



P-3C “Orion”

Dangerous Waters™ OWTOP

(Orion Warrior Training and Operating Procedures)

(Game Version : 1.03 / Manual Version : 1.3)



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Introduction to the P-3C in Dangerous Waters

The following chapters in this manual deal with the Sensors, Weapons and Tactics employed on/with the platform P-3C Orion in the game Dangerous Waters™. This manual deals with the “How-To” make use of the P-3C in a given tactical situation, and other stuff not already covered in the manual, but needed for operating. It does not substitute the game manual! If you have questions and/or problems regarding the functions (means the function of the buttons in a particular station) of the stations discussed within this manual, you have to revert to the game manual shipped with Dangerous Waters™. If you didn't buy the deluxe version with the printed manual, you will find the manual as a PDF file in the /manual folder in your Dangerous Waters™ installation directory.

The P-3C Orion is used as a Submarine Hunter (and in other roles) by various Navies in the world. The biggest user and the only country you can fly the P-3C in Dangerous Waters™ for (at the time of the writing of this document), are the United States of America. This document is based on unclassified information and game experience. As our experience evolves, so do our tactics, hence check back regularly for possible updates.

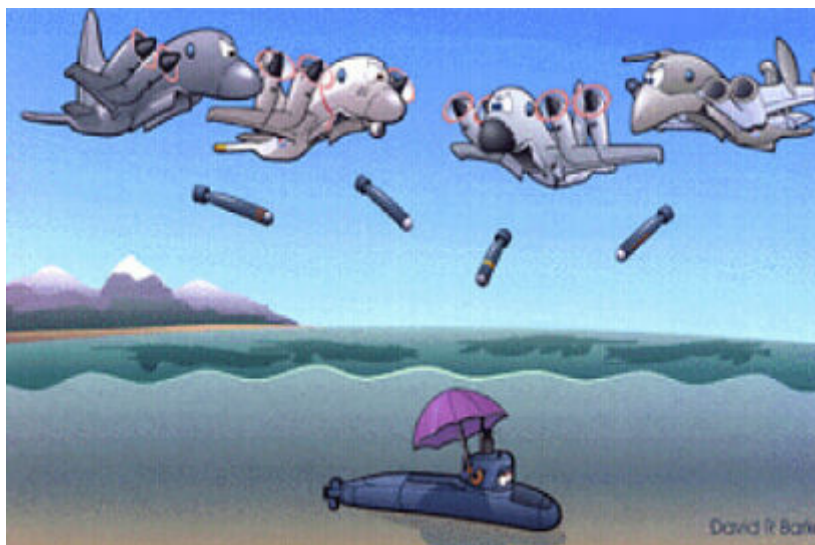
Along the way I want to say Thank You! to the contributors to this document: Smuook, Beer, STGChamby and JSteed. Especially the first two helped and taught me a lot, when all I knew about the P-3C was that it's a big airplane, and it's supposed to hunt submarines. STGChamby helped out with the Sound Gradients and Propagation Paths. Thanks to JSteed for providing me with the original Sonar Profiles file, that way it was easier to bring them in another format, and include the information for reference.

Note to our virtual Bubbleheads (I know you read this too ...)

Stealth is your friend – if you are ever seen/found by a good Orion Driver you are pretty close to being dead meat, unless one of the following happens:

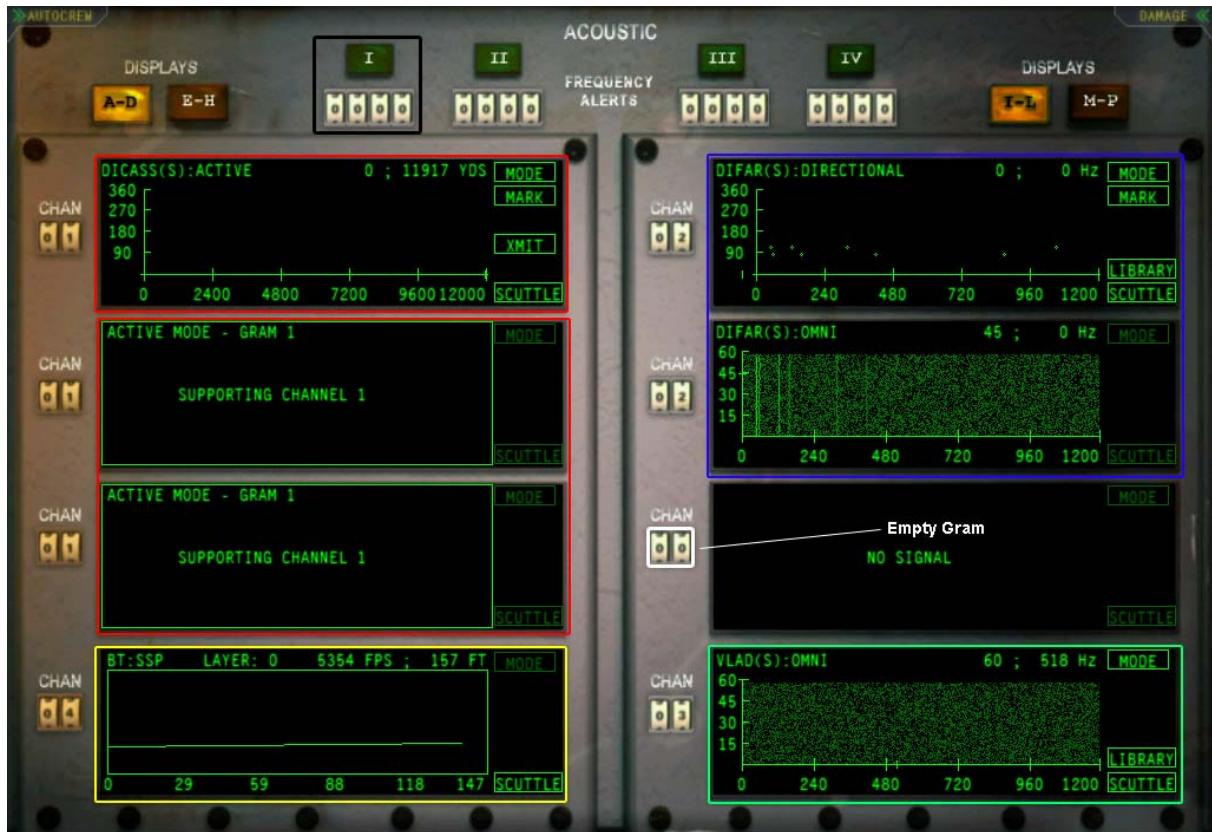
- You shoot down the Orion (and I know people who work on tactics to prevent that)
- The Orion expands all weapons capable of hitting you
- The Orion loses contact with you (that's a good one ...)

In other words ... You can run, but you cannot hide. Or you die tired (take your pick).



P-3C Sensors

Acoustics (Key “F2”)



Grams

The Acoustics Station deals with your most important sensors, the sonobuoys. As you can see on the image, you have 16 Grams (2x8) available, which means you can monitor up to 16 buoys in OMNI Mode (marked green) or eight buoys in DIRECTIONAL Mode (marked blue) or five buoys in ACTIVE Mode (marked red). You will soon learn to appreciate the NAV map feature, where sonobuoys with a contact within range, will go “hot” (means they display a red dot in them). That is very helpful, especially when you have to cover a lot of ground with them or you have a lot of buoys out. To be honest, this is far from reality, because in real life you need to monitor the buoy to notice it going “hot”, plus tactics that spread the buoys out, like this manual suggests sometimes (if not all the time), wouldn't work in real life either. But then, this is just a game. A good idea is, to try and keep the number of buoys dialed in as low as possible, that way you can easily switch modes or call up a buoy fast, without having to switch around a lot. Just keep those buoys that show “hot” and which you suspect having a submarine nearby, dialed in. If you select channel 00 (marked white) the Gram will show NO SIGNAL and can either be used as a supporting Gram for Directional/Active Mode or you can dial in a buoy of your choice.

Frequency Alerts

I recommend printing out the *Appendix A*, as you will need that information during a mission. The frequency alerts (you have four available – one of them is marked black) basically just notify you, that one of your dialed in buoys has a line in the Frequency Range you have set as alarm. It won't tell you which Gram though. That's something you have to find out for yourself. Frequency alerts work even when you don't have Autocrew enabled. However, assume you are hunting an Akula-II submarine in a moderate density Environment, means you have a couple of Freighters, maybe a Tanker or a Trawler and the occasional military

ship around. The Akula-II has 5 frequencies: 50, 125, 320, 1125 & 1886, and you have only four possible frequency alarms available. Means you can select up to four frequencies to dial in, if you are only hunting for the Akula-II. You will notice that you can't dial in anything over 1200Hz, because that's the max range of the buoys, therefore you are limited to 1200Hz. That's no biggie though, since to see those high frequencies (given that the buoys could display them), you would have to be practically on top of the submarine. So all you can use are the first four frequencies anyway. And here comes the other big problem: The Akula-II isn't the only platform with the combination of 50 & 125 Hz in its Profile, no Sir – the Fishing Boat, Powerboat, other submarines and surface ships have them too. And if you are in the above mentioned environment, chances are good, that your alarms will go off, but not because you have found the Akula.

Then there is the problem of getting more than one or two frequency lines. You see, most of the subs are pretty sneaky guys and if you are lucky you will get the first one or two lower Hz lines. If you are good, you will track him and place your buoys accordingly, that will let you classify him with line three and four. Anyway, if you use your frequency alarms, you have to take a look at your tactical situation first. Sometimes you can dial in the lower frequencies and it'll work, and sometimes you better start with the 3rd or even 4th frequency as alarm, or otherwise you end up with a lot of false alarms.

Sound Gradients and Propagation Paths

In this game there are 3 distinct Sound Speed Profiles (SSP) modeled, Positive, Negative and Isothermal. To find out what the actual SSP in your Operating Area is, you need to drop a BT buoy (P-3C, MH-60, FFG) or a XBT Probe (All Submarines).



The image above shows the return of a BT buoy in deep water. As you can see, the layer at the place where the buoy was dropped is at 462ft which is marked graphically (red) and displayed in numbers (blue). Important here is not only to know where the layer exactly is (in this case 462ft), but what general conditions you are operating in – which you can see in the graphical display - to determine probable distances to target. As you can see later in this chapter, depending on the SSP in the operating area you might discover contacts out to 30+ nm (pending some patches to the game).

Layer depth is defined as max sound speed at max depth above the thermocline. The important thing to remember about sound is that it is lazy and will seek an area of low sound speed. In the above example, sound originating above the layer will tend to be trapped in that area or duct. If your sonobuoy is shallow (above layer) and your target is deep (below layer), the chances of a detection are minimal.

Along with this chapter consult Section 5-Training, pages 5-3 to 5-19 in the Dangerous Waters manual to learn about things not mentioned in here but necessary for game play.

Sound Velocity Gradients

Positive

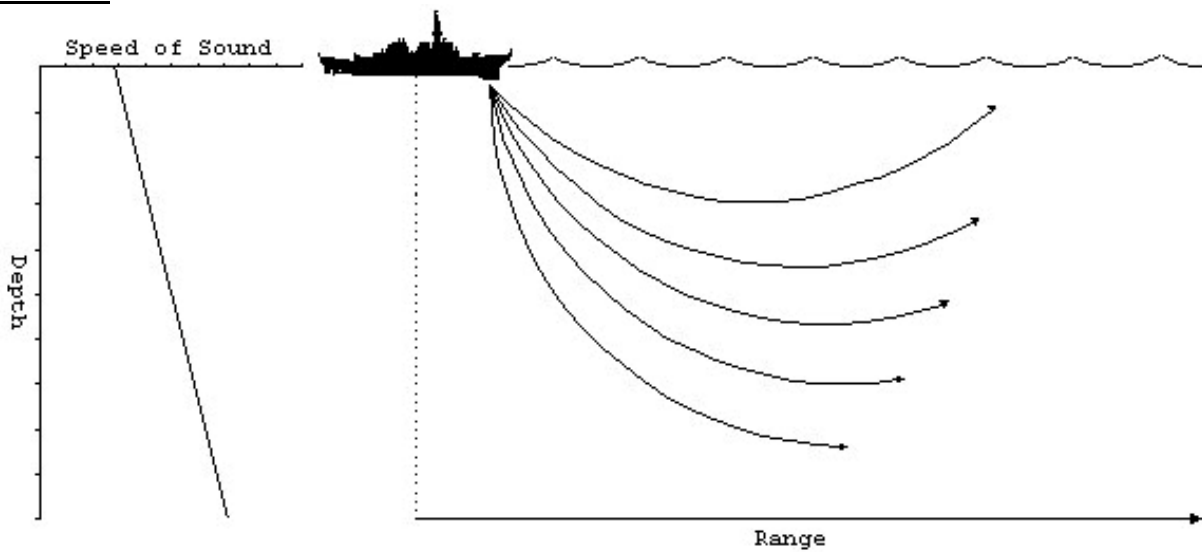


Image 1-1

Negative

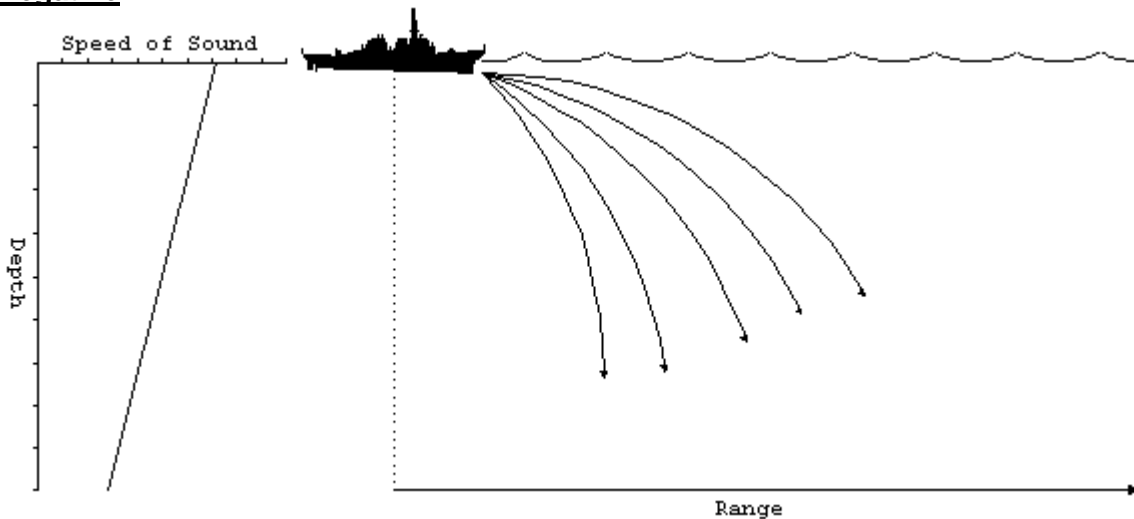


Image 1-2

Gradient consists of sound speed either decreasing (image 1-2) or increasing (image 1-1) at a constant rate with growing depth. In regard to the sound waves this means they either bend toward the bottom or toward the surface. In the case of an isothermal environment, the sound speed is constant from the surface to the bottom with little or no change. An example of isothermal would be the Persian Gulf. The entire water column acts as a duct with sound propagating in all directions. Sound will primarily be bounded by the two physical barriers of the surface and the bottom experiencing loss at all interactions.

