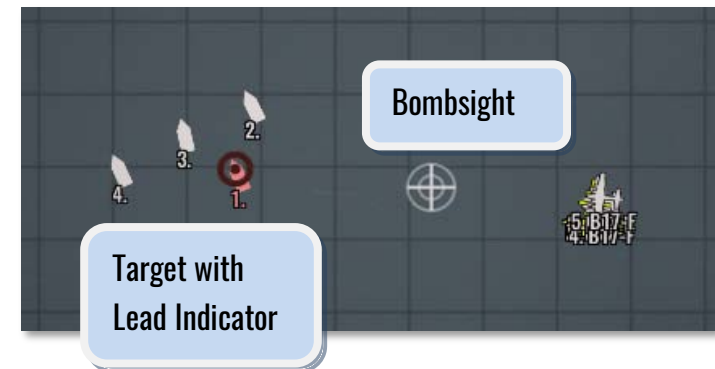
## LEAD INDICATOR & BOMBSIGHT

Air units only.

The lead indicator shows the where the Controlled Unit's target will be at the time the dropped payload would reach it.

Bombsight shows the impact location of bombs dropped from the Controlled Unit's current altitude and speed.

Lining up the two indicators and releasing bombs should put them near or onto the target, however the target is free to manoeuvre prior to bombs hitting.



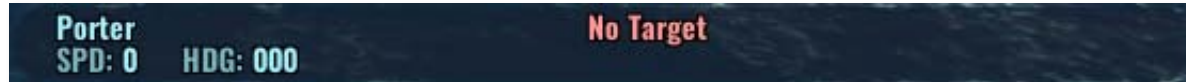
## MANUAL FIRING WEAPONS

When firing guns or torpedoes manually, a direction (bearing) and range must be provided.

- 1) Select MAN under the weapon settings then **LEFT CLICK FIRE**.
  - 2) The cursor will change to a targeting marker with the bearing and range from the Controlled Unit.
  - 3) **LEFT CLICK** on the Tactical Map (or Mini map) to select the position to target and fire at.
- OR use **T** or **Escape** to cancel manual firing.



## 8. UNITS & NAVIGATION



### CONTROLLED UNIT

The unit (ship or aircraft) you are currently in direct control of is the "Controlled Unit". Blue text above the toolbar shows the Controlled Unit's name, speed and heading. Red text shows information about the Controlled Unit's current target (if it has one).

The Controlled Unit is always highlighted on the Unit Roster.

The Controlled Unit can be steered directly through key commands.

The wanted speed in knots, rudder or turn setting and altitude/depth (if applicable) are temporarily displayed in the header of the Message Log whenever changed.

Tap or hold **KeyPadPLUS** and **KeyPadMUNIS** to change the speed of your unit.

Tap or hold **KeyPad4** and **KeyPad6** to turn unit left or right.

Tap or hold **KeyPad8** and **KeyPad2** to modify depth or altitude.

Use **KeyPad5** to set steering to 0.

### SWITCHING UNITS

There are multiple ways to switch your Controlled Unit:

- 1) **LEFT CLICK** map icon of a player owned unit.
- 2) **LEFT CLICK** on player owned unit within the 3D world.
- 3) **LEFT CLICK** on the small arrow for that unit from the Roster list.
- 4) **LEFT CLICK** on the small arrow of log message to go to unit message refers to.

Switching to an enemy unit will move the camera to it, but does not change the unit you control/issue orders to.

### SELECTING UNITS

There are multiple ways to select additional units to issue orders to:

- 1) **LEFT CLICK** Select All button under the Roster (to select/deselect all).
- 2) **LEFT CLICK** the names in the Roster to toggle highlighting/selecting them.
- 3) **LEFT CLICK** colored tab to select all units of that group color.
- 4) **LEFT CLICK** to enter Selection Mode and **LEFT CLICK** map icons to toggle highlighting/selecting them. Use **S** key again or **Escape** to exit Selection Mode.

5) Use **S** key to enter Selection Mode and **LEFT CLICK** units within the 3D world to toggle highlighting/selecting them. Use **S** key again or **Escape** to exit Selection Mode.

Enemy units cannot be selected as you cannot issue orders to them.



## PLOTTING WAYPOINTS

Use icon in map toolbar or **W** key to enter Navigation Mode.

Note the cursor changes to a ship's wheel.

**LEFT CLICK** anywhere on the map to place one or more waypoints.

Controlled Unit will immediately steer towards and follow (course displayed as lines).

Use map toolbar, **W** or **Escape** key again to exit Navigation Mode.

Steering left/right immediately cancel any course a unit was following.

Steering left/right immediately breaks formation if the unit was following another unit.

Using the Break button on the Orders panel (**F7**) will cancel any course or stop following another unit.

## SETTING FORMATIONS

Select (highlight) several units.

Open the Orders panel (**F7**) and under FORMATION section, use dropdown and distance slider to set the formation type and spacing distance.

Use FORM UP button for all selected units to move into formation around the Controlled unit.

## FOLLOW UNIT

Select any unit (friendly or enemy) as the target of the Controlled Unit.

Open the Orders panel (**F7**) and use Follow button to begin following the targeted unit at the distance specified on the formation spacing slider.

# ORDERS PANEL



## CONTROLS

Controls available depend on the type of Controlled Unit.

**P. DEPTH** - set submarine depth to periscope depth.

**DIVE!** - Crash dive a submarine.

**E. BLOW** - Emergency blow ballast on a submarine to attempt to immediately surface. Cannot submerge again once executed.

**SCOPE** - Raise/lower the periscope on a submarine.

**SILENT** - Silent running for a submarine. Stop all repairs and reloading to go quiet and decrease detection.

**Speed** - slide to set the speed.

**Turning** - slide to set the turn rate.

**Depth/Altitude** - slide to set the depth of a submarine or altitude of aircraft.

## FORMATION

**BREAK** - Controlled Unit immediately stops performing navigation; such as following another unit, being in formation with another unit or following map waypoints. Applying any steering input to the Controlled Unit will also "BREAK" navigation.

**FORM UP** - All selected units will form up on the Controlled Unit using the pattern and spacing indicated below.

**FOLLOW** - The Controlled Unit will follow its target.

**Formation Type** - Select a formation pattern from the dropdown (then use Form Up to execute the formation and spacing).

**Formation Spacing** - Set a distance using the slider (then use Form Up to execute the formation and spacing).

## COMBAT

**ATTACK** - all selected units immediately attack or engage the target of the Controlled Unit.

**CEASE** - all selected units cease firing.

**Fire At Will/Dogfight At Will** - when on, all selected units automatically engage enemy units.

**Auto Flak** - when on, all selected units flak guns automatically engage hostile aircraft (will cease firing at surface targets).

**Evade Hazards** - when on, all selected sea units automatically avoid navigation hazards such as other ships.

**Lay Smoke** - when on, all selected sea units lay smoke screens (submarines cannot lay smoke screens).

**RADAR** - all selected units switch Radar on or off depending based on the whether the current unit is using Radar.

**SONAR** - all selected units switch active Sonar on or off depending based on the whether the current unit is using Active Sonar.

## COLLISIONS

Sea units that strike terrain or another ship immediately loose speed. The speed at which the collision occurs determines how much damage (if any) may be incurred. Travelling at less than 5 knots usually results in no or minimal damage, while high speeds can cripple or outright destroy a ship due to extensive hull damage, flooding and knocked out subsystems.

## SUBMARINE TEST & CRUSH DEPTHS

Hulls of submarines are constructed to withstand the immense water pressure at the depths they operate. For each 33 ft (10 m) of depth close to 1 atmosphere of pressure is added.

Test depth is the safe depth at which a submarine can operate; during sea trials it has actually been reached. Crush depth is the actual depth causing the hull to structurally fail and implode, on average about 1.5x to 1.75x that of test depth.

Test depth for a submarine can be found on the Statistics panel of the Unit Viewer (Recognition Manual).

# 9. SHIP WEAPONS

## SELECTING TARGETS

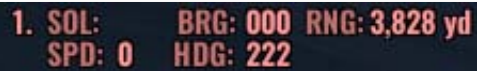
To select a target:

1) Use Target Mode button (T) in the Secondary Toolbar to enter target mode.

2) **LEFT CLICK** on either;

- map icon
- Message Log arrow
- actual target in the 3D world.

The target is now set and data about it is displayed above the Main Toolbar.



1. SOL: BRG: 000 RNG: 3,828 yd  
SPD: 0 HDG: 222

The image shows a dark rectangular box with red text. The text is arranged in two lines. The first line contains '1. SOL: BRG: 000 RNG: 3,828 yd'. The second line contains 'SPD: 0 HDG: 222'. The text is left-aligned and has a slight glow effect.

Note that issuing an Attack order to multiple units automatically sets their target as that of your Controlled Unit. All directors will cease tracking targets and begin tracking the new target.

## MAIN & SECONDARY GUNS

Use Main Guns button on the Main toolbar (Alpha1) to open the main guns gunnery panel.



Use Secondary Gun buttons on the Main toolbar (Alpha2) to open the secondary guns gunnery panel.



Lower part of panels show the various guns on board.

Primary gun panel shows each individual gun turret while Secondary Guns are organised into batteries.

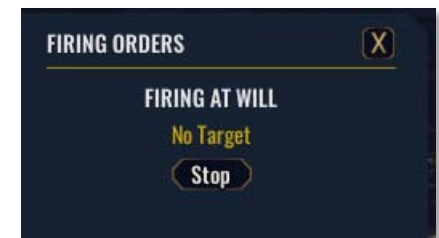
**LEFT CLICK** turret icons to select/deselect them for firing.

## FIRE AT WILL

**LEFT CLICK** AT WILL button next to FIRING ORDERS to enter (or cancel) "Fire At Will" mode. When Fire At Will is on ships will:

- commence firing primary and secondary guns at detected or upon detecting enemy units
- assign target of primary guns to all directors
- switch to new target if current target sunk or lost contact
- automatically use HE rounds against destroyers, submarines, merchants, oilers
- hides FIRING ORDERS settings on gun panels replacing them with "FIRING AT WILL" and displays current target for those guns if there is one
- at night/dark conditions fire star shells intermittently to illuminate target
- ships (or aircraft) firing at will have a small "guns" icon displayed under their name

Orders panel can be used to issue Fire At Will on/off command to all selected units.





## FIRING ORDERS - SETTINGS

\*\*\*\*\* IMPORTANT - FIRING ORDERS show settings applied to guns about to fire, NOT what guns are currently doing (See TURRET ICONS below) \*\*\*\*\*

**FIRE:** All selected turrets/guns open fire on the Controlled Unit's target (or at location if using manual MAN mode).

**HOLD:** All selected turrets/guns continue to aim at target.

**CEASE:** All selected turrets/guns return to resting.

Use **HOLD** to point all guns at target, wait several seconds, then use **FIRE** to fire all guns at once (Salvo mode).

### SHELL TYPE

**AP:** Armor Piercing - best used against heavily armoured ships. AP shells punch through armor then explode within the target, albeit with a smaller warhead.

**HE:** High Explosive - best used against "soft" unarmoured targets or to knock out subsystems such as directors and funnels. Explodes on impact with a larger warhead, but cannot penetrate thicker armor.

**SS:** Star Shell - an illumination round that drops a flare above the target position. Only 1 star shell per turret is fired.

Illuminated targets are easier to see in dark conditions, giving a bonus to the solution calculation against them.

**SPREAD** - Adjusts the fall of shot to be either more spread out (LOOSE), or tight (NARROW).

**LOOSE:** best used against a target with a poor firing solution, one that is manoeuvring or if you need a lucky hit quickly.

**FULL** is the default spread.

**NRRW:** (narrow) best used against a target with an excellent solution or that is slow/stationary.

### FIRING TYPE

**MAN:** Manual fire.

When firing, the position guns fire at is determined manually by **LEFT CLICK** of the aim marker on the map.

Only guns with target inside firing arc will fire, while others will turn towards target..

If the position is beyond maximum gun range, guns will only fire once position is within range.

When MAN setting is off, guns fire at the solution for the current target.

**SPOT:** Spotting fire.

The gun turret will not fire again until the shells reach their destination.

Shell splashes are observed to help determine the correct range, giving a bonus to the solution calculation.

Spotting fire has no effect when using Manual firing as guns are firing at a fixed position.



## TURRET ICONS

**LEFT CLICK** turret icons to select or deselect individual guns (or gun battery for secondary guns) to fire.

Ready bar shows the reload time for an individual turret or battery.

Colored circle on turret shows whether firing or holding fire.

Ammunition type being fired is displayed within this circle.

**MOUSE OVER** turret icon for detailed information about what actions a turret or gun battery is currently performing:

- Firing arc shows the area gun can fire in.

Target marker shows relative position of the target (or target location).

It must be within the arc for the gun to be able to fire at it. A white marker indicates it is out of the firing arc.

- Name of target (or "FIXED POINT" if using manual firing).

- Solution against target (if not using manual firing).

- Direction (bearing) and range to the calculated impact location.

- Shell type being fired and spread setting.

- Available ammunition.

## AMMUNITION

Primary guns require a functional magazine to operate. Several guns may share the same magazine and ammunition is taken from this pool.

Secondary guns share a dedicated pool of ammunition for each battery.

Firing a gun without ammunition of the type selected or a gun that runs out of ammunition will automatically switch to the other shell type (not star shells), reload, then continue firing. If no ammunition is available, the gun will cease firing.

Firing Star Shells will immediately switch back to HE or AP ammunition if available and continue firing.



## TORPEDOES & TORPEDO ROOMS

Use Torpedo button on the toolbar (**Alpha3**) to open the torpedoes panel.



For a submarine, use Torpedo buttons on the Main toolbar (**Alpha4**) to open the torpedo rooms panel.

Lower part of panels shows icons for the various torpedoes on board. **LEFT CLICK** turret icons to select/deselect them for firing. When firing from Torpedo Rooms, only 1 torpedo room may fire at a time, if multiple rooms are selected, it will default to firing from the forward room.



## FIRING ORDERS

Use the sliders to set the number of torpedoes to fire in the salvo and the spread of the salvo in degrees.

Use **FIRE** to begin firing torpedoes from all selected mounts (or selected torpedo room) with the number fired and spread as per the slider values.

Note that torpedo mounts or a torpedo room can never fire more torpedoes than are available/loaded, despite the slider setting. Only one torpedo room in a submarine can fire at a time.

## TORPEDO ICONS

**LEFT CLICK** torpedo icons to select or deselect the mounts (or torpedo room) to fire.

Ready bar shows the number of torpedoes available. A full bar indicates mount has all torpedoes remaining, or that all tubes in a torpedo room are loaded and ready to fire.

MOUSE OVER torpedo icon for detailed information about it:

- Firing arc shows the area torpedoes can fire in.

Ships: Target marker shows relative intercept point.

It must be within the arc for the gun to be able to fire at it.

Submarines: Torpedoes can fire in any direction. Gyro angle to intercept point is shown (in example to the right, 9°). The lower this angle, the better the chances of scoring one or more hits from a salvo.

- Name of target (or "FIXED POINT" if using manual firing).
- Solution against target (if not using manual firing).
- Direction (bearing) and range to the target location.
- Available ammunition

Torpedoes fired from surface ships have a limited firing arc. Remember to mouse over torpedo icons for information about firing arc and relative position of target. It is best to have the target (or target position if firing manually) within the torpedo launcher firing arc prior to firing. In some cases you may have to steer left or right to bring the target into the firing arc.

Torpedoes fired from submarines run straight to a safe arming distance, then use a gyro to turn to their calculated intercept point. Although they can be fired at any angle, they are much more accurate when fired with low gyro angles.

Torpedo rooms can reload their tubes, one at a time. Reload time required and remaining torpedo reloads are shown when MOUSE OVER a torpedo room icon.



## DEPTH CHARGES

Use Depth Charge button on the toolbar (**Alpha5**) to open the depth charge panel.

Use the SETTINGS sliders to set the number of repeats and time interval between repeats.

**LEFT CLICK** depth charge icons to select one or more to use.

Use **FIRE** to begin dropping depth charges.



## DEPTH CHARGE ICON

Mouse over depth charge icon to view number of depth charges remaining.

The number of repeats remaining and progress during each repeat of dropping depth charges are shown on the depth charge icon.

## TARGET SOLUTION & DIRECTORS

Target solution is a mathematical calculation to determine where a target ship will be at the time a weapon intercepts it.

This is achieved by observing the target over time as well as watching where shells land (short or long) in order to build up information about its course, speed and range.

Target solution is shown in the Target Data panel above the Main Toolbar (SOL) and on weapon panels where the Directors are shown, such as Primary and Secondary Guns, as well as Torpedo Mounts and Torpedo Rooms.

### Rate of Solution Accuracy Increases with:

- Good visibility to target, at close range
- Using Spotting fire against the target
- Correct identification of target ship class
- Using radar
- Target using radar
- Dark conditions and target illuminated by fire, muzzle flashes or fire
- Tracking target with multiple directors

### Rate of Solution Accuracy Decreases with:

- Poor visibility to target, at long range
- Changes in target course or speed.
- Changes in observing ship's course or speed.
- Target is burning or releasing smoke (unless observer using radar)
- Losing contact with target

**IMPORTANT:** Targeting a ship assigns all directors to track it **ONLY** if they are not currently tracking a target. Fire At Will mode may automatically change targets being tracked.

**LEFT CLICK** Stop to cease tracking a target by a director (which also disables Fire At Will mode). However, issuing an ATTACK command will immediately force all directors to track the target specified.

Each ship builds their own solution against a target.

Gun turrets under local control (not firing at a target directors are tracking) also build their own solution.

Calculation of the target solution is automatically performed by your crew as long as contact is maintained.

Using Manual Firing mode does not require a target solution as the guns fire at a fixed location determined by the direction and range specified.

The Control Room of a submarine compiles target information and can track a target in the same manner as a director.





## 10. SENSORS & DETECTION

See Unit Viewer (F6) Sensors & Armor tab for information about a ship's sensors and detection characteristics.

### Visual (Vis.) Horizon:

How far a ship can see. Larger ships can see further since they are taller. Large contacts can be seen "over" the visual horizon.

### Visual (Vis.)/Radar Detection:

How easy a ship is to spot visually or with radar. Smaller ships are harder to see or detect with radar.

### Surface/Air Radar:

How far the radar on this ship can detect ships or aircraft under the very BEST of conditions.

### Noise Level:

How noisy the ship is in decibels. Louder ships are easier to detect with passive sonar.

### Active Detection:

How easily the ship is detected by active sonar. A large hull makes a ship easier to detect with active sonar.