Surface Duct

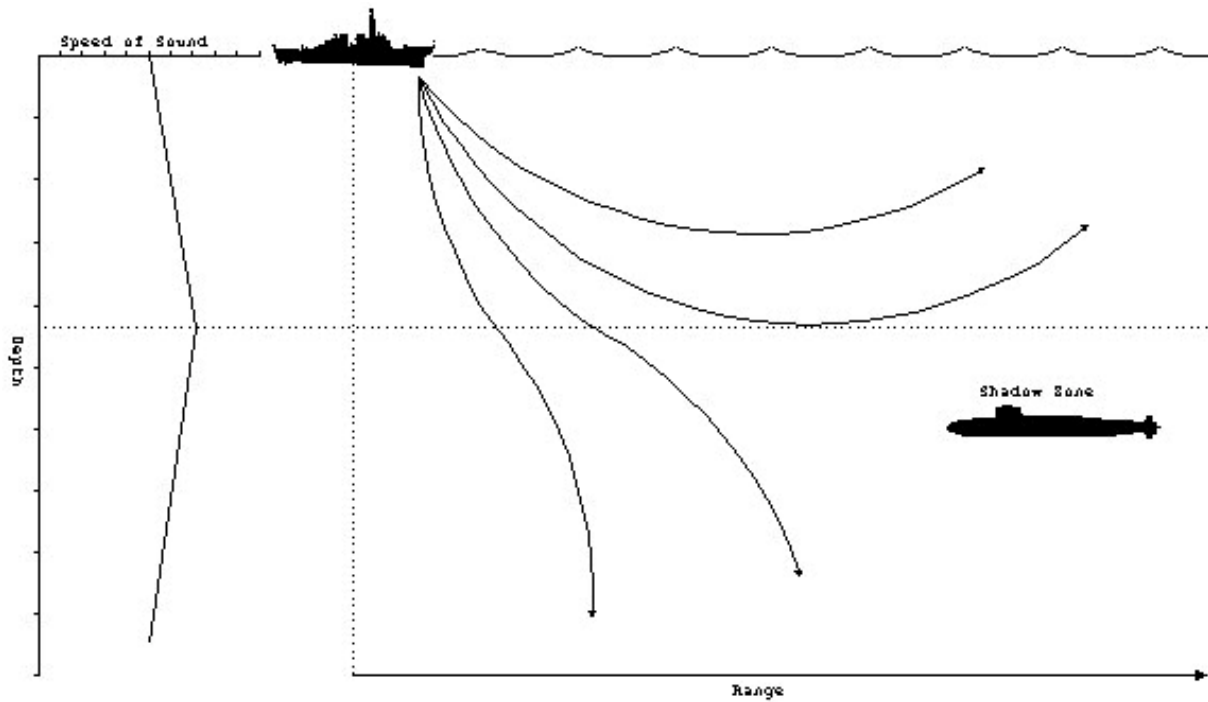


Image 2-1

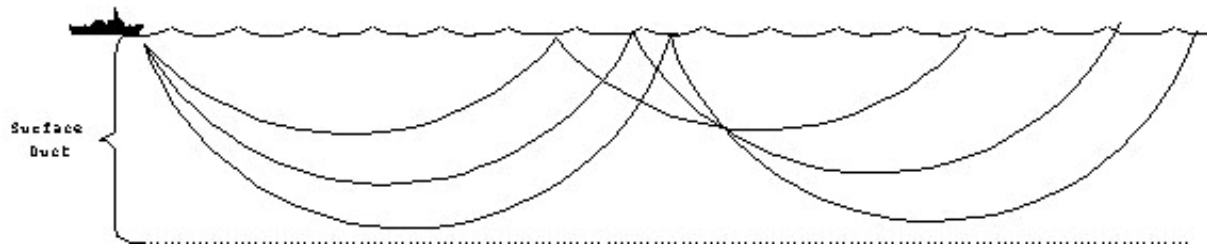


Image 2-2

Surface Duct means that there is a thermal layer present. Because of this layer the majority of the sound waves will be reflected towards the surface (assuming the sound emitter is above the layer), while the rest will pass through the layer, but will bend like light rays when going through glass (image 2-1). As a result you will have problems detecting submarines that are below the layer from above.

Convergence Zone

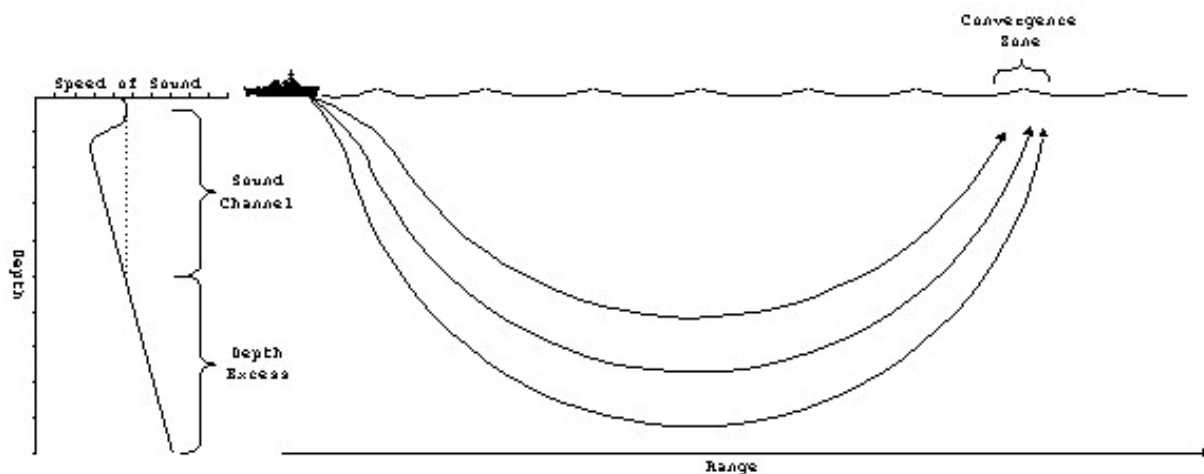


Image 3-1

Convergence Zone means that the Sound waves will be refracted or bent due to increasing pressure. In order for CZ to exist, sufficient depth excess must exist. Generally, a minimum of 200 fathoms (1200 feet) below the sound channel must be present for reliable CZ to exist. The effect of this is, that you will be able to detect Ships/Submarines out to 30 or 40nm or more. Imagine the whole thing as donut-shaped rings centered on your buoy. There may be one, two or more convergence zones available.

In contrast, Bottom limited is defined as a sound channel without sufficient depth excess to support CZ. In most cases this will result in a Bottom Bounce (BB) propagation path being formed. BB can also extend detection ranges. However, each interaction with the surface or bottom will result in signal loss.

Sonobuoys

The game models five distinct buoy types: LOFAR, DIFAR, DICASS, VLAD and BT.

The player can employ all with the exception of LOFAR buoys, which can be used in game though, if the Mission Designer has put them in. Except the BT buoys you can set the buoys either to **Shallow or Deep** (Depth is dependant on the actual buoy - more on this later). To make the right decision you have to balance the deployment time and the sensor range of the buoy against your current needs, and of course the available depth. **Shallow buoys take roughly 2 minutes to deploy and send data** from the moment they hit the water and **deep buoys take roughly 4 minutes to deploy and send data**. To make your life easier in finding the right distance from the targets datum to the deployment position of your buoy of choice, you can either use the 3-Minute Rule

$$\text{Distance (traveled in yards) in 3 minutes} = \text{Speed (in kts)} \times 100$$

or take a look at the chart in *Appendix D : Close in Buoy Chart*. Take note, the Chart in Appendix D shows the distances for two and four minutes. With some training and a bit of luck you will be able to place your buoys right on top of your target when they start sending data. For more information on the individual buoys check the Dangerous Waters™ manual, Section 5: Training. Keep in mind that **buoys will go “hot” if something is within its detection distance which in turn is based on the current acoustic conditions at the spot, i.e. SSP, water depth and so on**. This of course doesn't mean they will show any lines in Omni or a dot in Directional right away. They just go hot in the NAV Map. This is a very useful feature and will be discussed in the Tactics section later on. Take note that the colors on the NAV map don't actually represent depths as you would expect, but how good (or bad) sonar conditions at that particular position are. The lighter the blue, the worse are the sonar conditions. Keep that in mind when planning your tactic.

Further, buoys have a Lifespan of two hours, they loose power and sink to the bottom (and drop from the NAV map) after the time is up. Additionally, the contact to your buoys depends on Line of Sight communication, means if you are beyond the visual horizon the connection to your buoy will be lost, and you will get an “Out of Range” in the gram of the respective buoy.

Marking contacts with your buoys ...

You can only mark contacts in Active or Directional mode. To mark a contact you have to click on one of the points or at the same level in the Gram (in Directional mode), so a horizontal line goes through the point which represents one of the frequency lines of your contact of interest. Then click “Mark”. If it's a new contact, this action generates a bearing line with an Unknown Contact marker at the end. If that contact was already established on this buoy, then the bearing line on that contact will shift to represent the bearing change, assumed there was one.

If you want to mark a contact using an Active buoy you have to transmit first. Then wait till you see a spot (might be big and bright or even small and hard to see) that looks different then the normal background. Click that spot and hit “Mark”. If it's a valid (new) contact, then the contact will get a new number and will be placed in the NAV map with a bearing line and an Unknown contact marker. The Active buoy gives you both bearing and range, the bearing range will vary in length according to the distance of the contact to the buoy.

On top of this, even when you have marked a contact, you have to update him manually – all the time, unless you have Autocrew activated (They will updated every 2 minutes). That's where a 2nd player comes very handy, because together, one guy can concentrate on hunting and shooting, while the other one can concentrate on keeping the contacts up-to-date.

BT (Bathymograph) Buoy



The BT buoy is your tool to gain the actual SSP of the operating area.

No depth preset - it drops to the bottom regardless of the depth.

DICASS (Directional Command Activated Sonobuoy System) Buoy



The DICASS buoy is your most important buoy in the game against SSKs. It doesn't have a greater detection range than the VLAD, but it is the only buoy in the game to have an Active as well as Passive Mode which is especially helpful against slow moving Diesel Submarines.

Shallow = 90ft / Deep = 800ft

DIFAR (Directional Frequency and Ranging) Buoy



The DIFAR buoy is your buoy of choice when it comes to Littoral waters (or simply shallow waters). It has similar capabilities to the VLAD, though due to the Environment it works in, the detection range is shorter compared to the VLAD. Expect a max. of roughly 6nm in optimal conditions.

Shallow = 90ft / Deep = 400ft

VLAD (Vertical Line Array Directional Frequency Analysis and Recording) Buoy



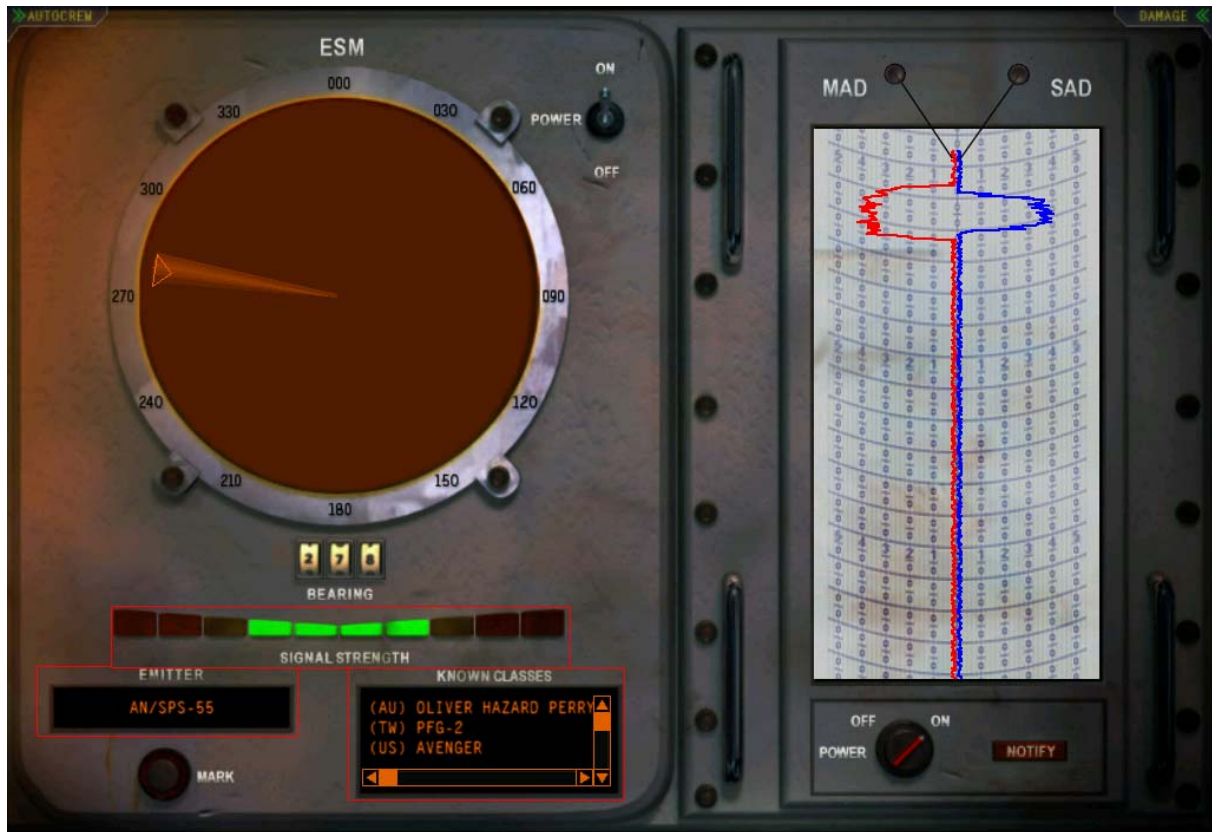
The VLAD is your buoy of choice for the deep blue. It works best in depths exceeding 1500ft and has the greatest passive detection range among the available buoys. If you are on a deep water hunt, this is your buoy of choice, the deep version should be able to go beneath most of the layers you will encounter and help finding the lurking subs there. Take note, if you try to use it in shallow waters you won't hear anything as the buoys will be buried in the mud.