### Passive/Active Sonar Strength:

How far the sonar models on this ship can detect the largest noisiest contacts under the very BEST of conditions.

## ENVIRONMENTAL CONDITIONS

Use F5 or Menu button to open the Menu panel and view the environmental conditions for the current battle.

The environmental conditions greatly impact the ability of units to detect each other by visual, radar and sonar as outlined below.

GATO		GATO CLASS SUBMARINE (SS)			
<b>Visibility &amp; Radar</b>		<b>Sonar &amp; Acoustics</b>		<b>Armor</b>	
Vis. Horizon	4 NM	Noise Level	135 dB	Belt	0.0"
Vis. Detection	67 %	Active Detection	100 %	Deck	0.0"
Radar Detection	20 %	Passive Sonar	18 NM	Magazine	0.0"
Surface Radar	10 NM	Active Sonar	1 NM	Turret	0.0"
Air Radar	22 NM			Bridge	0.0"
				Superstructure	0.0"
				Torp. Defense	0%

Icons: Radar, Sonar, Radar, Sonar, US Flag, SS, Gato, Navigation, Checkmark, Arrow

CONDITIONS	
Weather	SCATTERED
Visibility	85%
Sea State	3
Wind Speed	13.9 kn
Wind Direction	216°
Layer Depth	164 ft
Layer Strength	0.80
Duct Strength	1.5

# VISIBILITY

## CONDITIONS

Base visibility is displayed as a percentage on the Menu panel and is applied to ALL visual detections. It is determined by 3 environmental conditions:

- **Light level:** Time of day determines lighting conditions.
- **Weather:** Heavier cloud cover reduces visibility while rain or snow dramatically decreases visibility to about 50%.
- **Sea state:** Rougher seas make it harder to detect a contact and strong winds whip up spray.

## SEA

Visual detection of a sea unit is modified by the following factors:

- **Conditions:** base visibility as mentioned above.
- **Height of observer:** Larger ships are higher can see farther than small ones. This is shown by the visual horizon value. High flying aircraft can see further.
- **Size of contact:** Large contacts can be seen more easily than small stealthy ones.

Visibility is modified by the visual detection modifier of the contact.

- **Contact Speed:** Ships at high speed produce more funnel smoke and a larger wake, while stationary ships are harder to spot.
- **Land:** terrain within visual range behind a contact obscures it making it harder to detect
- **Illumination:** a contact on fire, firing guns which produce muzzle flashes or illuminated by star shells are easier to spot.
- **Submerged:** a submerged submarine is not visible, unless a periscope is raised.

## AIR

Visual detection of an air unit is determined by:

- **Conditions:** base visibility as determined by lighting, weather and sea state as mentioned above.
- **Size of contact:**  
Small fighter ~4,375 yd (4000m)  
Large bomber ~9,840 yd, (9,000m).
- **Land:** terrain within visual range behind a contact obscures it making it harder to detect.

# SMOKE SCREENS

On the Orders panel (F7), use "Lay Smoke" toggle under the COMBAT column to order all selected ships to begin (or stop) laying smoke screens.

- Viewing a ship through a smoke screen applies a significant penalty to solution calculations.
- A ship laying smoke itself or observing a target that is laying smoke is always considered to be viewing through smoke
- Smoke screens become less effective in higher sea states and may have gaps within them as stronger winds disperse the smoke.
- Enemy ships laying smoke are usually attempting to withdraw and continuing to fire at them may be a waste of valuable ammunition.

# RADAR

## CONDITIONS

Base radar detection is modified by 2 environmental conditions as lighting does not impact radar detection.

- **Sea state:** Radar can "see" further than visual, but detection drops off more quickly with sea states above 6.
- **Weather:** Rain or snow scatters radio waves dramatically decreasing radar detection.

These environmental modifiers apply to all radar detections outlined below.

## SEA

Radar detection of a sea unit is determined by:

- **Conditions:** base radar conditions as determined by weather and sea state as mentioned above.
- **Strength of surface radar:** listed under the Unit Viewer Sensors tab, Surface Radar indicates how far the system can spot a large sea contact under the best conditions.
- **Size of contact:** listed under the Unit Viewer Sensors tab, Radar Detection indicates the size modifier of the radar signature for a particular ship.
- **Land:** in radar range behind the target scatters radio waves, decreasing detection.

## AIR

Radar detection of an air unit is determined by:

- **Conditions:** base radar conditions as determined by weather and sea state as mentioned above.
- **Strength of air radar:** listed under the Unit Viewer Sensors tab, Air Radar indicates how far the system can spot a large air contact under the best conditions.
- **Size of contact:** Large heavy bombers can be detected more easily than small fighters.
- **Land:** in radar range behind the contact scatters radio waves, decreasing detection.
- **Altitude:** Low flying aircraft are harder to detect than those at altitude.

## RADAR DETECTION

Radar can detect contacts at much longer ranges than visual under the right conditions, however to do so the observer must emit radio waves.

These radio waves can be detected by other ships and give away the presence of the observer.

**Any Sea unit using radar may be detected at a distance up to 80% the sum of the Surface Radar strengths of the emitting unit and receiving units.**

# SONAR

Sonar uses sound propagation through the ocean to detect submarines and ships. It cannot detect aircraft.

There are two types of sonar:

- 1) **Passive:** listens for the noise made by the target.
- 2) **Active:** sends out a loud "ping" and listens for a return echo from the target.

## CONDITIONS

- **Sea state:** Rougher seas are louder making it harder to hear the contact.
  - **Rain or snow:** Dramatically decreases sonar range by about 50%.
  - **Layer:** A sudden drop in water temperature may generate a layer which reflects sound waves. Listening across a layer modifies sonar range by the Layer Strength value.
  - **Duct:** A channel above the layer which improves sound propagation. Sound travels farther within the duct increasing sonar range by a factor of the Duct Strength value.
- These environmental modifiers apply to all sonar detections outlined below.

Conditions are shown on the Menu panel (F5).

**Layer Depth** - if a layer is present, how deep is it. A submarine at depth below this level is considered under the layer.

**Layer Strength** - how strong the layer deflects sound waves. Detection range is multiplied by this factor.

**Duct Strength** - if a layer is present, by what factor the duct propagates sound. Detection range is multiplied by this factor.

Example: there is a layer 164 ft deep with strength of 0.8 with a duct above it of strength 1.5.

A submarine below 164 ft would detect ships at 0.8x normal range and can only be detected at 0.8x normal range.

A submarine above 164 ft (in the duct) could detect ships at 1.5x their normal range, but also be detected at 1.5x normal range!



CONDITIONS	
Weather	SCATTERED
Visibility	85%
Sea State	3
Wind Speed	13.9 kn
Wind Direction	216°
Layer Depth	164 ft
Layer Strength	0.80
Duct Strength	1.5

## PASSIVE SONAR

Passive sonar detection of a sea unit is determined by:

- **Conditions:** base sonar conditions as determined by weather, sea state and acoustics as mentioned above.
- **Strength of passive sonar:** listed under the Unit Viewer Sensors tab, Passive Sonar shows how far the system can hear a very noisy sea contact under the best conditions.
- **Noise level of the target:** Louder ships are easier to hear as shown by the Noise Level value of the Unit Viewer Sensors tab.
- **Contact speed:** Going faster makes more engine noise and flow noise of water against the hull making the contact easier to detect.
- **Observer speed:** Slow speeds are quieter making it easier to hear a contact above your own noise.
- **Baffles:** Ships and submarines have a blind spot behind them where sonar cannot hear a contact.
- **Land:** Land in front of a target makes it impossible to detect. Land or the seabed behind a target makes it harder to detect.

## ACTIVE SONAR

Active sonar detection of a sea unit is determined by:

- **Conditions:** base sonar conditions as determined by weather, sea state and acoustics as mentioned above.
- **Strength of active sonar:** listed under the Unit Viewer Sensors tab, Active Sonar how far the system can hear a contact under the best conditions.
- **Contact speed:** Going faster creates more turbulence making the contact easier to detect.
- **Observer speed:** Slow speeds are quieter making it easier to hear a contact above your own noise.
- **Baffles:** Ships and submarines have a blind spot behind them where sonar cannot hear a target.
- **Contact facing:** A side on contact is much easier to detect than when front on as it provides a larger surface area to reflect the "ping".
- **Land:** Land in front of a target makes it impossible to detect. Land or the seabed behind a target makes it harder to detect.

# 11. ARMOR & PROTECTION

## BALLISTICS

War on the Sea features detailed ballistics and damage systems. All gun types are individually modelled based on historical data with specific range, muzzle velocity, calibre and armor penetration characteristics. They are not necessarily balanced for game purposes but rather, are intended to emulate their historical performance. For simplicity, wind is not factored into the ballistics model.

## SHELL PENETRATION

Armor is used to protect vital systems from hits.

It is represented as the thickness of armour plating in a specific region of a ship (in inches or millimetres). There are other factors such as the materials used, quality of armor as well as slope. Armor at a sloped angle deflects incoming shells better, making it much more effective without having to actually thicken it.

The hull of a ship has two armor values: belt (vertical) and deck (horizontal) which represent the protection against a hit to the side or a hit from above.

Regions of the superstructure and gun turrets of a ship have a single armor value.

## SHELL HITS

The following factors determine whether a shell will penetrate armor:

**Calibre** - Larger shells can punch through thicker armor.

**Muzzle Velocity** - Higher velocity shells possess more energy to penetrate armor.

**AP Shell** - Armor piercing shells have a smaller explosive warhead, but penetrate armor about 5x better than a HE shell of similar calibre.