Shallow = 600ft / Deep = 1200ft

LOFAR (Low Frequency Analysis and Recording) Buoy

This buoy offers only Omni Directional Mode. Aside from that you can't choose it as load out. The only time when you will use a LOFAR buoy, will be, when the Mission Designer places them in the mission.

MAD/ESM (Key "F4")

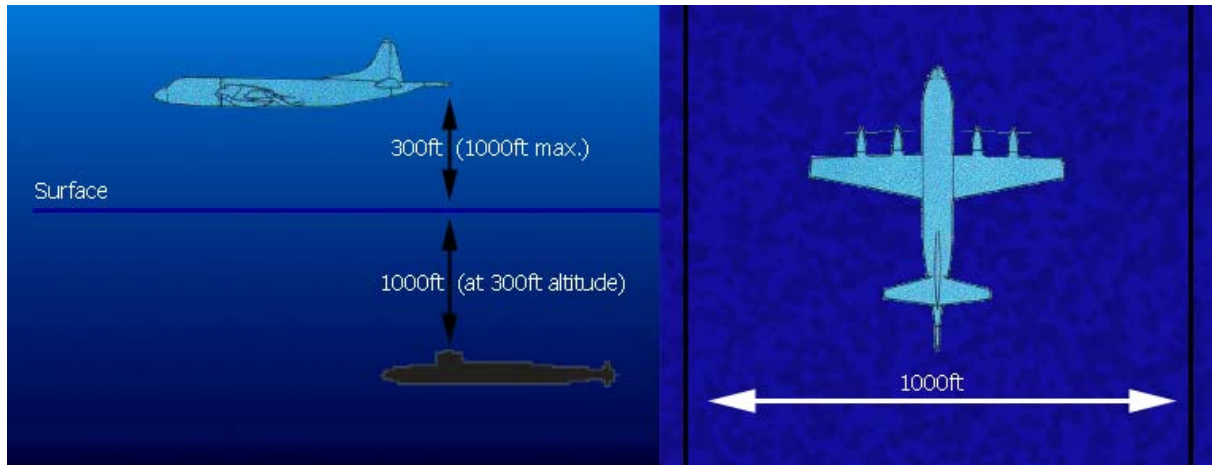


ESM

The ESM is a passive Sensor. It relies entirely on your distance to the emitter and the signal strength. Plus, just like with Radar beams, you are limited by the horizon, means the higher you are the more you can "see". If the signal is too weak you will only see that there is something, but not what emitter it belongs to. Next to the size of the Wedge you can gain the strength of the signal from the Signal Strength Indicator below the ESM monitor. Basically, the more colorful it gets the bigger is the signal you receive (and the closer is probably the transmitting platform). You will get the info about what Transmitter it is (in this case an AN/SPS-55) and which classes of platforms have such a transmitter. Sometimes it's just one, but more often then not, you will get a bigger list of platforms and have to choose for yourself the appropriate one. Once you hit "Mark", the contact will appear on the NAV Map with a LOB. If you classified him, he will have the classification marked in the list "Known Classes".

If you think you have found a sub, then you can fly down the bearing and maybe catch the sub on the surface (or eat a SAM). Be careful when you try something like this. It's pretty dangerous and you should have a Maverick ready. But without anything that gives you the distance to the sub and therefore a location, better stay away and try to localize him. Once that's done, send him a greeting, by way of a Maverick or two - if he is still on the surface. Otherwise he will most certainly welcome your torpedoes. You could use your Radar to pinpoint his location; however that gives away your position to him as well. Either way, be very careful.

MAD/SAD



The MAD/SAD Sensor (see manual page 9-15 for details) in the game works up to an altitude of 1000ft (Ownship). Best employment altitude is 300ft at which you have roughly 1000ft coverage below the surface (see above left). Further you are in the middle of a 1000ft Corridor, so you can detect submarines up to 500ft to either side of your Aircraft (above right). The SAD has less range than the MAD. SAD coverage will be to roughly 750ft depth.

Since this sensor is located on your tail, you have to actually fly past the submarine before you get a reading. Take note that you don't have to turn on Autocrew to be notified of a MAD detection. If you get a MAD hit you will hear "MAD!, MAD!, MAD!" from your crew and it will show in the chat/messages window as "Mad!, Mad!, Mad!". On top of that you will see a new Unknown mark on the NAV Map. If you have already detected that particular contact with your MAD sensor, then the old marker will be moved to the new location. Therefore it's advisable to immediately mark the location of a MAD return (as described in the tactics chapter) and classify the contact as good as possible.

Since this sensor reacts to large chunks of metal in or on the ocean, you will get hits when you fly over or fly close to surface ships as well. Surface ships will only generate a MAD return, while submarines generally give you a MAD and a SAD return. The exception to this rule happens, when a submarine dives below the maximum SAD Range. Example for that would be the Seawolf diving at Max Operating Depth. Even if you fly at 300ft or lower you won't get a SAD return. Remember, whenever you get a MAD call, check the MAD readout for SAD and compare with your tactical picture. If you get a return and nothing can be found on the surface, chances are pretty good that you stumbled upon a submarine, even if you don't get a SAD return (that only means it's pretty deep).

If a submarine is trying a "Down Periscope" and hiding beneath a surface ship, you will get two Unknown Contact markers in close proximity, or if the sub skipper is really good, then you will just get one marker, but either way the SAD return will be visible.

Radar (Key "F3")



Your Radar Coverage (or Radar Horizon) depends just as in real life upon your altitude. Basically, the higher you go, the larger your coverage. If you really want to know how high you have to go for a certain Radar Horizon, use the following formula:

$$\sqrt{\text{Altitude in ft} \times 1,17} = \text{Radar Horizon in Nautical Miles (nm)}$$

For convenience I have added the altitudes, you need to have, to make proper use of the Radar Settings in game. Keep these numbers in mind, as they are important for ALL Line-of-Sight Communication, including sonobuoys.

Setting (on the Radar)

16 kyds
32 kyds
64 kyds
128 kyds
256 kyds

Altitude

170ft
680ft
2710ft
10900ft
43320ft

IRDS (Key “F7”)

The IRDS is a retractable camera mounted in the underside of the Orion fuselage. You can turn it 360° and it can look up 15° and down 84°, plus it offers an Auto Track mode, where the selected Target is kept as best as possible in the middle of the camera lens. This function is not perfect, it doesn't center on something in your view, but instead the camera is centered on the relative bearing/position of the track selected in the track list. If the track is not where the object is in reality, then the camera will be off target. The more your track is off, the more your camera will be off.

Further it has a 8X Zoom and four display options (Normal, Grayscale, Infrared, LLTV). With the QuickPos Buttons you can easily turn it either fully forward or backward. Further capabilities of the IRDS include the possibility to shoot photos and to mark contacts visually.

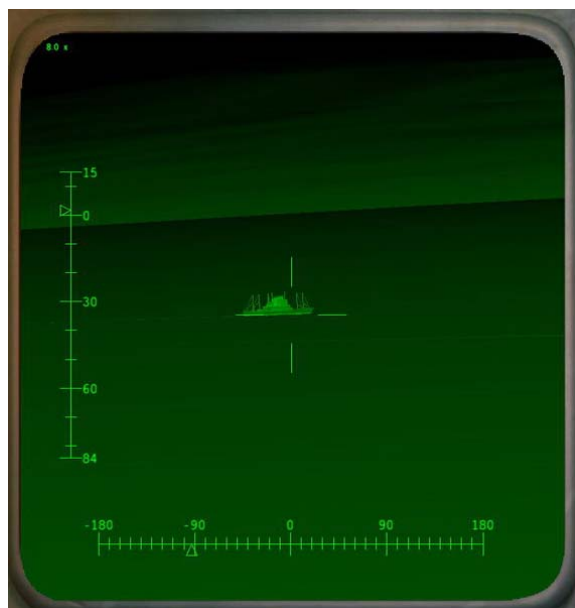
Normal Mode

The Standard or Normal IRDS Mode is just like any other camera, and is impaired by bad weather, clouds and so on.



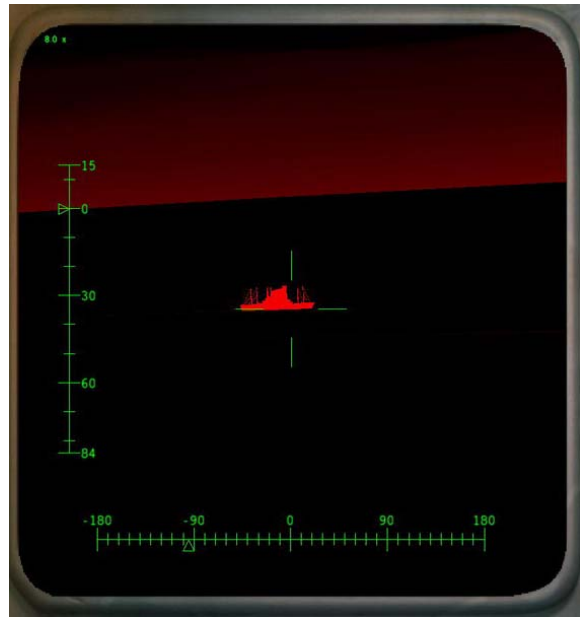
LLTV Mode

The LLTV mode shows a lowlight display, and is good for Nighttime operations. However its drawback is the fact that similar to the Normal mode it is impaired by Bad weather and clouds.



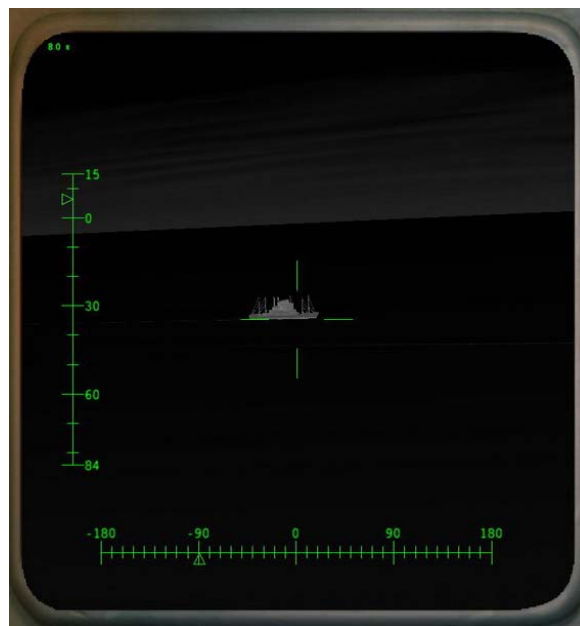
Infrared Mode

This Mode is good for Night Operations and during Bad Weather. When clouds, rain or simply the night limit your visibility, this will be the mode to use. Against the cold (black) water you can spot Surface Ships, Aircraft and surfaced Submarines pretty easily, even over great distances. However there is a drawback in the limited use for identification purposes. To properly identify a vessels class you have to get rather close sometimes, depending on the class of the vessel and your viewing angle. On very few occasions it's possible to see a submarine just below the surface, but don't count on it. Even if you see it, it will be dangerously close, and in most of those cases the submarine probably will pop up and loose a SAM at you.



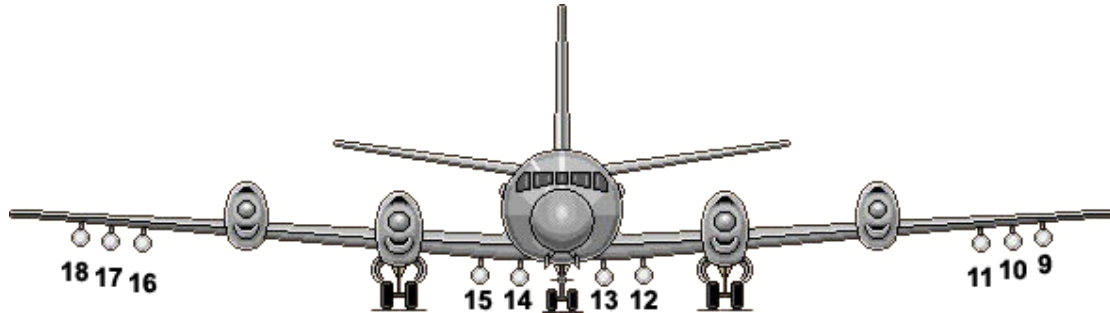
Grayscale Mode

This mode provides a higher contrast, but is limited to good visibility and good light conditions. I haven't found great use for this mode yet. Normally you will either use the "Normal" or "IR" mode.