**Striking Angle** - Shell strikes at shallow angles may simply bounce away (ricochet).

**Short Range** - shell has higher velocity with shallow trajectory. It can punch through belt armor, but ricochet off of deck armor.

**Long Range** - shell arcs downward with steep trajectory. It can ricochet off belt armor but penetrate deck armor (called plunging fire).



## DAMAGE DEALT BY SHELLS

When an AP shell strikes armor the following may occur:

- Shell calibre is greater than 14x the thickness of armor struck, it automatically penetrates and explodes doing full damage.
- Shell strikes, penetrates the armor and explodes doing full damage.
- Shell strikes at a shallow angle and is deflected (ricochet) doing 20% damage.
- Shell fails to penetrate armor and explodes externally, causing only 20% damage.

High explosive (HE) shells do an additional 25% damage.

HE shells can still penetrate armour, but are as only as effective as an AP shell about 1/5th of their calibre.

Any hit to an unarmored part of a ship (or if shell calibre is greater than 14x armor thickness struck), will automatically penetrate and explode doing full damage.

## TORPEDO DEFENCE SYSTEMS

Torpedoes deliver a large warhead below the waterline, making them devastating weapons at sea.

Some larger ships have a torpedo defence system (TDS) built into their hull to help absorb the explosive force of a torpedo.

Upon being hit, the TDS is destroyed, making it ineffective against subsequent hits to the same region of the ship.

TDS is indicated as a percentage value and is usually only present in the outer hull of the mid-section of a ship.

Upon a torpedo hit to a compartment with TDS:

- chance for damage to be dealt to neighbouring compartments is reduced by half of the TDS value.
- all damage dealt by that torpedo reduced by the TDS value.
- TDS value of compartment hit and its neighbours reduced to 0% as they are permanently destroyed by the torpedo impact.

## 12. DAMAGE CONTROL

Use **F8** or the toolbar button to open (only available for ships and submarines).



Separated into 3 sections:

### 1) STATUS

Lists damage/flooding severity, speed/turn rates, efficiency and number of damage control parties.

**COUNTERFLOOD** Toggle: If ON, **LEFT CLICK** on a compartment within the ship's hull will flood it with water. Can be used to help balance a ship that has flooding due to damage. Counterflooding too many compartments will scuttle a ship!

**AUTO DC** Toggle: If ON, damage control parties will automatically repair the ship (including counterflooding!). Automatic damage control is deactivated when counterflooding compartments.

### 2) HULL VIEW

Grid displaying watertight compartments within the hull. Icons indicate whether a compartment contains a particular subsystem.

### 3) DECK VIEW

Below the Hull View is the Deck View. Icons display the various subsystems present above the hull. **LEFT CLICK** on a subsystem will assign a damage control party to it. Subsystems on or above the deck cannot flood.

**LEFT CLICK** on a compartment will assign an available damage control party to it or if the **COUNTERFLOOD** toggle is on, flood it with water.

## EFFICIENCY

The current Efficiency level of a ship is listed under Status.

- Decreases repair/reload times and solution calculations.
- Decreased by 2% for each offline, flooded or burning compartment.
- Decreased by 15% if the command centre is offline or destroyed, namely the Bridge or Control Room for submarines.

## VULNERABLE

A penalty applied to time to extinguishing fires and increases fire spread chance.

- Carrier performing Air Operations: 160%
- Cargo on board:
  - Troops (120%)
  - Supplies (130%)
  - Engineering (140%)
  - Fuel (180%)

During a Dynamic Campaign, a carrier on cooldown after launching or landing aircraft is considered to be performing Air Operations.

If present, the vulnerable penalty is displayed at bottom of Status section.

In the example shown here, an oiler carrying fuel requires 180% the time to extinguish fires and fires have a 180% chance to spread.

When present, mouse over the Vulnerable text to display the cause of the penalty, in this example it would display "Fuel".



# COMPARTMENTS AND SUBSYSTEMS

Mouse over a compartment or region to display additional information:

The name of the compartment or region.

Repair time and an icon to indicate if a damage control party is present.

Integrity - status icons (fire, flooded, offline or damaged) and the current percent intact.

Armor - thickness of vertical (belt) and horizontal (deck) armor.

Torpedo Defense - how well a hull compartment can resist a hit from a torpedo (Section 11. Armor & Protection).

Ammunition - if a weapon system or magazine.



Icons indicate the status of a compartment or subsystem:



**Flooded** - Hull only. The compartment is flooded or taking on water. Too many flooded compartments will cause a ship to sink or capsize.



**Burning** - The compartment or subsystem is on fire. Burning causes damage over time and fires may spread to neighbouring areas (including from hull to deck and deck to hull).



**Repairing** - A damage control party is in the compartment or subsystem and is repairing it.



**Damaged** - Integrity is below 100%.



**Offline** - The subsystem here is no longer working until repaired.



**Destroyed** - Integrity has been reduced to 0. Any subsystem here is permanently offline. If within the hull it is automatically flooded. Destroyed compartments cannot be repaired but damage control can be assigned to fight fires.

Dynamic Campaigns: can only be restored by releasing the ship from your command. Damaged ship enters repair queue and becomes available to recruit (fully restored) once repair time is completed.

Offline or destroyed subsystems have the following effects:

<b>Primary Gun</b>	Cannot fire or reload
<b>Magazine</b>	Cannot reload guns which use this magazine
<b>Secondary Gun</b>	Entire battery cannot fire or reload
<b>Torpedo</b>	Cannot fire
<b>Torpedo Room</b>	Cannot fire or reload
<b>Depth Charge</b>	Cannot drop charges
<b>Bridge/Control Room</b>	15% efficiency penalty
<b>Aircraft (All)</b>	Cannot launch planes

<b>Conning Tower</b>	Submarine cannot use periscope
<b>Director</b>	Cannot track target, solution bonus lost
<b>Engineering</b>	Decreases speed
<b>Propellers</b>	Decreases speed
<b>Funnel</b>	Decreases speed
<b>Electric Engine</b>	Decreases speed of a submerged submarine
<b>Rudder</b>	Decreases turn rate
<b>Propellers &amp; Rudder</b>	Decreases speed and turn rate

## DAMAGE CONTROL PARTIES

A ship will have one or more damage control parties as shown on the Summary Panel.

**LEFT CLICK** a compartment to assign a damage control party to it.

- 1) If burning: Extinguish fire after timer expires
- 2) If flooded: Remove flooding after timer expires
- 3) If offline: Restore subsystem after timer expires
- 4) If damaged: Restore integrity to 100%
- 5) Party automatically returned to available list

Assuming a 2 minute timer for fire, flooding and repairs: a damaged, burning, flooded region with the subsystem offline would take 8 minutes to restore. If that region takes additional damage (not from burning) or party is manually reassigned elsewhere, timer for that step is restarted.

A party decreases by 50% chance of neighbouring fire or flooding to spread into their region.

Remember that a party can only fight fires in a destroyed compartment, it cannot be repaired, is permanently offline and if within the hull, counts as permanently flooded.

## AUTO DAMAGE CONTROL

By default, damage control parties are automatically assigned to repair compartments and regions as they take damage.

If a ship takes sustains damage to more compartments than it has parties, manual placement of the parties can be used to prioritise repairs.

**LEFT CLICK** the auto Damage Control icon to toggle it on and off.

When off, **LEFT CLICK** a compartment or region to:

- remove a damage control party if one is present
- assign a free damage control party to it

Once assigned, turning auto damage control back on will leave the parties where they are. Once they finish their current repairs, they will automatically be assigned to a new repair task if needed.

## COUNTERFLOODING

As more hull compartments become flooded, a ship may list and risk capsizing. It is possible to purposefully flood regions of a ship to help prevent this.

**LEFT CLICK** the counterflood icon then **LEFT CLICK** a hull compartment to purposefully flood it.

Auto damage control is immediately disabled when counterflooding. Turning auto damage control back on will assign repairs to the counterflooded compartments.

Submarines have too few compartments for effective counterflooding, it is not recommended under any circumstances!

A ship can be scuttled by purposefully counterflooding too many compartments.

## DAMAGE STATUS ICONS

Shown on the Unit Roster for Sea units only. From left to right;

Fire - at least one compartment is on fire and not under repair.

Flooding - at least one compartment is flooded and not under repair.

Needs Repair - at least one compartment is offline (or not at full integrity) and not under repair.



Compartments may not be under repair due to Auto Assign Damage Control being off, or there are more damaged regions than there are parties to perform repairs. Regardless, they are a good indicator that it might be time to take control of that ship and start managing the damage situation.



## 13. AIRCRAFT

Aircraft can be damaged by machine guns, anti-aircraft fire and flak bursts.  
They are destroyed by collisions with ships, sea and terrain.

A close range flak burst is immediately fatal to any aircraft.

Machine guns, anti-aircraft fire and non-fatal flak bursts count as a single hit on aircraft.

Hits have a chance to be absorbed causing no damage.

Chance to absorb a hit is based on aircraft size and whether it has armor or self-sealing fuel tanks.

Each damaging hit produces a smoke trail, with the 3rd damaging hit being fatal to the aircraft.

US heavy bombers have the highest damage absorb chance, allowing them to take a lot of battle damage.  
Japanese fighters have none, making them very fragile!

### COLLISIONS

Aircraft cannot collide with other aircraft, but they can collide with ships, terrain and the sea.

### FRIENDLY FIRE

Aircraft cannot be hit by friendly machine gun fire.

## ATTACKING WITH AIRCRAFT

Aircraft will use their weapons automatically when issued an Attack order. A fighter will engage other aircraft in a dogfight with guns while a dive/torpedo bomber will determine the best weapon to attack with based on target, ordnance and current altitude and will open/close bomb doors as needed.

Attacking with multiple aircraft can be done in 2 ways, as a formation or independently.

### FORMATION ATTACK

Select **ONLY** the leader of a flight and order it to attack a target.

Aircraft following this leader will hold formation and attack the target when the leader does.



Used for aerial torpedo and bombing attacks where dropping ordnance in a pattern or spread is desired.

Pattern and spread is based on formation and spacing of the flight. Modify this prior to ordering the attack.

Effective only when the flight is already in formation or will have sufficient time to reform before reaching the target.

### INDEPENDENT ATTACK

Select **ALL** members of the flight and order them to attack a target.

Aircraft will break formation, act individually, converge on the target and attack at will.



Used for dogfights, strafing and rocket attacks or against stationary targets where spreading out the attack is not necessary.

Be careful not to bunch up a formation making it susceptible to anti-aircraft fire or enemy fighters!

Effective when the flight is already in formation or if scattered.

Best used with loose or spaced out formations so as not to bunch up your aircraft.

## **BOMBING TECHNIQUES**

When using **A** (or the **ATTACK** button on Orders panel) to issue an attack target command, the altitude your bomber is currently at will determine how it attacks:

- Above 2400ft (900m): Dive bomb if it is a dive bomber, otherwise level bomb
- Below 900ft (300m): Skip bomb
- Otherwise: Level bomb

### **SKIP BOMBING**

Skip bombing involves dropping bombs at very low altitude so that they skip like a stone across the water to their target.

Dropping bombs at low altitudes (around 150 ft) and about 750-1000 yd away, should cause them to strike the water and skip towards the target. They may fall short, bounce over or hopefully skip into the target.

It takes practice and some luck to consistently score hits with this technique.

However it does involve flying straight and low at enemy ships, exposing the attacker to anti-aircraft fire.

### **ADVANCED TIPS**

- A flight of aircraft may be split into smaller groups by ordering several members to "Form Up" on the controlled aircraft.
- Attack ships from multiple directions when possible to avoid anti-aircraft fire.
- Use Independent attacks on slow or stationary targets.
- Spread out Formation attacks against fast or maneuvering targets.
- Issuing a Formation attack using guns or rockets will automatically become an Independent attack; as firing guns or rockets in a pattern around a target makes little sense.

Finally, use the Battle Editor to set up aircraft attacks against various ships and practice tactics against moving targets and avoiding anti-aircraft fire.

## MANUAL ATTACKS

Unlike using ship weapons (which open a panel to operate them), aircraft weapons directly fire (or drop) the weapon.

Use Machine Guns button **Alpha1** in toolbar to fire (and stop firing) machine guns. A status bar on the icon shows ammunition remaining.

Using any other aircraft weapon will fire (or drop) it immediately.

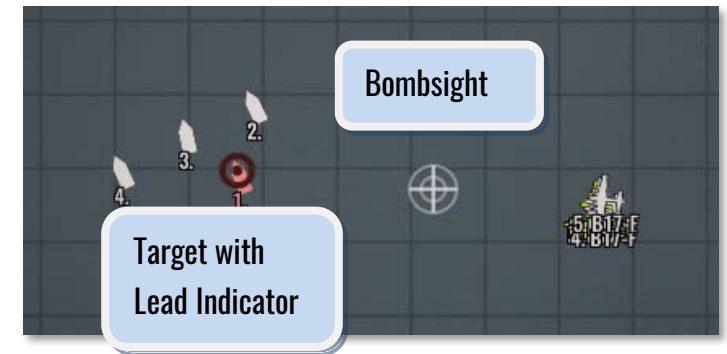
Using **Alpha6** Bomb Doors or **Alpha7** All Drop commands will execute the command for ALL selected aircraft.

For bombs and aerial depth charges, a bombsight is displayed on the map which can be overlaid with the target intercept indicator. Lining up the two indicators and releasing bombs should put them near or onto the target, however the target is free to manoeuvre prior to bombs hitting.

Defensive machine guns (rear gunners etc) cannot be used manually and automatically defend the aircraft.

Performing air attacks manually is entirely optional, but with practice they can be very effective and give you more control over avoiding anti-aircraft fire, attacking a particular part of a ship or turning during a strafe or rocket attack to spread it across a ship.

Training exercises 9 & 10 outline step by step instructions for performing various manual attacks with aircraft.



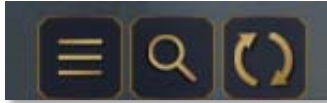
# 13. BATTLE EDITOR



**Map & Icons**  
**LEFT CLICK** map and drag to pan map.  
**LEFT CLICK** icon to select group.  
**LEFT CLICK** icon and drag to move group.  
**LEFT CLICK** COURSE to enter navigation mode and **LEFT CLICK** map to place AI navigation waypoints.

## TOOLBAR

From left to right:



Battle Settings (**F5**) - Open/close Battle Settings panel.

Unit Viewer (**F6**) - Open/close Unit Viewer panel.

Next Group (**F7**) - cycle through all groups on map.

## BATTLE SETTINGS

Set the time, date, weather and location of the battle here.

Choose side to play (BLUE or RED).

**TACTICAL** enter the world and begin the battle.

**SAVE/LOAD** the battle (to load a battle in progress use Single Battle/Load).

**QUIT/CONFIRM** to return to Main Menu.

**Terrain**: Enter the approximate decimal degrees for the location. World terrain surrounding the Pacific Ocean is currently available.

**CLEAR ALL** delete all existing Sea and Air groups.

## SEA/AIR GROUP

**BOTH**:

Assign side, either Red or Blue.

Assign formation and spacing.

**LEFT CLICK** Course to enter navigation mode and **LEFT CLICK** on map to place AI navigation waypoints for the selected group. **LEFT CLICK** Course again or use **Escape** to exit navigation mode.

**SEA**:

**LEFT CLICK** 2 ships in a group to select them and use **SWAP** to change their positions within the group/formation.

**LEFT CLICK** one or more ships in a group to select them and use **REMOVE** to remove them from the group. Removing all ships deletes the group.

Use sliders to set starting speed and heading.

**AIR**:

**LEFT CLICK** on **Plus** or **Minus** buttons to edit the number of aircraft, reducing to 0 will delete the group.

Only one aircraft type allowed per group.

Use dropdown to set payload for aircraft.

Use sliders to set starting speed, heading and altitude.

## FORMATION

Sea groups only. Shows the layout of ships based on the formation settings.

Numbers correspond to each ship in the group. Use the **SWAP** function to move individual ships within the formation as desired.

## MAP & ICONS

**LEFT CLICK** a Sea or Air icon to select that group.

Selected group icon is highlighted in yellow.

**LEFT CLICK** and drag map to reposition it as desired.

Centre of the combat engagement zone is at the centre of grid.



# 14. CAMPAIGNS

Recruit ships, assemble them into task forces, transport troops and supplies, perform air patrols and strikes as well as build airfields and ports to achieve your strategic goals.

## EVENTS

Major events occurring during a campaign appear as a large central panel. Events include the prelude leading up to the campaign and the campaign outcome.

Time is paused during an event.

### BATTLE OF THE CORAL SEA



#### 4-8 May 1942

In order to expand the southern perimeter of the empire Japan undertakes Operation Mo, the invasion of Port Moresby in New Guinea as well as Tulagi in the Solomon Islands. The ensuing naval battle, the first carried out by carrier aircraft only, ultimately turns back the Port Moresby invasion.

A light carrier, a destroyer and several smaller vessels are lost by the Japanese.

Allied forces suffer significant losses with the sinking of the fleet carrier Lexington, a destroyer and an oiler. Yorktown, the other US fleet carrier participating, is damaged and hastily returns to Hawaii for repairs.

CONTINUE

**LEFT CLICK** CONTINUE button or "x" button at upper right to continue the campaign.

# STRATEGIC MAP

**MOUSEWHEEL** to zoom in/out.  
**LEFT CLICK** and drag to pan map about.

GATO

1. Gato

Sea Group

Swap Positions >>

Manage Cargo >>

TACTICAL COURSE

Medium (12-16kn)

500

Line Ahead

**LEFT CLICK** a Location, Sea or Air group icon to open it.

Time Bar

07:37 8 August 1942 0x

COMMAND POINTS: 174

Navigation icons: back, pause, forward, full screen

Toolbar

Map navigation icons: list, search, refresh, zoom in, zoom out

Map Filters

Map filter icons: fog, visibility, terrain, etc.

## TOOLBAR

From left to right:



Campaign Summary (**F5**) - Open/close Summary panel.

Unit Viewer (**F6**) - Open/close Unit Viewer panel.

Next Sea/Air (**F7**) - Cycle through friendly groups.

Next Location (**F8**) - Cycle through all locations.

## TIME BAR

Displays current time, date and time compression rate.

Light meter shows 24 hr light conditions with current lighting at centre.

Useful for determining if twilight is approaching.

COMMAND POINTS shows available points to spend on recruitment of ships.

## CAMPAIGN SUMMARY

Save or Quit a campaign as well as view information about the current situation.