P-3C Weapons

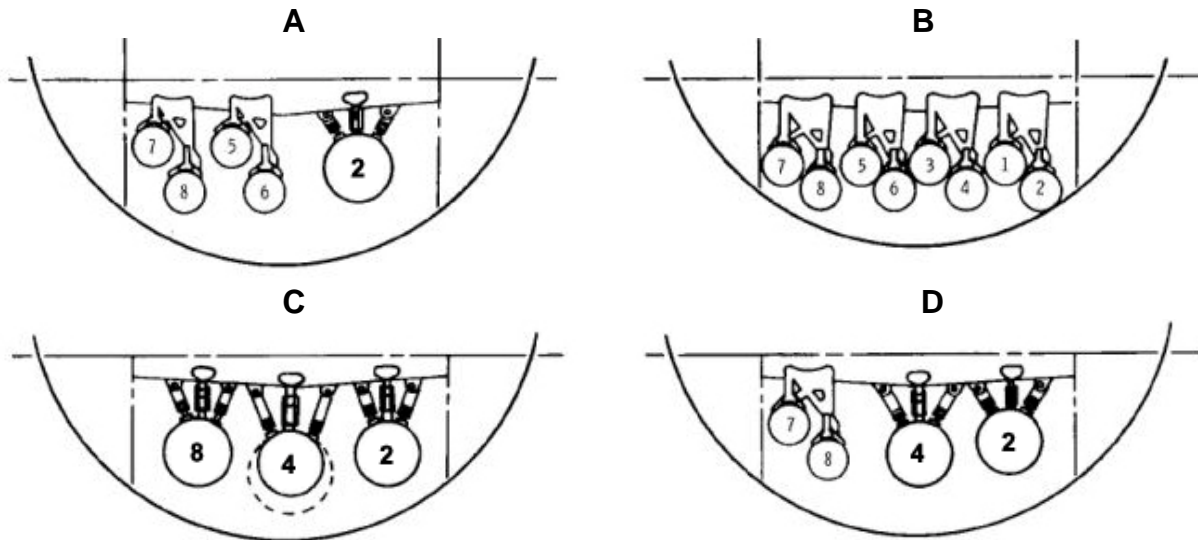
P-3C Wing Stores



The P-3C has 10 Wing Stores available. However in the game you can only use 9 of them. Store number 12 is always configured with the ESM Pod. The other stores can be configured as following:

- Stores 18 / 09: Empty or AGM-65 Maverick
- Stores 17 / 10: Empty or AGM-65 Maverick or AGM-84 SLAM-ER or 1000lb Mine
- Stores 16 - 11: Empty or AGM-65 Maverick or AGM-84 SLAM-ER or 2000lb/1000lb Mine

P-3C Bomb Bay Stores



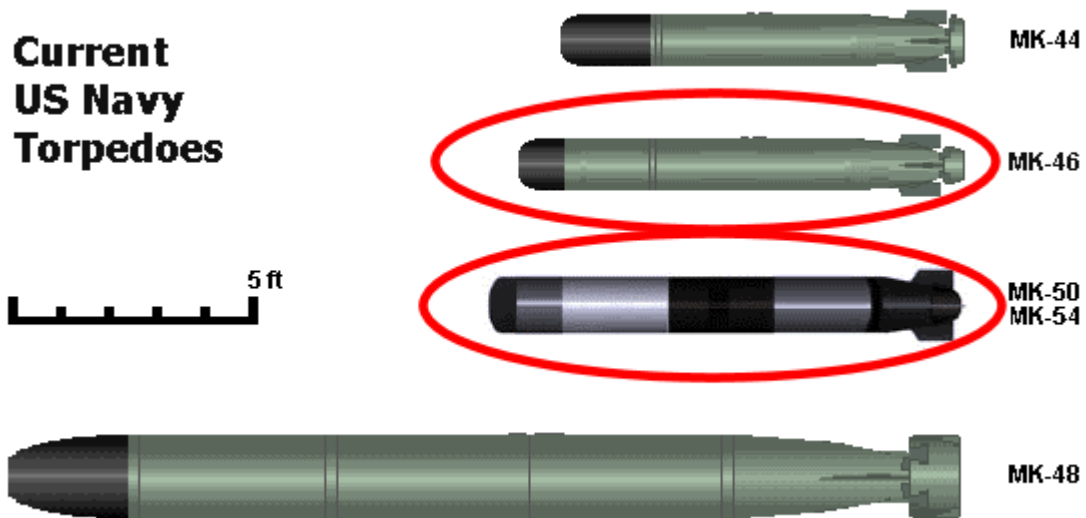
The Bomb Bay Stores of the P-3C can be configured to the various mission needs. The number inside the symbols marks the station number on the selector switch in the right hand TACCO station.

The most often used configuration is marked "B" with the maximum load of Torpedoes available. If you choose configuration A, D or C you can carry one, two or three 1000lb/2000lb mines in addition to four, two or zero torpedoes in the bomb bay.

Whichever of the four Configurations you choose, you can mix the torpedoes as you like. Unless the Mission Designer has restricted your Weapons, you can have all Mk46s or all Mk50s or a mix of your choice of them. However, take note that the torpedoes in the odd numbered positions can only be released after the accompanying torpedo in the lower slot has been fired. Example (B) : if you want to fire torpedo number 3 you have to fire number 4 first.

Mk 46 / Mk 50 Torpedo

Current US Navy Torpedoes



Mk 46 Torpedo

Max Range : 6nm (12,152 yd)
 Max Depth : 1500ft (500yd)
 Max Speed : 45kts
 Warhead : 45.4kg HE
 Targets : Submarines, Surface (Don't work on Landing Craft)

Mk 50 ALWT (Advanced LightWeight Torpedo) Barracuda

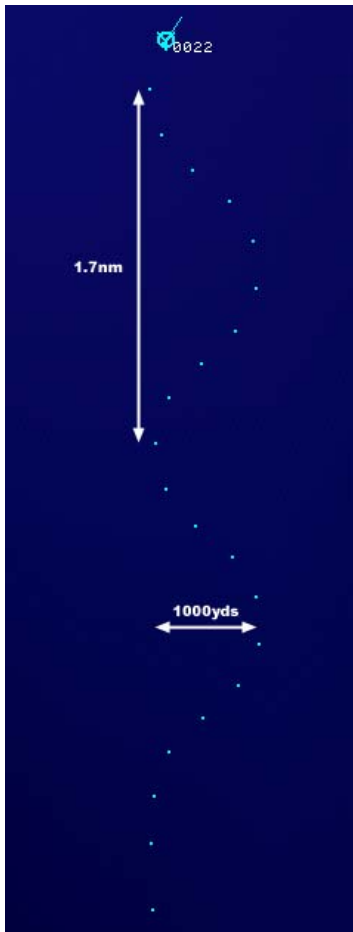
Max Range : 7nm (14,177yd)
 Max Depth : 3600ft (1,200yd)
 Max Speed : 55kts
 Warhead : 100kg HE
 Targets : Submarines, Surface (Don't work on Landing Craft)

The torpedoes have two search settings: Snake & Circle.

When employing torpedoes it is good advice to turn on the history function (ALT+H) to see if the torpedo has started its preset search pattern or has acquired a target. Unless someone changes the doctrine, the torpedo will always turn to starboard first. If you don't enable the torpedo at zero distance, then the torpedo will first drive on along the set Runout Bearing. That gives you the chance to basically fire above the shoulder before activating the torpedo.

If you drop in shallow water make sure to fly as low and slow as possible, to avoid dropping the torpedo right into the bottom. And put in the right Pre-Sets, especially the Depth of the torpedo is preferably closer or equal to the ceiling then to the floor. Dropping in 100ft or less involves a lot of luck.

Torpedo SNAKE Setting



If you set the torpedo for a Snake Search pattern, it will look like the image to the right. During its pattern, the torpedo will cover roughly 1.7nm in one evolution (means one turn to port and one to starboard). The turning points are roughly 1000yds laterally and 0.85nm vertically separated. Since the torpedo turns left and right, you have to keep in mind that the distance he will cover in a straight line won't be the same as his MaxRange. Means if you have to shoot from a greater distance it's better to set the Run-to-Enable (RTE) to a number that brings the torpedo closer to the target before going active. These figures depend, similar to the Circle setting, on the speed of the torpedo. The given figures are the ones observed when using the Default speed of 55kts. The pattern gets tighter when the speed is slower.

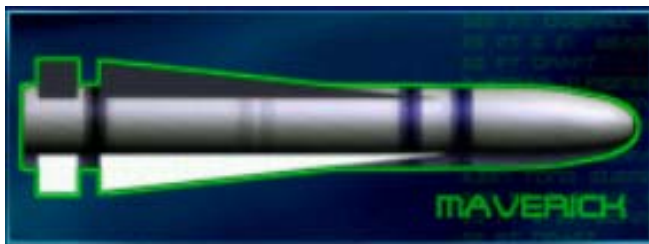
Torpedo CIRCLE Setting



The Circle setting will result in a perfect circle with a diameter decreasing with increasing speed.

Speed	Diameter
35kts	1000yds
45kts	900yds
55kts	850yds

AGM-65 Maverick



Max Range : 30nm
Warhead : 200kg (complete)
Target : Only Surface

You can shoot at **anything** with the Maverick, as long as you classify it as a surface contact.

AGM-84 SLAM-ER



Max Range : 150nm
Target : Stationary Targets

See Manual page 9-31 for details

1000lb/2000lb Mine



The 1000lb and 2000lb mines are air delivered, variable depth mines. In game you can set them to the following Pre-Set depths:

- Surface: just below the surface
- Shallow: 82ft
- Deep: 436ft
- Bottom: rest on sea bottom

You can use mines as torpedo decoys (doesn't matter which size), just drop them in front of an incoming torpedo and at Shallow depth. It doesn't work all the time, but often enough.

P-3 Tactics

Introduction

The tactics described in the following chapters are either based upon unclassified real life tactics or tactics developed during game play. All of them are tested to some extent and deemed work- and usable in the game.

Crew Coordination

A general suggestion for the P-3C is to play it in MultiStation mode whenever possible. A very useful combination for playing has been the following:

Player #1 (Pilot & TACCO):

- Pilot Station
- TACCO Station

Player #2 (Sensor Operator):

- Acoustics Station
- Radar Station
- MAD/ESM Station
- IRDS(Camera) Station

As you can see, this combination makes a distinction between the operating of the individual sensors and employing the plane tactically. Especially when tracking and hunting a contact, it shares the workload evenly among the two players. You can fly it alone, and you can put in more players, but as said before, this combination works very well and generates a lot of fun and less boredom. Essentially for this is good communication, preferably by Voice utilizing TeamSpeak or Ventrillo. A nice side effect to that is the added immersion. While it's nice to have the PC tell you that you just had a MAD return, a loud and eager MAD!, MAD!, MAD! from your fellow crewmember, followed by "this one is close – strong MAD return", is definitely something adding to the fun. Plus two brains are sometimes harder to beat than just one.

To help in the task of the AW Operator, the TACCO should announce to him which buoys are currently those presumably next to the target.

The TACCO will say : "Buoys ***of interest***, number X, Y, Z, ..."

This means for the AW Operator that buoys X, Y, Z are those he has to monitor for signs of the target. There are further things to keep in mind, but they will be added at a later time.

Tools for Crew Coordination

For In-Game Crew Coordination you have two choices, either you use the build-in MultiPlayer Chat System or use one of the available Voice Communication programs (requires a Headset). The Multiplayer Chat System is pretty easy to use; however for station management, Voice Com. is faster and involves less effort. For Voice Com. see *Appendix H*

MultiPlayer Chat System

Hit one of the following keys, and then enter your message in the chat window. Finally hit "ENTER" to send.

- Key "A" : Sends your message to all controlled platforms on both sides
- Key "D" : Sends your message to all controlled platforms on your side
- Key "T" : Sends your message to all people on your platform

Pilot Station (Key “F1”)

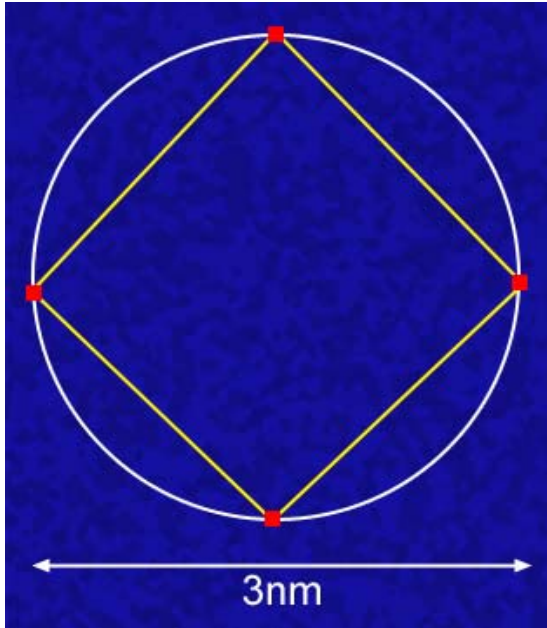


Make sure to always have Autocrew enabled (it handles the Countermeasures), just in case someone tries to shoot at you. Read the manual, to know about such niceties like how to turn on and off individual engines, raise and lower the landing gear and so on. You need to have the pilot station assigned if you want to fly and/or add waypoints.

As a Pilot you have four choices to steer your aircraft. Three with the autopilot, one without. If you choose to fly manually, follow the steps described in the DW Manual. With the autopilot you can either set waypoints, dial in the course on the Taskbar or hit “C” and then click on the point on the NAV map where you want to fly to. Using Waypoints is generally recommended when you have to fly longer distances or certain course legs, like a MAD ladder search or stuff like that. You can even use it in an Attack situation sometimes (but it's not recommend). More often you will rely on the taskbar or using “C” and setting a course of choice. Especially when attacking or when you have to react more quickly, the third option is definitely recommend.

Take note that your Max. Airspeed depends on your altitude. At Altitudes below 10,000ft you can only reach about 370kts with the throttles firewalled. If you cross that altitude and climb higher you will notice an increase in maximum Airspeed. At the preset HIGH altitude your Max Speed will be roughly 470kts. While this is not important during most games, keep it in mind for long transit flights. However, before climbing that high you should consider the time you need to get up and to get down to operating altitudes or MAD altitude.

Orbiting on Autopilot using Waypoints



How to set up an orbit: draw a circle with the wanted diameter, then hit "INSERT" and place four waypoints like on the image to the left. Once you are done with WP #4 right click, and then left click the last waypoint (it should turn red). Now press "ALT" and "INSERT", release "INSERT" while continuing holding "ALT" and left click on the first waypoint in your circle pattern. Release "ALT" and left click somewhere on the map – Done.

How to Take-Off from an Airfield

The Autopilot does a nice job on landing the aircraft and he will get you back in the air, if you follow these steps:

- Use the mouse to put the throttle to MaxPower and wait till the display reaches Red
- Set the altitude to 3000ft (or more depending on your Airfield) and wait for the response from the Autopilot
- Hit "3"
- Let the Aircraft roll and wait till it lifts off – then click on the Landing Gear Lever to retract it to the UP position.

This works if the Mission Designer didn't screw up and put half of the field in some hill or something like that. If that happens though and you are on the Airfield and you know the runway isn't long enough for the Autopilot to get the P-3 into the Air then you need to fly it manually.

- Use the mouse to put the throttle to MaxPower and wait till the display reaches Red
- Set the altitude to 3000ft (or more depending on your Airfield) and wait for the response from the Autopilot
- Hit "3"
- Let the Aircraft roll and wait till you have more then 120kts Speed
- Turn off the Autopilot and immediately pull back gently on the stick
- Once off the ground click on the Landing Gear Lever to retract it to the UP position.
- When you are safely in the air, turn the Autopilot back on and set an altitude of your choice

TACCO Station (Key "F6") / General Tactics & Procedures



Well, as an aspiring TACCO in Dangerous Waters™ you will need some utilities at hand, and its good advice to follow some basic procedures.

TACCO Tools & Utilities:

- This manual
- Sheet of paper and pencil
- Calculator
- Stopwatch

TACCO – Things to Remember:

- Point your mouse at a Buoy LOB Crossing and hit "ENTER" to place a Position Marker. Once placed, double click it and enter the time.
- Point your mouse at a MAD contact and hit "ENTER" to place a Position Marker. Once placed, double click on it and enter time and "MAD" to distinguish between acoustic and MAD fixes.
- When not carrying DICASS buoys external, have at least one Shallow and one Deep DICASS ready for ejection in the internal launcher. That means, it is showing DICASS D or S, the tube is equalized (E is blue) and the drop button is highlighted.
- Have at least one torpedo preset to safe settings (so it wont hit neither the bottom nor any civilians/allies if applicable) and bomb bay doors open, if you expect trouble within the near future.
- Have a Maverick selected and ready – All the time!