Information is provided on 6 tabs:

**OBJECTIVES:** Outlines what is required to win the campaign.

**LOCATIONS:** lists all map locations along with their port and airfield levels, troops and resources. Conflict bar is shown for locations currently being fought over.

**SEA:** A roster of all ships currently under your command.

**REPAIR:** lists friendly ships currently undergoing repair and number of days required to complete repairs.

**LOSSES:** lists all friendly ships lost during the conflict as well as total friendly aircraft losses.

**ENEMY LOSSES:** as above, but for enemy ships and aircraft.

Time compression controls from left to right:

Decrease Time (**Comma**)

Pause Time (**Space**)

Increase Time (**Period**)

Max. Time (**Slash**)



## MAP FILTERS

From left to right:

Centre Map

Show Sea Icons

Show Air Icons

Show Location Icons

Show Contact Icons

Show Weather Overlay

Show Map Labels



At the bottom are additional buttons:

**MAP KEY:** Legend of all icons and colors displayed on the map (see below).

**RULES:** Summary of the rules and parameters for the current campaign (see below).

**SAVE:** Save the current campaign.

**QUIT/CONFIRM:** Quit the current campaign and return to the Main Menu.

## LOADING CAMPAIGNS

1) Select Campaign from the Main Menu and **LEFT CLICK** LOAD button.

2) **LEFT CLICK** save file to select it, then **LEFT CLICK** START button to resume.

Campaigns saved during combat will immediately resume that battle.

# MAP KEY

## CAMPAIGN SUMMARY X

OBJECTIVESSEALOCATIONSREPAIRLOSSESENEMY LOSSES










### ICON COLOURS

Friendly	<span style="color: blue;">■</span>
Enemy	<span style="color: red;">■</span>
Neutral	<span style="color: gray;">■</span>
Selected	<span style="color: yellow;">■</span>






### LOCATIONS

Ports & Airfields	★
Home Port	★

### SEA & AIR

Submarine	
Escort	
Transport	
Cruiser	
Battleship	
Fleet Carrier	
Fighter / D.Bomber / T.Bomber	
Medium Bomber	
Heavy Bomber	

### WEATHER

Cloud Icons: Scattered	
Broken	
Overcast	
Rain Snow	
Storm Snowstorm	

Numbers show sea state/wind speed

Explains all icons, images and colors displayed on the map.

MAP KEYRULESSAVEQUIT



## CAMPAIGN SUMMARY X

OBJECTIVES
LOCATIONS
SEA
REPAIR
LOSSES
ENEMY LOSSES

### RULES

**Friendly Nations**  
USA  
AUSTRALIA

**Hostile Nations**  
JAPAN

**Friendly Home Ports**  
NEW HEBRIDES  
Max Port Level: 5  
Max Airfield Level: 5

**COMMAND POINTS**  
Starting: 200  
Released Ships Refund: 100%  
Sunk Enemy Yield: 50%

**RESOURCE REPLENISHMENT**  
Home Ports Receive: WEEKLY  
Troops: 2,000  
Supplies: 4,000  
Engineering: 100  
Fuel: 100

**SHIP REPAIR TIME**  
Base Days: 5  
Days Per Destroyed Region: 1

**AIR OPERATIONS**  
Cannot perform between: 18:00 05:00

### LOCATIONS

RANK	1	2	3	4	5
<b>UPGRADE COST</b>					
Supplies	500	1,000	2,000	3,000	4,000
Engineering	50	100	200	300	400
Fuel	50	100	200	300	400
<b>PORT BONUSES</b>					
Detection Range	5 NM	11 NM	16 NM	22 NM	27 NM
Rearm Ships			Yes	Yes	Yes
Release Ships					Yes
<b>AIRFIELD BONUSES</b>					
Detection Range	15 NM	29 NM	44 NM	58 NM	73 NM
Wildcat	4	4	8	8	8
Avenger		4	4	8	8
B17-F					8

Friendly rank 0 location enemy detection range is 8 NM.  
Port and airfield detection range bonuses are additive.  
Detection ranges are maximum and reduced by time of day and weather.

Summary of all rules for a campaign.

MAP KEY
RULES
SAVE
QUIT
CONTINUE

## LOCATIONS

Locations are key strategic points on the map where ports and airbases exist (or can be built).

**LEFT CLICK** a location icon on the map to open it.

Friendly resources available at that location are shown along with a conflict bar.

A conflict bar that is not solid in color indicates the "balance" of the conflict at that location.

Current level of port and airfield facilities, as well as resources required to upgrade them is shown.

If port or airfield level is high enough, you may manage ships and launch various aircraft here as per the campaign RULES.



**Home Ports:** are the only locations where friendly ships may be recruited and new resources arrive.

**Upgrading Ports & Airfields:** Spend the resources listed under the port or airfield icon to upgrade them. If sufficient resources are available, **LEFT CLICK** the icon to upgrade it.

## RESOURCES

### COMMAND POINTS

Used to recruit ships. Ships released from command may refund some or all their **COMMAND POINTS** based on campaign settings.

Friendly sunk or scuttled ships recover no **COMMAND POINTS**.

Enemy ships sunk earn additional **COMMAND POINTS**.

### TROOPS

Enemy troops at the same location as yours trigger ground combat which expends troops and supplies from both sides over time.

May be carried by transports, submarines, destroyers, light cruisers and moved to other locations.

No troops from any side at a location render it neutral.

### SUPPLIES

Troops fight best with at least 1 per troop.

Consumed by troops during combat.

May be carried by transports and moved to other locations.

Required to upgrade ports and airfields.

### ENGINEERING

May be carried by transports and moved to other locations.

Required to upgrade ports and airfields.

### FUEL

May only be carried by oilers and moved to other locations.

Required to upgrade ports and airfields.

# SHIPS & SEA GROUPS

## CREATE A NEW SEA GROUP

**LEFT CLICK** a home port, then **LEFT CLICK** NEW SEA button to recruit ships. Using the Unit Viewer, navigate to the ships desired, use the names in class dropdown to select individual ships and then use Add Unit (**Return**) to add them to the new sea group. Mouse over a ship icon for details on ammunition, aircraft on board, cargo and any permanently destroyed regions of the ship requiring repairs.

Highlight one or more ships by **LEFT CLICK** on their icons.

**REMOVE:** remove one or more highlighted ships from the group.

**SWAP:** change the locations of two selected ships within the group.

Cancel: close the new group without creating it, spending no COMMAND POINTS.

Rename: type a new name for this Sea group.

**DONE:** Create the group, total cost for all units is shown and enough COMMAND POINTS must be available.

When selecting individual ship names in the Unit Viewer, some may not be available based on the prefix in front of their name:

(C) - Command. This ship is already under your command.

(U) - Unavailable. This ship is not available in the campaign. It is already sunk or not in service at the time.

(S) - Sunk. This ship has been sunk during the course of the campaign.

(R8) - Repair. This ship is under repair and will be available to recruit in the number of days indicated, in this example 8.

## FORMATION

**LEFT CLICK** the formation button (middle) to open/close the formation preview.

Ships are shown in the formation by their corresponding numbers.

Similar to formations in combat, the formation type and spacing can be set.

Use the **SWAP** button to switch positions of 2 selected ships within the formation.

Speed of a Sea group is determined by the slowest ship in the group.

Launch Scout button is to the left of the formation button (see Automated Scouting section below).





## MANAGING SEA GROUPS

Once created and on the map;

**LEFT CLICK** the ship icon directly to select that group.

Alternatively **LEFT CLICK** the Next Sea/Air button to cycle through all friendly Sea and Air groups.

**TACTICAL** - Enter the 3D world.

**COURSE** - Enter navigation mode to plot a course.

**LEFT CLICK** the strategic map one or more times to place waypoints for this group to follow. Distance and approximate time to reach the destination are shown when placing waypoints.

Use **Escape** or **LEFT CLICK** the Course button again to exit navigation mode.



Additional orders may be issued using the dropdowns to select the order and the corresponding button to execute it.

### Upper

**Swap** - switch positions of 2 highlighted ships.

**Split** - create a new Sea Group containing any highlighted ships of the current group.

**Merge** - move the highlighted ships of this group into the closest friendly group that is within range.

**Release** - remove the highlighted ships from you command. May only be performed if within range of a home port or port of sufficient rank.

### Lower

**Cargo** - open the cargo panel. See Cargo Section below for more information.

**Aircraft** - launch one or more planes from the highlighted ship.

Aircraft carriers have a cooldown between launches during which time they are considered vulnerable from performing Air Operations.

**Bombard** - shell a location.

Requires Battleship, Battlecruiser or Heavy Cruiser in group to perform.

Damages airfield and port at this location, may decrease their level and airfield cannot launch aircraft for a time based on damage done.

Expend 1/3 of ammunition, may be performed up to 3 times.

**Unload All** - all ships unload their cargo at the closest location within range.

**Rearm** - replenish ammunition of all ships in group if within range of a friendly port of sufficient rank.

Actions performed by Sea groups on the strategic map, such as loading/unloading cargo, bombarding a location or launching aircraft are considered to occur instantaneously. The speed of a Sea group is determined by the slowest ship within the group.

## CARGO

**LEFT CLICK** the arrow buttons corresponding to various resources to transfer them between location and a ship.

Sea group must be within range of a location to move cargo and movement of cargo is immediate.

Only one type of cargo may be carried at a time.

Fuel may only be carried by oilers.

Maximum cargo capacity and cargo on board is reduced by battle damage.