- When placing buoy waypoints, put in the number of waypoints at once, you think you will need, then switch over to the NAV map and place them as you like. You can of course place them at the TACCO station, but most of the time you will have a better overview at the NAV map.
- When you are hunting and you get a MAD contact, immediately drop a Shallow and a Deep (if its deep enough) buoy (use DICASS if you have to attack on the spot, otherwise keep it passive) and reload if you fired from the internal tubes.
- It's generally more advisable to shoot a torpedo with a set bearing and NOT at a specific contact. If you use the bearing you can easily lead the target and generally make sure that the torpedo will do what you want him to do.
- As soon as you start the game and regardless of your height, turn on your MAD sensor. Since it's a passive sensor it doesn't give your position away, and you might even be too high to make it work. But this way it's on, you can forget about it and you will be notified if you get any returns.
- The "R" key is your friend! You can quickly determine bearing and distance on the NAV map and Geoplot with it.
- To calculate the opposite heading take the course and either apply
+ 2 and - 2 (if the bearing starts with 0 or 1) or
- 2 and + 2 (if the bearing starts with 2 or 3)

Example #1 : Bearing **321** = *Opposite* Bearing **141** (3 – 2 = 1 and 2 + 2 = 4)

Example #2 : Bearing **056** = *Opposite* Bearing **236** (0 + 2 = 2 and 5 – 2 = 3)

- Once you have two successive position markers, regardless of the sensor you used, measure the distance and calculate the rough speed of the target. For example you have a MAD contact and a buoy cross bearing, 2 minutes and 1000yds apart. That would lead to a rough target speed of 15kts.

$$\frac{\frac{\text{Dist.}}{\text{Min.}} \cdot 60}{2025} = \text{Speed in kts}$$

Example:

$$\frac{\frac{1000\text{yds}}{2 \text{ Min.}} \cdot 60}{2025} = 15\text{kts}$$

- One (MAD) contact = position
- Two successive (MAD's) = course and speed
- Aside from my homebrew formula you can use various other methods of calculating Distance, Speed or Time. To do that you can use one of the Basic Formulas and/or the three, respectively six minutes rule, all of which are described on the following page.

Distance / Speed / Time - Calculations

Basic Formula

All operators should be adept at solving speed, time and distance problems. All of which are based on a simple formula, which may be written in any of the three following ways:

- a) Distance covered (in miles) = speed (in knots) x time (in hours).
- b) Speed (in knots) = distance covered (in miles) ÷ time (in hours).
- c) Time (in hours) = distance covered (in miles) ÷ speed (in knots).

Where **D** = distance in miles, **S** = speed in knots, and **T** = time in hours.

Distance is measured in DATA MILES (2000 Yards = 1 DM), and Time is represented by the minutes ÷ 60, to give you time in Hours.

Examples (This is all based on 1 knot = 1 DM / hour):

- a) To find the Distance, given speed = 30 knots and time = 6 minutes:
 $D = S \times T = 30 \times (6 \div 60) = 3 \text{ miles}$
- b) To find the speed, given distance = 10 miles time = 30 minutes (30/60 hour)
 $S = D \div T = 10 \text{ miles} \div (30 \div 60) = 10 \text{ miles} \div 0.5 = 20 \text{ knots}$
- c) To find the time, given distance = 14 miles speed = 30 knots
 $T = D \div S = 14 \text{ miles} \div 30 \text{ knots} = 0.46 \text{ hours or } 27.6 \text{ min}$

The Six-Minute Rule

If either the distance travelled in DM or the Speed maintained during a period of six minutes is known, the unknown of the two quantities may be easily and quickly solved by applying the six-minute rule. Which states that during a period of six minutes:

- a) Distance (in miles) = Speed (in knots) ÷ 10
- b) Speed (in knots) = Distance (in miles) x 10

Examples:

- I. To find the distance traveled in six minutes, given speed = 14 knots,
 distance is: $14 \div 10 = 1.4 \text{ miles}$ (Decimal point is moved one place to the left)
- II. To find the speed maintained during six minutes given that the distance traveled = 2.8 miles:
 $2.8 \times 10 = 28 \text{ knots}$ (Decimal point is moved one place to the right)

The Three-Minute Rule

If either the distance traveled in yards or the speed in knots is maintained during a period of three minutes then the speed can be calculated and the unknown of the two quantities can be easily and quickly solved by applying the three minute rule.

It states that; during a period of three minutes:

- a) Distance (in yards) = Speed (in knots) x 100
- b) Speed (in knots) = Distance (in yards) ÷ 100

Examples:

- I. To find the distance traveled in three minutes given that speed = 18 knots:
Distance = $18 \times 100 = 1800$ yards (Decimal point is moved two places to the right)
- II. To find the speed maintained during three minutes given that the distance traveled = 1200 yards:
Speed = $1200 \div 100 = 12$ knots (Decimal point is moved two places to the left)

By applying the Six Minute Rule to your example of 1000 yards in 2 minutes we get:
1000 yards in 2 minutes = 3000 yards in 6 minutes = 1.5 DM in 6 mins = $1.5 \times 10 = 15$ knots

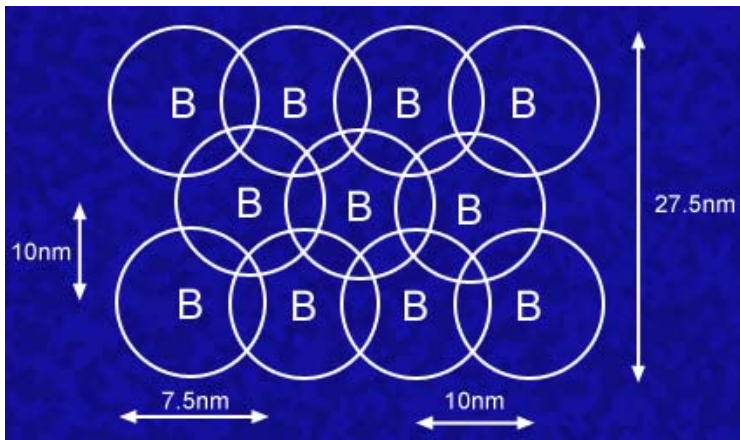
Drop / Equalize / Load - Times

Times in Seconds	Weapon Quick Launch	No Wpn Quick Launch
Drop Times	2.5 (External) 1.5 (Internal)	3.5
Equalize	1.5	5.5
Load Internal	3	30

Buoy Patterns & Tactics

If you deploy buoys by using waypoints, they will be spaced 2.7nm from each other in a straight line along your current course by the AI, but you can change the placement of those waypoints either on the NAV Maps or at the TACCO Station. Keep in mind that buoys are not very accurate, means that you want to have as many bearing lines at the same time (from different angles) on the same contact. More bearing Lines (that cross) equal a better position of the contact. Though if you have to, you can live with just two, just keep in mind then, they don't mark a location, but an area where the contact is. The following patterns are designed with the same buoy type in mind, however you can mix the buoys to your liking, adapting to the actual acoustic condition in your search area. Keep in mind, that if you mix the buoys or simply use a different buoy then the distances change according to the individual detection ranges.

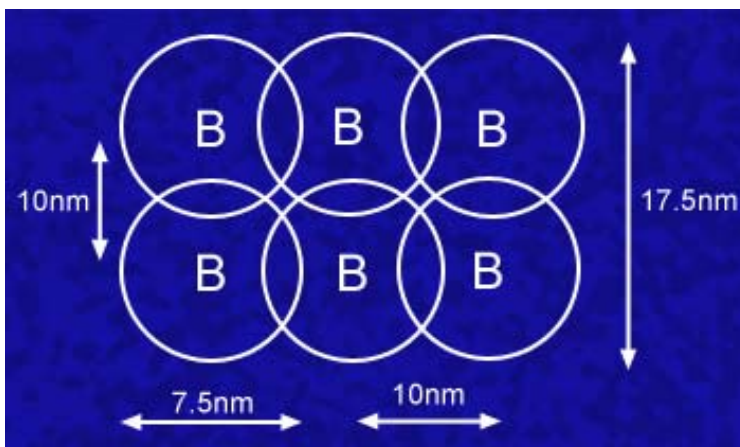
Buoy Pattern #1 – Area Search



The pattern to the left is an example for employing the VLAD Deep buoys in water depths exceeding 1300ft. You can use a modified version of this pattern for other buoys as well, just take the limited detection range and actual acoustic conditions at the location where you want to place your buoys into account. Drop the first line of four buoys (or more if needed), that's your base line. The spacing between those buoys is about 10nm and since

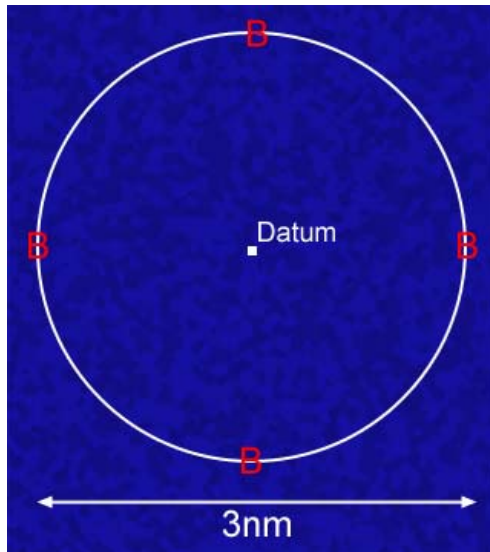
each buoy detects stuff within a max. of 7.5nm around it, the detection envelopes of the buoys overlap. As a help measure draw a 7.5nm range circle around each buoy (VLAD-Deep, other vary in their detection ranges). The next barrier line will follow the base line with a 10nm separation between the baseline and barrier line two. Again this means that the envelopes overlap a lot. To get better detection fixes and cover all the space, don't put them in like a box, but instead set them off a bit (about half way between the buoys of the baseline). Barrier line three will be the same as the baseline again. Continue this as long as you want or as long as you have buoys.

Buoy Pattern #2 – Area Search (2nd Version)



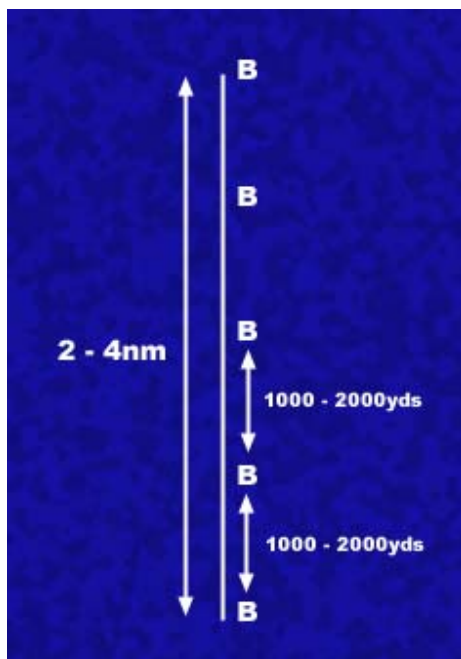
This pattern is a slight modification of the first Area Search pattern. Instead of offsetting the buoy lines, you put all the buoys in a neat pattern. The only difference between this and the other pattern is, that instead of coverage holes on the edges of the pattern, now you have (small) holes in the middle of the pattern as seen in the picture.

Buoy Pattern #3 – Datum Prosecution



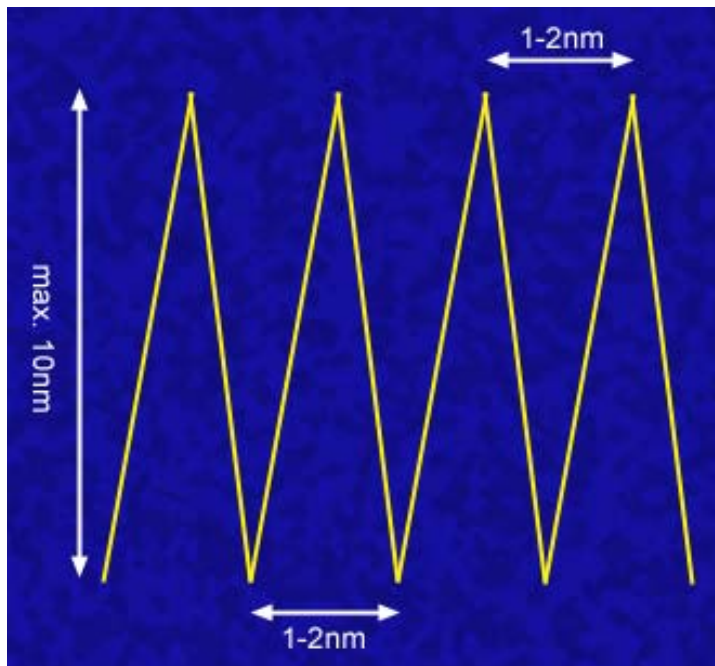
This tactic is used, when you prosecute from a fresh datum. It's important that you are pretty close to it, as to keep the time between the deployment of the buoys and the initial datum close. Once the buoys are deployed (you should choose Shallow buoys) you will most certainly get a lead (means bearing line) on your contact, use this for a MAD run and don't lose him.

Buoy Pattern #4 – Tight Barrier Line



This buoy pattern is used when you deploy a barrier line of buoys. You use this tactic (tight spacing) when you know that the submarine you are looking for has to cross a certain line or position (or at least close to it), and you need to classify it. Since this tactic uses up a lot of buoys it is not recommended for everyday use. An example how and when to use this pattern can be seen in the first two training missions made by Beer. In those missions the enemy Akula will cross a certain line (which is about 7nm long). You need to detect and CLASSIFY the Akula before you are allowed to attack it. That means that your buoys have to get close to it, as it's one sneaky sucker, even at higher speeds.

MAD Tactics



Unlike in real life, it has proven more effective to use the MAD pattern as displayed to the left in Dangerous Waters. You can fly this pattern at max speed. Space the individual turning points about 1-2nm apart, not more or you are not covering enough ground, less and you are becoming ineffective. Make the legs at max. 10nm long. That's because you want to cover as much ground as possible without exposing uncovered ground to long. Means if you make longer legs, you might miss the sub you are searching for. Try to always work your way outwards from the assumed destination of the sub. This is especially important when protecting individual ships or

convoys. That way you can be sure that everything behind you and hence between you and the ship/convoy is safe. Keep as low as possible (300ft or Shift+1), but you can fly as fast as you want.

Another use for MAD is to confirm the location of a PosSub located by at least two buoy bearing lines. Simply fly towards the point where the bearing lines cross, and hope for a MAD return. If you get a return and there is no surface contact, then you just found a sub. That however is most of the time only half of the job. Because the MAD won't tell you what sub is lurking beneath the waves. On top of that, it's a risky tactic against Human Sub Skippers as some of them tend to wait just below the surface, then pop up and fire a SAM at every unsuspecting aircraft coming close. Therefore, whenever you come close to a PosSub location and you can't be sure that he is both unsuspecting and deep, have a Maverick ready, activated and the finger on the button.