Taking on cargo renders a ship vulnerable based on factors such as flammability and weight.

Vulnerable penalties: Troops (20%), Supplies (30%), Engineering (40%), Fuel (80%)

See the Vulnerable section under Damage Control for more details.



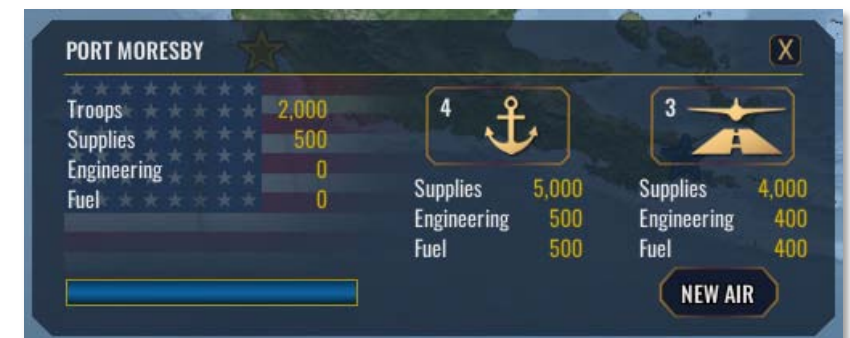
## AIRCRAFT

### LAND BASED AIRCRAFT

Select a friendly location with an airfield and use the NEW AIR button to create a new air group.

Aircraft available are based on rank of airfield.

Destroyed land based aircraft are automatically replenished the following day.



### CARRIER/SHIP AIRCRAFT

Select a friendly Sea group.

Highlight a ship that has aircraft.

Use the lower orders dropdown to select Aircraft, then **LEFT CLICK** the corresponding execute button.

Destroyed carrier or ship based aircraft are permanently lost and can be replenished by using the Rearm action for a Sea group.



## LAUNCHING AIRCRAFT

Once at the CREATE NEW AIR panel;  
Select the type of aircraft to launch, the number and use dropdown  
to select payload.

Carrying a load out reduces the **Endurance** (range) aircraft can fly.  
**LEFT CLICK** DONE button when finished to launch the aircraft,  
after which they appear on the map.



Preparation and launching of a flight is immediate, however if carrying a payload a **Launch Cooldown** based on the size of the flight is incurred by the airfield or ship before another flight can be launched. Aircraft carriers are considered to be "Vulnerable" during this cool down.

## MANAGING AIR GROUPS

Once created and on the map;  
**LEFT CLICK** the aircraft icon directly to select it.  
Alternatively **LEFT CLICK** the Next Sea/Air button to cycle through  
all friendly Sea and Air groups.

**LAND** - Land the flight if within range of Home location or ship.

**RTB** - Return to base. Plots a course to the indicated Home and lands.

**TACTICAL** - Enter the 3D world.

**COURSE** - Plot a course.

**LEFT CLICK** the strategic map one or more times to place waypoints for this group to follow. Distance and approximate time to reach the destination are shown when placing waypoints. Use **Escape** or **LEFT CLICK** the Course button again to exit plotting course mode.



**Endurance** indicates how far it can fly before insufficient fuel forces it to return to base.

Once at 0, Air group will immediately RTB, namely plot a course back home and attempt to land. No other course can be plotted once endurance reaches 0.

**Landing** - Air groups always return home to the location or ship that launched them.

If that home is no longer available (airfield captured by enemy or ship/carrier sunk), the aircraft within the flight are considered to have ditched and are lost.

Landing incurs a cooldown at the location (or ship) preventing additional launches until it has expired.

## SCOUTING & SEARCH PATTERNS

**LEFT CLICK** a ship with scout aircraft (including aircraft carriers) and then **LEFT CLICK** the "Launch Scout" button next to the Formation details. If the ship is not in **Launch Cooldown** a single scout aircraft will be launched.

Any Air group containing only 1 aircraft can perform automated search patterns, whether launched via the Launch Scout button or manually via the "Launch Aircraft" command.



Any flight with only 1 member may have a search pattern plotted using the waypoint marker icons surrounding the task force.

**LEFT CLICK** one or more waypoint icons to place waypoints relative to the taskforce.

**LEFT CLICK** centre ship icon to clear waypoints.

**LEFT CLICK** circular arrows to set clockwise or counter-clockwise path (at current range indicated).

Use slider at bottom to set range of waypoints from task force.

Once set,

- 1) Aircraft will fly the plotted search pattern until it is completed (or out of fuel).
- 2) Return to the ship, then automatically re-launch and repeat the search pattern (even outside of allowed air operation hours).



## LOCATION SCOUTING

Land based aircraft currently do not have automated scouting as locations themselves automatically detect enemy ships or aircraft in a radius determined by the port and airfield rank as well as weather and time of day.

Shaded circles on map around each location show maximum detection ranges with aircraft operational (outer circle) and without aircraft (inner circle).



## PLOTTING COURSES

- 1) **LEFT CLICK** the COURSE button of either a Sea or Air group to enter navigation mode.
  - 2) **LEFT CLICK** map one or more times to place waypoints for this group to follow. Distance and approximate time to reach the destination are shown when placing waypoints.
  - 3) Use **Escape** or **LEFT CLICK** the Course button again to exit plotting course mode.
- LEFT CLICK** the COURSE button to enter navigation mode cancels any course the group was already following. Sea units will navigate to the waypoints avoiding land and will often zigzag. Air units always navigate directly to waypoints and can fly over land.



## ENCOUNTERS

When units of opposing factions detect each other (or are very close) an encounter occurs. Unless a battle occurs, hostile units remain visible on the map for several hours, fading over time.

**BEGIN** - Enter the 3D world, search for the enemy and engage them in battle.

**IGNORE** - Air units may ignore Sea units and simply report their position and leave.

**SAVE** - Save the campaign prior to starting the engagement.

**GO TO** - Select the friendly group involved and zoom map onto the position of the engagement.

After an encounter, contact is lost with all hostile units involved for a grace period of 60 minutes. Hostile units may leave the area or remain and continue searching for your forces to re-engage. All ammunition expended as well as destroyed regions of Sea units persist until rearmed or repaired. Sunk or scuttled Sea units are permanently lost by both sides.

**ENCOUNTER**

Group: **WILDCAT**  
Date: **8 August 1942**  
Time: **11:06**  
Weather: **BROKEN**  
Sea State: **6**

**BEGIN** **IGNORE** **SAVE** **GO TO**



## THE GROUND WAR

Whenever troops from opposing sides occupy the same location, ground warfare occurs. This is achieved by transporting troops to a location and unloading them there.

Any location where ground warfare is occurring shows the balance of the conflict as a colored bar with the colors representing relative strength of both sides.

The strength of a fighting force at a location is determined by;

**TROOPS** - more troops increases fighting strength.

**SUPPLIES** - access to food, medical supplies and heavy weapons increase the effectiveness of troops by 500%.

100 troops with 100 supplies (at least 1 supply per troop) is the equivalent of 500 troop strength.

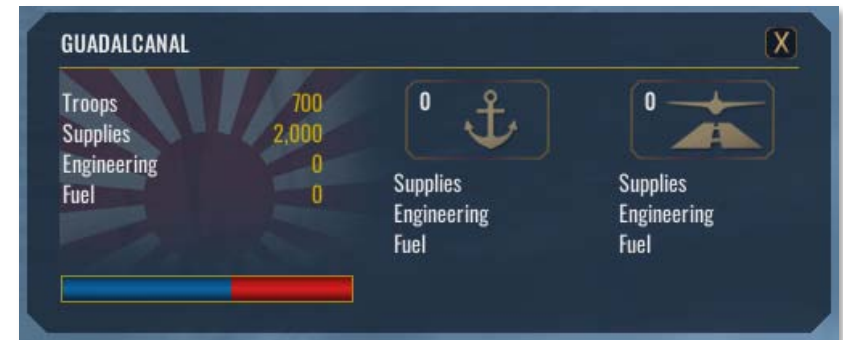
Supplies are consumed at rate of 5% of troop number per day of fighting.

**DEFENCES** - the combined rank of the port and airfield at the location provides +20% per rank.

1000 troops defending a location with rank 5 port and rank 5 airfield would gain +200% bonus, making them equivalent to 3000 troop strength.

Performing a shore bombardment does not effectively decrease the number of enemy troops, but can reduce port and airfield ranks, which in turn decreases this bonus.

Bonuses from Supplies and Defences and stack.