If you have only one bearing line from a buoy take the buoy itself as base and fly along the bearing line outwards. If the sub is not that fast and you are not too slow you should be able to get a return.

Searching with the P-3C Orion

Introduction

The ocean is one hell of a big haystack to find some very small needles in. In reality Orion's are send out to places where someone already has found a needle or at least thought he has found one. The earlier chapters displayed various ways to make initial contact by laying buoy patterns or doing MAD runs and more. Aside from that you can get information by link or other means from fellow friendly units. The following tactics all start with a single position where a sub was detected. This is called a *datum*. If the sub has shot something, it's a *flaming datum*. Either way, you have a point to start from, which is the beginning of the end for the sub. The following tactics are based on the case that your initial indication is a "hot" buoy. If your case is something different, then go down the points and hop in where it fits, for example a MAD contact. For easier access and better overview, each of the four tactic schemes has its own page, though you will notice that some parts are the same; however I make them this way, and all you have to do is turn to the right page for the occasion and follow the steps.

I'll explain the following tactics:

- Open (Deep) Water – No Surface Traffic close
- Littoral (Shallow) Water – No Surface Traffic close
- Open (Deep) Water – Surface Traffic close
- Littoral (Shallow) Water – Surface traffic close

Open (Deep) Water:

That's everything behind the deep water mark. Let's just say we are talking about depth in excess of 500ft.

Littoral (Shallow) Water:

Opposed to Open Waters, this will be everything at 500ft or less.

No Surface Traffic close:

This means that surface traffic is more then 7.5nm away from the buoy and can not be seen in directional mode.

Surface Traffic close:

Surface traffic is closer then 7.5 nm to the buoy and/or can even be seen in directional mode.

Open (Deep) Water – No Surface Traffic close

1. Open Water allows you to use all buoys without the risk of burying them in the mud.
2. You have a single “hot” buoy. Put a range circle around it with its max detection radius. **If** there is no traffic within it, then it must be something beneath the waves.
3. **If** the buoy provides you with a bearing **go to** step #7 **else** continue with step #3.
4. Put an area circle with a radius of roughly half of the max detection range (centered on the hot buoy) on the map.
5. Drop a Datum Buoy Pattern based on this circle. You can use Deep or Shallow buoys (take water depths into account). If you think the sub is going to run, use shallow, otherwise deep for better detection.
6. Wait till the buoys are deployed, one of them should go “hot”.
7. **Go to** step #2
8. Fly down the bearing line, starting from the hot buoy. MAD should be activated, ESM on Autocrew. 300ft height (“SHIFT+1”) and 180kts speed (“1”).
9. When you get a MAD return immediately drop a Shallow and a Deep (depending on water depth) buoy. Use DICASS if you have to attack on the spot, otherwise keep it passive.
10. Turn, fly back and fly again down the bearing line (updated) to gain a second MAD contact.
11. Drop another Shallow/Deep combination
12. Now you have two successive contacts and therefore the rough course and speed of the target.
13. Turn and fly from the first to the second MAD contact, and then further on along his projected course. You should get a third MAD contact. Drop a Deep buoy and continue along the course, drop a Shallow buoy which should be active when the sub is beneath it (Refer to Appendix D).
14. Try to classify the target. Follow your Rules of Engagement (ROE) and mission briefing.
15. Decision time : If you are authorized to attack and it's a bad guy, then you would be able to do an attack run now. If not but you have to track him, continue tracking him with MAD and buoys.

Littoral (Shallow) Water – No Surface Traffic close

1. In Littoral Waters you can only use DIFARs and the Shallow DICASS. Do not try and use the Deep DICASS or the VLADs ... those will end up in the mud if the water depth is less than 500ft.
2. You have a single “hot” buoy. Put a range circle around it with its max detection radius. **If** there is no traffic within it, then it must be something beneath the waves.
3. **If** the buoy provides you with a bearing **go to step #7 else** continue with step #3.
4. Put an area circle with a radius of roughly half of the max detection range (centered on the hot buoy) on the map.
5. Drop a Datum Buoy Pattern based on this circle. Use Shallow buoys.
6. Wait till the buoys are deployed, one of them should go “hot”.
7. **Go to** step #2
8. Fly down the bearing line, starting from the “hot” buoy. MAD should be activated, ESM on Autocrew. 300ft height (“SHIFT+1”) and 180kts speed (“1”).
9. When you get a MAD return immediately drop a Shallow buoy. Use DICASS if you have to attack on the spot, otherwise keep it passive.
10. Turn, fly back and then fly again down the bearing line (updated) to gain a second MAD contact.
11. Drop another Shallow buoy.
12. Now you have two successive contacts and therefore the rough course and speed of the target.
13. Turn and fly from the first to the second MAD contact, and then further on, along his projected course. You should get a third MAD contact. Drop a shallow buoy and continue along the course, drop another Shallow buoy which should be active when the sub is beneath it (Refer to Appendix D).
14. Try to classify the target. Follow your Rules of Engagement (ROE) and mission briefing.
15. Decision time : If you are authorized to attack and it's a bad guy, then you would be able to do an attack run now. If not but you have to track him, continue tracking him with MAD and buoys.

Open (Deep) Water – Surface Traffic close

1. Open Water allows you to use all buoys without the risk of burying them in the mud.
2. You have a single “hot” buoy. Put a range circle around it with its max detection radius. Since you have surface traffic within the circle, your first order of business is to find out if a submarine may be lurking there as well. That could be a bearing that doesn't point toward a surface contact nearby or double lines on the same bearing where only one surface contact is visible, or something else that makes you believe that the surface contact is not “alone”.
3. **If** the buoy provides you with a bearing which is definitely not a surface contact **go to step #7** **else** continue with step #3.
4. Put an area circle with a radius of roughly half of the max detection range (centered on the hot buoy) on the map.
5. Drop a Datum Buoy Pattern based on this circle. You can use Deep or Shallow buoys. If you think the sub is going to run use shallow otherwise deep for better detection.
6. Wait till the buoys are deployed, at least one, but more likely most of them will go “hot”. Check if one of those buoys gives you a bearing toward a non-surface contact. **If** that's the case **go to step #7**, **else** use your intuition and pick the buoy which is most likely the one with the target close.
7. **Go to** step #3
8. Fly down the bearing line, starting from the hot buoy. MAD should be activated, ESM on Autocrew. 300ft height (“SHIFT+1”) and 180kts speed (“1”).
9. When you get a MAD return immediately drop a Shallow and a Deep buoy. Use DICASS if you have to attack on the spot, otherwise keep it passive.
10. Turn, fly back, and then fly again down the bearing line (updated) to gain a second MAD contact.
11. Drop another Shallow/Deep combination
12. Now you have two successive contacts and therefore the rough course and speed of the target.
13. Turn and fly from the first to the second MAD contact and further on, along his projected course. You should get a third MAD contact. Drop a Deep buoy and continue along the course, drop a Shallow buoy which should be active when the sub is beneath it (Refer to Appendix D).
14. Try to classify the target. Follow your Rules of Engagement (ROE) and mission briefing.
15. Decision time : If you are authorized to attack and it's a bad guy, then you would be able to do an attack run now. If not but you have to track him, continue tracking him with MAD and buoys.

Littoral (Shallow) Water – Surface Traffic close

1. In Littoral Waters you can only use DIFARs and the Shallow DICASS. Do not try and use the Deep DICASS or the VLADs ... those will end up in the mud if the water depth is less than 500ft.
2. You have a single “hot” buoy. Put a range circle around it with its max detection radius. Since you have surface traffic within the circle your first order of business is to find out if a submarine may be lurking there as well. That could be a bearing that doesn't point toward a surface contact nearby or double lines on the same bearing where only one surface contact is visible, or something else that makes you believe that the surface contact is not “alone”.
3. **If** the buoy provides you with a bearing which is definitely not a surface contact **go to** step #7 **else** continue with step #3.
4. Put an area circle with a radius of roughly half of the max detection range (centered on the hot buoy) on the map.
5. Drop a Datum Buoy Pattern based on this circle. Use Shallow buoys.
6. Wait till the buoys are deployed, at least one, but more likely most of them will go “hot”. Check if one of those buoys gives you a bearing toward a non-surface contact. **If** that's the case **go to** step #7, **else** use your intuition and pick the buoy which is most likely the one with the target close.
7. **Go to** step #3
8. Fly down the bearing line, starting from the hot buoy. MAD should be activated, ESM on Autocrew. 300ft height (“SHIFT+1”) and 180kts speed (“1”).
9. When you get a MAD return immediately drop a Shallow buoy. Use DICASS if you have to attack on the spot, otherwise keep it passive.
10. Turn, fly back, and then fly again down the bearing line (updated) to gain a second MAD contact.
11. Drop another Shallow buoy.
12. Now you have two successive contacts and therefore the rough course and speed of the target.
13. Turn and fly from the first to the second MAD contact and further on, along his projected course. You should get a third MAD contact. Drop a Shallow buoy and continue along the course, drop another Shallow buoy which should be active when the sub is beneath it (Refer to Appendix D).
14. Try to classify the target. Follow your Rules of Engagement (ROE) and mission briefing.
15. Decision time : If you are authorized to attack and it's a bad guy, then you would be able to do an attack run now. If not but you have to track him, continue tracking him with MAD and buoys.

Attacking with the P-3C Orion

Unlike with every other platform in the game you can't just stop, take a breath and configure your weapons before firing. In the Orion you have to set your weapons and make everything ready (as much as possible) before you turn in for your attack run, keep that in mind! If possible attack away from any neutrals/civilians to avoid hitting them incidentally. After all, once the torpedo is released you can't influence it anymore. If you have to shoot in close vicinity of neutrals/friendlies then set a large enough ceiling. Depending on the neutrals you have to vary between 140ft and 210ft at max.

On some attacks you will learn to rely on your intuition and experience as it's sometimes the only way to bring them off successfully

These attack schemes are prone to changes and dependant on your opponents, so take them with a grain of salt, and even more important, fit them to your needs and what you see what works.

Attack Run on Submarines (from the Stern)

Attacking from the stern has both advantages and disadvantages. The advantages are, if you are lucky your opponent won't even hear your torpedo homing in on him till his sub goes boom. And if you are not really sure on the speed and location you can shoot on the safe side and hope that the torpedo will find his way (unless you overshoot). The disadvantages are however, if your opponent heard your torpedo, he might still have time to deploy countermeasures and get away clean. Especially against well versed opponents (not the AI) this happens more often then you will like.

- Line up around 5nm behind your target, along its projected course
- go to 300ft ("SHIFT+1") and reduce to 154kts ("1")
- open the bomb bay doors
- set the torpedo for the desired setting, make sure that RTE = 0 and Search pattern = SNAKE, set the Runout Bearing to the course of your target
- Click Assign to transfer the settings to the torpedo
- Wait till you are about 2,000yds behind the target/last fix and then release the torpedo
- turn on history on the torpedo and watch what it's doing, if necessary line up for another attack

Attack Run on Submarines (from the Bow)

This one is really difficult and you need a good feeling for your opponent and your plane to make this work. When you try this, timing is everything. But if you do it right, you can normally count on clean and deadly hits. When you attack head on you have to be really sure what course and speed your opponent has and even more important - will have - when you are lining up for, and making your attack run.

- Line up around 5nm in front of your target, along its projected course
- go to 300ft ("SHIFT+1") and reduce to 154kts ("1")
- open the bomb bay doors
- set the torpedo for the desired setting, make sure that RTE = 0 and Search pattern = SNAKE or CIRCLE (CIRCLE is safer in this situation, if you aren't sure of your solution), set the Runout Bearing to the opposite course of your target
- Click Assign to transfer the settings to the torpedo
- Now the tricky part: You have to guess how far he has traveled in the meantime between your last fix and now. Release your weapon about 1,000yds in front of him.
- turn on history on the torpedo and watch what it's doing, if necessary line up for another attack

Attack Run on Submarines (from the Side)

If you can avoid, avoid it. Your opponent will definitely hear your torpedo and if he is quick and you are not right on the money he will have a good chance of releasing countermeasures and evading your torpedo. Procedures are similar to the Attack Run from the Stern.

Attack Run on Surface Vessels (Unarmed)

Line up, assign either a torpedo or Maverick, get within it's launch parameters and shoot. Wait till the target has been sunk, if necessary reengage.

Attack Run on Surface Vessels (Armed)

Armed means they can shoot down things that fly. So stay back. Use of Mavericks is recommended, if that's not possible then you can either drop your torpedoes from a safe distance (4nm+) and turn tail or use *Appendix E* and sling your torpedo close in.

Nevertheless if you try attacking a FFG for example with just torpedoes you will most likely end up in the drink and the FFG unharmed, as the SM-2s are really nasty against you. The better solution in that case would be to go as low as possible and fly as close as possible below his Radar Horizon, which would be around 10nm and drop your torpedoes and hope for the best. The best solution however would be to stay away as far as possible and hope a submarine or bomber finishes that guy!

Shallow Water Torpedo Attacks

Attacking Submarines in Shallow Water carries its own sets of complications. Aside from the general tactics described above, you have to pay close attention to the water depth you are going to drop your torpedo in. For the moment, till proven otherwise assume an absolute minimum depth of 100ft for a successful torpedo drop. Actually the whole thing is pretty straightforward - the main rule is to fly as low and slow as possible to drop the torpedo with the least kinetic energy possible. To achieve that you should follow this procedure:

- Go to min. Altitude of 300ft (Shift + 1)
- Set speed to min. of 154kts (Key "1")
- Put the plane on direct course towards your drop point
- Either manually fly it down to 100ft or lower or use the autopilot
- If conditions permit go slower than 154kts
- Drop the torpedo

Torpedo Settings

- Ceiling : 10ft
- Search Depth : 10ft
- Floor : 10ft

Now those torpedo settings take into account that while the torpedo searches left and right, it doesn't seem to matter at which depth the target actually is, hence the low floor and search depth setting. Aside from that, we are talking about water with 100ft or less depth, so the sub doesn't have that much depth to hide in anyway. One drawback of this is, that the torpedo will attack any surface vessel close by if he finds that before the sub - so if there is anything close to the sub you don't want to hit, then better be very careful how you play this.