# WEATHER

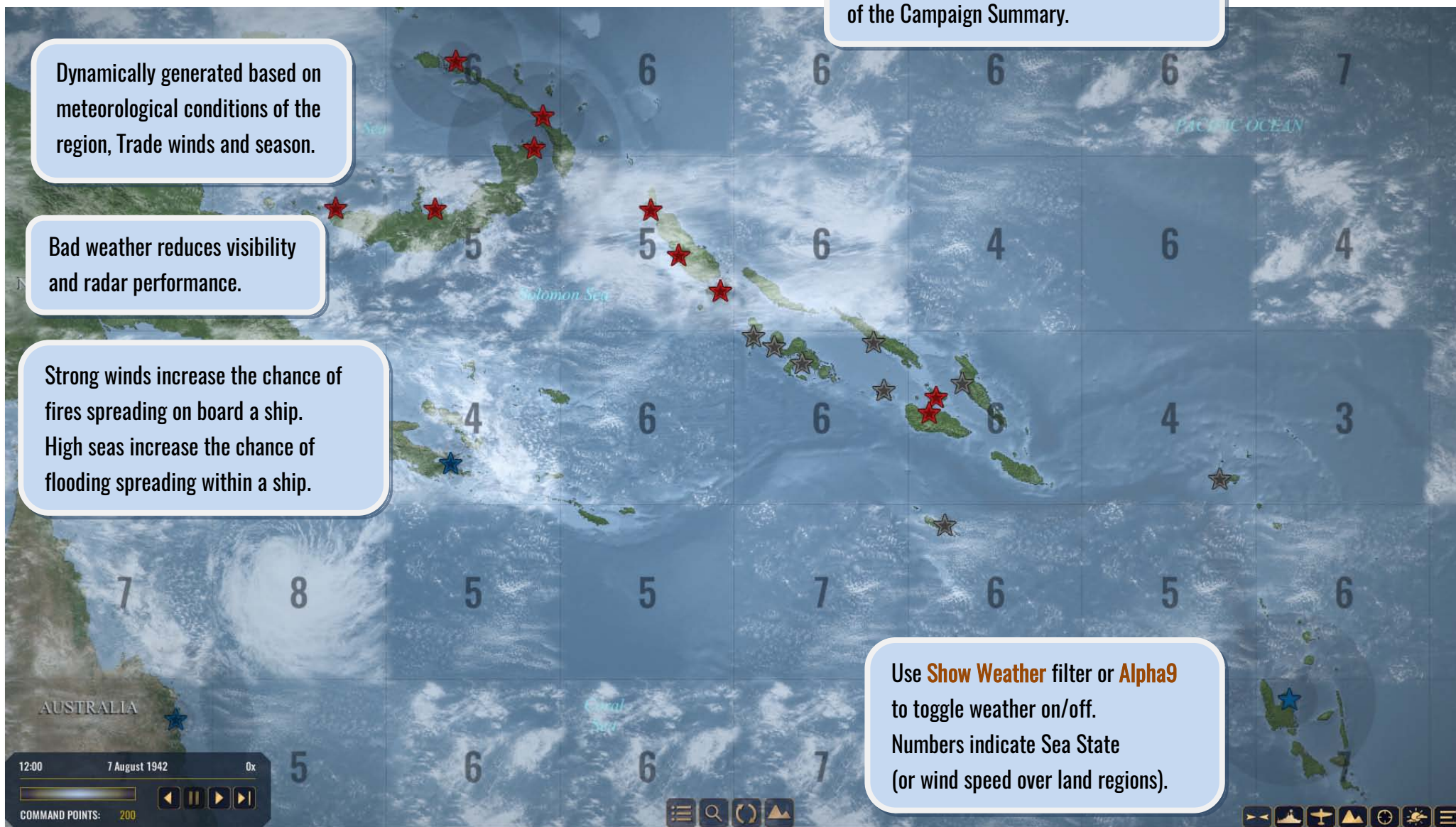
Cloud icons are described under **MAP KEY** of the Campaign Summary.

Dynamically generated based on meteorological conditions of the region, Trade winds and season.

Bad weather reduces visibility and radar performance.

Strong winds increase the chance of fires spreading on board a ship.  
High seas increase the chance of flooding spreading within a ship.

Use **Show Weather** filter or **Alpha9** to toggle weather on/off.  
Numbers indicate Sea State (or wind speed over land regions).





# 15. OPTIONS

## GAME

**Tooltips** - Set the level of detail shown during mouse over buttons.

**Auto Classify Ships** - Enemy ships automatically classified correctly when Solution is high enough.

**Pause Combat** - Allows pausing of the game while in combat.

**Hide Shells** - Shells are not graphically displayed.

**Auto Switch Air Leader** - Automatically take control of next aircraft when player controlled leader shot down.

**Metric Measurements** - Use metric units.

**Show Map Bombsight** - Display an icon on the tactical map to indicate bomb impact location.

**Show Map Intercept** - Display an icon on the tactical map to indicate target position lead based on current weapon.

**Ship Friendly Fire** - Allows shells and torpedoes to hit ships of the same side.

**Ship Collisions** - Allows ships to collide with others of the same side.

**Dud Torpedoes** - Enable or disable dud torpedoes.

**Dud Bombs** - Enable or disable dud bombs.

**Unlimited Camera** - Camera can move to any object, whether it has been detected or not.

**Simple Camp. Map Drag** - Enable or disable inertia on the campaign strategic map when dragging.

**Combat Difficulty** - Adjusts the overall difficulty of battles.

**Sonar Range** - Set base sonar sensitivity range for both player and enemy.

## CONTROLS

**Camera Sensitivity** - Adjusts the sensitivity of mouse and key control of the camera.

**Invert Mouse** - Swaps the Y axis of the mouse when dragging to pan the camera.

**Restore Default** - Returns all key and mouse controls to their default values.

**Remapping keys** - **LEFT CLICK** a key to highlight it, then press desired key or mouse button to change it.

## VIDEO

**Full Screen** - Toggles the game between full screen and windowed mode.

**Resolution** - Select resolution from those supported by your monitor.

**Anti Aliasing** - Improves jagged edges of graphics.

**Ocean Quality** - Sets ocean level of detail (decrease to improve performance).

**VSync** - Vertical synchronization (recommend ON to improve performance).

**Shadows** - Enables or disables shadows.

**Color Filter** - Post processing color filter for improved visuals.

**Bloom** - Post processing effect for improved lighting and visuals.

**Terrain** - If enabled, displays terrain.

**Trees** - If enabled, displays trees.

**Underwater Particles** - Displays the underwater particles.

**Multiple Monitor Support:** to run War on the Sea across multiple monitors, set **Full Screen** to OFF so as to run the game in windowed mode. Stretch the window out to any size you wish.

## AUDIO

**Master Volume** - Master volume for all sound effects.

**Effects Volume** - Adjust in combat sound effects.

**Music Volume** - Adjust volume for music in combat and menus.

**Combat Log/Campaign Message Volume** - Volume of UI generated sounds.

**Music In Combat** - Enable or disable music when in combat.

## 16. CONTROLS REFERENCE

Keys shown are the Default NUMPAD layout. WASD alternative keys (which can be set under OPTIONS/CONTROLS) are shown in **Light Blue**.

<b>General</b>		<b>Combat Controls</b>		<b>Navigation</b>		<b>Mission Editor</b>	
Cancel	<b>Escape</b>	Pause	<b>Space</b>	Increase Speed	<b>KeyPadPLUS / R</b>	Settings, Save/Load	<b>F5</b>
Time Compression	<b>F9</b>	Menu	<b>F5</b>	Decrease Speed	<b>KeyPadMINUS / E</b>	Inspect & Add Units	<b>F6</b>
Hide Combat UI	<b>F10</b>	Unit Viewer	<b>F6</b>	Steer Left	<b>KeyPad4 / A</b>	Next Sea/Air	<b>F7</b>
		Orders	<b>F7</b>	Steer Right	<b>KeyPad6 / D</b>		
<b>Camera Controls</b>		Damage Control	<b>F8</b>	Steer Up	<b>KeyPad8 / W</b>	<b>Campaign Map</b>	
Camera Left	<b>Left Arrow</b>	Main/Machine Guns	<b>Alpha1</b>	Steer Down	<b>KeyPad2 / S</b>	Summary	<b>F5</b>
Camera Right	<b>Right Arrow</b>	Secondary Guns/Bomb	<b>Alpha2</b>	Centre Controls	<b>KeyPad5 / Q</b>	Inspect & Add Units	<b>F6</b>
Camera Up	<b>Up Arrow</b>	Torpedo	<b>Alpha3</b>			Next Sea/Air	<b>F7</b>
Camera Down	<b>Down Arrow</b>	Torpedo Room	<b>Alpha4</b>	<b>Sensors, Map</b>		Next Location	<b>F8</b>
Zoom In	<b>Equals</b>	Depth Charge/Rocket	<b>Alpha5</b>	Open Map	<b>Tab</b>	Centre Map	<b>Alpha4</b>
Zoom Out	<b>Minus</b>	Chase Camera	<b>C</b>	Mini Map	<b>M</b>	Show Sea	<b>Alpha5</b>
Drag Camera	<b>Mouse1</b>	Look At Target	<b>F</b>	Lock Map	<b>X</b>	Show Air	<b>Alpha6</b>
Freeze Camera	<b>BackQuote</b>	Target Nearest Air	<b>Y</b>	Radar On/Off	<b>Semicolon</b>	Show Locations	<b>Alpha7</b>
Switch To Underwater	<b>MOUSE2</b>	Target Mode	<b>T</b>	Active Sonar On/Off	<b>Quote</b>	Show Contacts	<b>Alpha8</b>
		Navigation Mode	<b>N</b>	Binoculars View	<b>B</b>	Show Weather	<b>Alpha9</b>
<b>Unit Viewer</b>		Select Mode	<b>S / H</b>	Time Decrease	<b>Comma</b>	Show Map Labels	<b>Alpha0</b>
Next Unit	<b>Comma</b>	Attack	<b>A / V</b>	Pause	<b>Space</b>	Decrease Time	<b>Comma</b>
Previous Unit	<b>Period</b>			Time Increase	<b>Period</b>	Pause	<b>Space</b>
Classify/Select Unit	<b>RETURN</b>			Time Max.	<b>Slash</b>	Increase Time	<b>Period</b>
						Maximum Time	<b>Slash</b>