High Altitude Attacks

The following tactic is quite far from reality, but considering some of the game mechanics might be a necessity to use. One little known fact and probably seldom used option as well is the fact that altitude makes a difference in speed in Dangerous Waters. Out to roughly 10,000ft the Max Speed of the P-3 is around 370 to 380kts. But it can go a lot faster. If you climb over 10,000ft you will notice a steady increase in speed and the dial will top out at roughly 480kts at the High altitude setting of 28,899ft. This little tidbit of knowledge coupled with indestructible torpedoes (well, as long as they don't hit a target) allows you to sling shot your torpedoes nearly 5nm out! This is nothing against SAM armed Surface Ships, but lurking sub skippers who want to send a SAM up yours can only watch in astonishment when the death comes flying.

Now we could all be happy forever if there wasn't that little problem lurking in the back. An unfortunate aspect of the physics model is the fact that a torpedo who screams in at 650kts+ won't just dip in and get on to work but dives a tad deeper than dropped from normal altitudes of 300ft or less. That means, you better have, lets say, 400ft+ available to drop your torpedo in or you will bury it deeeep in the mud. It helps to pay close attention to your settings especially the Floor and Search Depth. Unless you have some depth to work with you will need some shallow settings to get the torpedo turning upwards as quickly as possible.

On a side note, if you can sling those pretty heavy torps for 5nm try imagine where your buoys end up. Personally I only tested them up to 10,000ft/360kts and even then they fly a hell of a long way (6nm). So if you are about to drop them from higher and at considerably faster speeds, check the results beforehand and take notes, otherwise you might end up dropping buoys all over the place, just not at the intended place.

Appendix

A : Sonar Frequencies, TPK & Blade Count

Submarines								
Class	Country	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	TPK	Blades
AGOSTA	Pakistan	50	125	360	1050	1877	10	7
AKULA-I	Russia	50	125	320	1075	1493	7	7
AKULA-I IMPROVED	Russia	50	125	320	1100	1883	7	7
AKULA-II	Russia	50	125	320	1125	1886	7	7
AMÉTHYSTE	France	50	125	340	1075	1520	7	7
COLLINS	Australia	50	125	360	1050	1523	10	7
DAPHNÉ	Pakistan	50	125	340	1200	1541	10	7
DELTA-IV	Russia	50	125	360	975	1505	7	7
DSRV	United States	60	125	485	995	1937	10	7
FOXTROT	India	50	125	320	955	1517	10	6
HAI LUNG	Taiwan	50	125	360	1050	1544	10	5
HAN	China	50	125	340	1075	1511	7	7
HARUSHIO	Japan	50	125	320	1050	1547	10	7
KILO	China	50	125	340	1050	1502	10	6
	India	50	125	340	1050	1502	10	6
	Iran	50	125	340	1050	1502	10	6
	Russia	50	125	340	1050	1502	10	6
KILO IMPROVED	China	50	125	340	1050	1502	10	7
	Russia	50	125	340	1050	1502	10	7
LOS ANGELES (688)	United States	60	125	320	1075	1403	7	7
LOS ANGELES (688i)	United States	60	125	320	1100	1406	7	7
MIDGET SUBMARINE	North Korea	50	125	320	880	1952	12	7
MING	China	50	125	320	955	1835	10	7
Mini-Sub	Civilian	50	125	320	880	1952	12	7
	Civilian	60	125	485	995	1937	10	7
OHIO	United States	60	125	340	975	1412	7	7
OSCAR-II	Russia	50	125	320	1025	1499	7	7
POISK-2	China	60	125	485	995	1937	10	7
	Russia	60	125	485	995	1937	10	7
SEAWOLF	United States	60	125	320	1125	1409	7	7
SONG	China	50	125	360	1050	1514	10	7
TR-1700	Argentina	50	125	340	1050	1874	10	7
TRAFALGAR	United Kingdom	50	125	320	1075	1490	7	7
TYPE 206A	Germany	50	125	320	1050	1526	10	7
TYPE 209/1400 MOD.3	Brazil	50	125	320	1050	1529	10	7
TYPHOON	Russia	50	125	320	1000	1508	7	7
VICTOR-III	Russia	50	125	360	1150	1496	7	7
XIA	China	50	125	360	975	1832	7	7

Surface Military								
Class	Country	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	TPK	Blades
ABUKUMA	Japan	50	125	320	755	1799	8	4
ALLIGATOR	Russia	50	195	430	875	1613	8	4
AMAZON	Pakistan	50	160	450	700	1745	8	4
ARLEIGH BURKE	United States	60	160	450	700	1430	8	5
ASAGIRI	Japan	50	160	450	715	1796	8	4
AVENGER	United States	60	125	485	915	1448	12	4
BOGHAMMAR	Iran	50	125	485	1260	1763	12	4
BORIS CHILIKIN	Russia	50	195	420	595	1616	8	4
BREMEN	Germany	50	125	320	755	1706	8	5
BROADSWORD	Brazil	50	125	340	1350	1559	8	4
CASSARD	France	50	160	450	715	1667	8	5
CHARLES DE GAULLE	France	50	125	395	670	1655	6	5
CHARLES F. ADAMS	Germany	60	160	450	700	1865	8	4
CLEMENCEAU	Brazil	50	195	395	655	1658	6	4
COMBATTANTE II	Malaysia	50	125	495	1260	1769	12	4
COMBATTANTE IIB	Iran	50	125	485	1290	1760	12	4
DEEPAK	India	50	195	420	595	1694	8	4
DELHI	India	50	160	310	715	1721	8	4
D'ESTIENNE D'ORVES	France	50	125	360	1175	1676	8	4
DUKE	United Kingdom	50	125	320	755	1556	8	4
DURANCE	France	50	195	430	595	1688	8	4
	Australia	50	195	430	595	1691	8	4
ENTERPRISE	United States	60	195	395	670	1418	6	4
FAST INFILTRATION CRAFT	North Korea	50	125	485	1260	1763	12	3
FEARLESS	United Kingdom	50	195	420	855	1562	8	4
FORT VICTORIA	United Kingdom	50	195	430	595	1565	8	4
FOUDRE	France	50	195	420	1230	1682	8	4
FRENCH TYPE A-69	Argentina	50	125	340	1175	1739	8	4
FUQING	China	50	195	430	595	1649	8	6
GEARING	Taiwan	60	160	470	700	1742	8	4
GEORGES LEYGUES	France	50	195	450	700	1664	8	4
GODAVARI	India	50	125	320	755	1724	8	5
GRISHA-V	Russia	50	125	320	775	1598	8	4
HAI OU	Taiwan	50	125	485	1260	1778	12	4
HARPERS FERRY	United States	60	195	430	875	1442	8	4
HERMES	India	50	195	395	655	1838	6	4
HOUDONG	Iran	50	125	485	1290	1784	12	4
HOUKU	China	50	125	485	1260	1781	12	4
HUANGFENG	China	50	125	495	1260	1862	12	4
	North Korea	50	125	495	1260	1862	12	4
	Pakistan	50	125	495	1260	1862	12	4
HUNT	United Kingdom	50	125	495	935	1571	12	4
HUON	Australia	50	125	495	915	1718	12	4
INVINCIBLE	United Kingdom	50	195	405	655	1550	6	4
IVAN ROGOV	Russia	50	195	420	855	1610	8	4
JEANNE D'ARC	France	50	195	405	655	1661	6	4
JIANGHU I	China	50	125	340	1175	1637	8	4

Surface Military								
Class	Country	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	TPK	Blades
JIANGWEI	China	50	125	340	755	1634	8	4
KARA	Russia	50	160	405	625	1583	8	4
KASHIN	Russia	50	160	395	700	1586	8	3
	India	50	160	470	700	1844	8	3
KASTURI	Malaysia	50	125	360	815	1793	8	4
KIROV	Russia	50	195	405	640	1577	8	4
KITTY HAWK	United States	60	195	405	655	1421	6	4
KNOX	Taiwan	60	125	340	1380	1775	8	4
KONGO	Japan	50	160	450	700	1841	8	5
KONI	Libya	50	125	320	755	1787	8	4
KRIVAK-III	Russia	50	125	340	795	1601	8	4
KUZNETSOV	China	50	195	395	655	1574	6	4
	Russia	50	195	395	655	1574	6	4
LA FAYETTE	France	50	160	360	755	1673	8	5
	Taiwan	60	125	360	1350	1847	8	5
LEANDER	Pakistan	50	125	320	1320	1856	8	5
LEANDER	India	50	125	360	1320	1748	8	5
LUDA I	China	50	160	450	715	1628	8	4
LUHU	China	50	160	450	735	1631	8	4
MAGAR	India	50	195	420	895	1727	8	4
MEKO 140 A16	Argentina	50	125	340	755	1736	8	5
MEKO 360 H2	Argentina	50	160	470	715	1733	8	4
NANUCHKA-II	India	50	125	320	815	1853	8	4
	Libya	50	125	320	815	1853	8	4
NANUCHKA-III	Russia	50	125	360	815	1604	8	4
NATYA	India	50	125	485	935	1751	12	4
NATYA	Russia	50	125	495	935	1622	12	4
NEUSTRASHIMYY	Russia	50	125	360	755	1595	8	4
NEWPORT	Australia	60	195	420	895	1445	8	4
NIMITZ	United States	60	195	395	685	1415	6	4
OLIVER HAZARD PERRY	United States	60	125	320	755	1436	8	5
	Australia	60	125	320	755	1859	8	4
OSA-II	Libya	50	125	495	1260	1640	12	4
OSPREY	United States	60	125	485	915	1451	12	4
OURAGAN	France	50	125	420	875	1679	8	4
PFG-2	Taiwan	60	125	320	755	1772	8	5
SAAM	Iran	50	125	360	755	1757	8	4
SAAM	Iran	50	125	360	755	1757	8	4
SACRAMENTO	United States	60	195	430	565	1454	8	6
SANDOWN	United Kingdom	50	125	485	915	1568	12	4
SHEFFIELD	Argentina	50	125	450	700	1880	8	5
SLAVA	Russia	50	195	395	610	1580	8	4
SOVREMENNY	China	50	160	470	735	1592	8	4
	Russia	50	160	470	735	1592	8	4
SPRUANCE	United States	60	160	470	700	1433	8	5
SUPPLY	United States	60	195	430	580	1457	8	6

Surface Military								
Class	Country	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	TPK	Blades
T-43	China	50	195	495	935	1652	12	4
TARANTUL- III	Russia	50	125	320	835	1607	8	4
TARANTUL-I	India	50	125	320	815	1868	8	4
TICONDEROGA	United States	60	160	395	610	1424	8	5
TICONDEROGA VLS	United States	60	160	395	625	1427	8	5
TOURVILLE	France	50	160	470	735	1670	8	4
TRIPARTITE	France	50	125	495	915	1700	12	4
TYPE 143A	Germany	50	125	485	1260	1709	12	4
TYPE 332	Germany	50	125	495	915	1715	12	4
TYPE 42	United Kingdom	50	160	450	700	1553	8	5
UDALOY	Russia	50	160	450	715	1589	8	5
VICTORIOUS	United States	60	125	485	915	1448	8	4
VISHNAYA	Russia	50	125	485	550	1619	12	4
WASP	United States	60	195	420	875	1439	8	4
YARROW FRIGATE 2000	Malaysia	50	125	350	755	1790	8	4
YUTING	China	50	125	420	895	1646	8	4

Surface Civilian								
Class	Country	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	TPK	Blades
Car Carrier	Civilian	60	195	430	910	1478	10	4
Cargo Ship	Civilian	60	160	420	910	1481	10	4
Cruise Ship	Civilian	60	160	420	870	1943	15	7
Fishing Boat	Civilian	50	125	485	1200	1484	25	4
Fishing Boat (Modified)	North Korea	50	125	485	1200	1484	25	4
Freighter	Civilian	60	160	420	910	1931	20	7
Oiler	Civilian	60	160	420	910	1475	7	4
Powerboat	Civilian	50	125	495	790	1946	30	7
Super Tanker	Civilian	60	195	430	910	1958	7	4
Trawler	Civilian	50	160	495	1200	1487	25	4
Yacht	Civilian	60	125	485	740	1934	30	7

Mines & UUVs								
Class	Country	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	TPK	Blades
Mobile Mine	Military	50	125	320	610	1802	30	4
SLMM	Military	60	125	340	780	1472	30	4
UUV	Military	60	125	340	780	1955	30	4

Decoys								
Class	Country	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	TPK	Blades
Active Decoy	Military	50	125	485	1826	0	0	0
Towed Decoy	Military	50	125	495	1829	0	0	0

Torpedo								
Class	Country	Freq 1	Freq 2	Freq 3	Freq 4	Freq 5	TPK	Blades
53 cm Torpedo	Military	50	125	320	610	1802	30	4
53-65K Torpedo	Military	50	125	340	730	1898	30	4
53-65KE Torpedo	Military	50	125	340	730	1898	30	4
65 cm Torpedo	Military	50	160	495	630	1805	30	4
A 244 Torpedo	Military	50	125	360	1140	1820	30	4
APR-2E Torpedo	Military	50	125	360	750	1916	30	4
DM 2A4 Torpedo	Military	50	125	360	1120	1817	30	4
E 15 Torpedo	Military	50	125	320	750	1919	30	4
E45-75A Torpedo	Military	50	125	320	730	1889	30	4
F 17 Torpedo	Military	50	125	340	740	1904	30	4
L5 Torpedo	Military	50	125	320	740	1901	30	4
Mk 37 Torpedo	Military	60	125	340	780	1811	30	4
Mk 44 Torpedo	Military	60	125	340	800	1814	30	4
MK 46 Torpedo	Military	60	125	340	720	1463	30	4
MK 48 ADCAP Torpedo	Military	60	160	495	760	1469	30	4
MK 50 Torpedo	Military	60	125	340	740	1466	30	4
SAET-60 Torpedo	Military	50	125	340	730	1895	30	4
SET-53ME Torpedo	Military	50	125	320	610	1802	30	4
SET-65 Torpedo	Military	50	125	320	730	1892	30	4
SET-65E Torpedo	Military	50	125	320	730	1892	30	4
Shkval Torpedo	Military	50	160	495	760	1928	0	0
Spearfish Torpedo	Military	50	125	340	1100	1808	30	4
SST-4 Torpedo	Military	50	125	320	750	1919	30	4
Stingray Torpedo	Military	50	125	320	1160	1823	30	4
SUT Torpedo	Military	50	125	320	750	1919	30	4
TEST-71M Torpedo	Military	50	125	320	730	1892	30	4
TEST-71ME Torpedo	Military	50	125	320	730	1892	30	4
TEST-71ME-NK Torpedo	Military	50	125	320	730	1892	30	4
Tigerfish Torpedo	Military	50	125	360	740	1907	30	4
Type 40 Torpedo	Military	50	125	340	740	1913	30	4
Type 89 Torpedo	Military	50	125	320	740	1910	30	4
UMGT-1 Torpedo	Military	50	125	320	730	1889	30	4
USET-80 Torpedo	Military	50	125	340	730	1895	30	4
USET-95 Torpedo	Military	50	125	340	750	1922	30	4
Yu-3 Torpedo	Military	50	125	320	750	1919	30	4
Yu-4 Torpedo	Military	50	125	320	750	1919	30	4

B : Buoy Spacing Chart**DANGEROUS WATERS - Buoy Spacing Chart**

Speed over Ground	Yards Sec	500yds Spacing	1000yds Spacing	1500yds Spacing	2000yds Spacing
150	83	6.0	12.0	18.0	24.0
160	89	5.6	11.3	16.9	22.5
170	94	5.3	10.6	15.9	21.2
180	100	5.0	10.0	15.0	20.0
190	106	4.7	9.5	14.2	18.9
200	111	4.5	9.0	13.5	18.0
210	117	4.3	8.6	12.9	17.1
220	122	4.1	8.2	12.3	16.4
230	128	3.9	7.8	11.7	15.7
240	133	3.8	7.5	11.3	15.0
250	139	3.6	7.2	10.8	14.4
260	144	3.5	6.9	10.4	13.8
270	150	3.3	6.7	10.0	13.3
280	156	3.2	6.4	9.6	12.9
290	161	3.1	6.2	9.3	12.4
300	167	3.0	6.0	9.0	12.0
310	172	2.9	5.8	8.7	11.6
320	178	2.8	5.6	8.4	11.3
330	183	2.7	5.5	8.2	10.9

C : Datum Prosecution – Expanding Circles Chart

Expanding Circle Chart: Use to estimate Area of Probability Based on range from Datum, using Speed Estimate of Target vs. Datum Age. Units in Yards.											
	Time in Minutes										
Speed Kts	1	2	3	4	5	6	7	8	9	10	11
1	33	67	100	133	167	200	233	267	300	333	367
2	67	133	200	267	333	400	467	533	600	667	733
3	100	200	300	400	500	600	700	800	900	1000	1100
4	133	267	400	533	667	800	933	1067	1200	1333	1467
5	167	333	500	667	833	1000	1167	1333	1500	1667	1833
6	200	400	600	800	1000	1200	1400	1600	1800	2000	2200
7	233	467	700	933	1167	1400	1633	1867	2100	2333	2567
8	267	533	800	1067	1333	1600	1867	2133	2400	2667	2933
9	300	600	900	1200	1500	1800	2100	2400	2700	3000	3300
10	333	667	1000	1333	1667	2000	2333	2667	3000	3333	3667
11	367	733	1100	1467	1833	2200	2567	2933	3300	3667	4033
12	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400
13	433	867	1300	1733	2167	2600	3033	3467	3900	4333	4767
14	467	933	1400	1867	2333	2800	3267	3733	4200	4667	5133
15	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
16	533	1067	1600	2133	2667	3200	3733	4267	4800	5333	5867
17	567	1133	1700	2267	2833	3400	3967	4533	5100	5667	6233
18	600	1200	1800	2400	3000	3600	4200	4800	5400	6000	6600
19	633	1267	1900	2533	3167	3800	4433	5067	5700	6333	6967
20	667	1333	2000	2667	3333	4000	4667	5333	6000	6667	7333
21	700	1400	2100	2800	3500	4200	4900	5600	6300	7000	7700
22	733	1467	2200	2933	3667	4400	5133	5867	6600	7333	8067
23	767	1533	2300	3067	3833	4600	5367	6133	6900	7667	8433
24	800	1600	2400	3200	4000	4800	5600	6400	7200	8000	8800
25	833	1667	2500	3333	4167	5000	5833	6667	7500	8333	9167
26	867	1733	2600	3467	4333	5200	6067	6933	7800	8667	9533
27	900	1800	2700	3600	4500	5400	6300	7200	8100	9000	9900
28	933	1867	2800	3733	4667	5600	6533	7467	8400	9333	10267
29	967	1933	2900	3867	4833	5800	6767	7733	8700	9667	10633
30	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000
31	1033	2067	3100	4133	5167	6200	7233	8267	9300	10333	11367
32	1067	2133	3200	4267	5333	6400	7467	8533	9600	10667	11733
33	1100	2200	3300	4400	5500	6600	7700	8800	9900	11000	12100
34	1133	2267	3400	4533	5667	6800	7933	9067	10200	11333	12467
35	1167	2333	3500	4667	5833	7000	8167	9333	10500	11667	12833

Expanding Circle Chart: Use to estimate Area of Probability Based on range from Datum, using Speed Estimate of Target vs. Datum Age. Units in Yards.

	Time in Minutes								
Speed Kts	12	13	14	15	16	17	18	19	20
1	400	433	467	500	533	567	600	633	667
2	800	867	933	1000	1067	1133	1200	1267	1333
3	1200	1300	1400	1500	1600	1700	1800	1900	2000
4	1600	1733	1867	2000	2133	2267	2400	2533	2667
5	2000	2167	2333	2500	2667	2833	3000	3167	3333
6	2400	2600	2800	3000	3200	3400	3600	3800	4000
7	2800	3033	3267	3500	3733	3967	4200	4433	4667
8	3200	3467	3733	4000	4267	4533	4800	5067	5333
9	3600	3900	4200	4500	4800	5100	5400	5700	6000
10	4000	4333	4667	5000	5333	5667	6000	6333	6667
11	4400	4767	5133	5500	5867	6233	6600	6967	7333
12	4800	5200	5600	6000	6400	6800	7200	7600	8000
13	5200	5633	6067	6500	6933	7367	7800	8233	8667
14	5600	6067	6533	7000	7467	7933	8400	8867	9333
15	6000	6500	7000	7500	8000	8500	9000	9500	10000
16	6400	6933	7467	8000	8533	9067	9600	10133	10667
17	6800	7367	7933	8500	9067	9633	10200	10767	11333
18	7200	7800	8400	9000	9600	10200	10800	11400	12000
19	7600	8233	8867	9500	10133	10767	11400	12033	12667
20	8000	8667	9333	10000	10667	11333	12000	12667	13333
21	8400	9100	9800	10500	11200	11900	12600	13300	14000
22	8800	9533	10267	11000	11733	12467	13200	13933	14667
23	9200	9967	10733	11500	12267	13033	13800	14567	15333
24	9600	10400	11200	12000	12800	13600	14400	15200	16000
25	10000	10833	11667	12500	13333	14167	15000	15833	16667
26	10400	11267	12133	13000	13867	14733	15600	16467	17333
27	10800	11700	12600	13500	14400	15300	16200	17100	18000
28	11200	12133	13067	14000	14933	15867	16800	17733	18667
29	11600	12567	13533	14500	15467	16433	17400	18367	19333
30	12000	13000	14000	15000	16000	17000	18000	19000	20000
31	12400	13433	14467	15500	16533	17567	18600	19633	20667
32	12800	13867	14933	16000	17067	18133	19200	20267	21333
33	13200	14300	15400	16500	17600	18700	19800	20900	22000
34	13600	14733	15867	17000	18133	19267	20400	21533	22667
35	14000	15167	16333	17500	18667	19833	21000	22167	23333

D : Close in Buoy Spacing Chart

<i>Target Speed in Kts</i>	<i>Distance in Yards</i>		<i>Distance in Nautical Miles</i>	
	2 Min.	4 Min.	2 Min.	4 Min.
0	0	0	0	0
1	67.5	135	0	0.1
2	135	270	0.1	0.1
3	202.5	405	0.1	0.2
4	270	540	0.1	0.3
5	337.5	675	0.2	0.3
6	405	810	0.2	0.4
7	472.5	945	0.2	0.4
8	540	1080	0.3	0.5
9	607.5	1215	0.3	0.6
10	675	1350	0.3	0.6
11	742.5	1485	0.4	0.7
12	810	1620	0.4	0.8
13	877.5	1755	0.4	0.9
14	945	1890	0.5	0.9
15	1012.5	2025	0.5	1
16			0.5	1.1
17			0.6	1.1
18			0.6	1.2
19			0.6	1.3
20			0.7	1.3
21			0.7	1.4
22			0.7	1.5
23			0.8	1.5
24			0.8	1.6
25			0.8	1.7
26			0.9	1.7
27			0.9	1.8
28			0.9	1.9
29			1	1.9
30			1	2
31			1	2.1
32			1.1	2.1
33			1.1	2.2
34			1.1	2.3
35			1.2	2.3
36			1.2	2.4
37			1.2	2.5
38			1.3	2.5

E : Drop Ranges

Buoy Dropping Ranges

The numbers presented here are based on testing and are rounded, individual results might vary a bit, but probably not more than 10yds (lower ranges) / 100yds (higher ranges) give or take. The speeds are noted down as Speed the Autopilot acknowledges when pressing the respective key and the resulting speed with wind from the side (or without wind).

	Setting		
	"1" = 154 (180) kts	"2" = 263 (300) kts	"3" = 364 (360) kts
Altitude	Distance		
300ft	400yds	700yds	800yds
1000ft	950yds	1550yds	1850yds
2000ft	1700yds	1.4nm	1.6nm
3000ft	1.1nm	1.7nm	2.1nm
4000ft	1.3nm	2.2nm	2.7nm
5000ft	1.6nm	2.6nm	3.2nm
6000ft	2.0nm	3.2nm	3.8nm
7000ft	2.4nm	3.7nm	4.4nm
8000ft	2.7nm	4.2nm	5.0nm
9000ft	3.0nm	4.5nm	5.4nm
10000ft	3.2nm	5.0nm	6.0nm

Torpedo Dropping Ranges

The numbers presented here are based on testing and are rounded, individual results might vary a bit, but probably not more than 10yds (lower ranges) / 100yds (higher ranges) give or take. The speeds are noted down as Speed the Autopilot acknowledges when pressing the respective key and the resulting speed with wind from the side (or without wind). I only mapped out the 4 available preset altitudes of MAD, Low, Medium and High. If you use altitudes in between, you have to make a guess on the resulting numbers or test it yourself. Take note that the torpedo enters the water nearly vertical at the Medium and High altitude.

	Setting		
	"1" = 154 (180) kts	"2" = 263 (300) kts	"3" = 364 (360) kts
Altitude	Distance		
300ft (MAD)	260yds	380yds	430yds
678ft (Low)	380yds	530yds	560yds
	"1" = 154 (180) kts	"2" = 263 (300) kts	"3" = 364 (420) kts
13599ft (Medium)	1.3nm	2.3nm	3.0nm
	"1" = 154 (180) kts	"2" = 263 (300) kts	"3" = 364 (465) kts
28899ft (High)	2.0nm	3.3nm	5.0nm

F : OrionWarrior TeamSpeak Server

Introduction

Orion Warrior is supporting a Team Speak server for all members to use at no cost. TeamSpeak is a popular second party voice communication program that will run behind Dangerous Waters and allow a crew/team to communicate real time just like an Interior Communication System (ICS) on the aircraft.

Aside from the OrionWarrior TS Server there are other Servers available, the most noticeable one the DW Central TS Server. However the following little tutorial will deal with the OW TS Server only. Take note, passwords are CASESENSITIVE. The tutorial below can be found in this thread at the OW Forum as well: [OW TS Tutorial](#)

Requirements

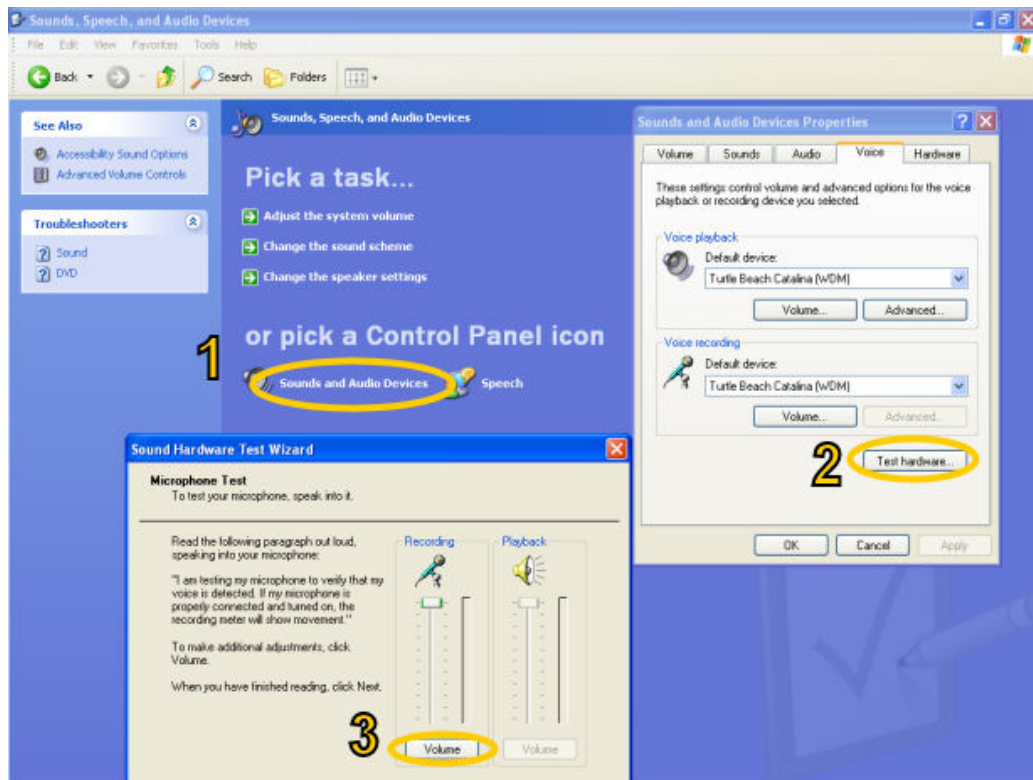
- Headset
- TeamSpeak client

How-To get a TeamSpeak client

Just click on this link : [TeamSpeak Homepage](#) and download the latest client from the right hand side Quick Downloads menu.

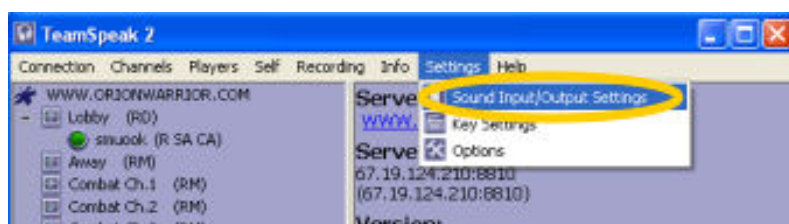
How-To set up a TeamSpeak client

1. To get started... **get a microphone and make sure it works!** If you have WindowsXP, you can do this from the Sound, Speech, and Audio Devices in your Control Panel:



If you have problems, fix them before you get on a TeamSpeak channel during actual gameplay. If you have feedback or distortion, work it out by moving your microphone, changing your microphone settings, etc...

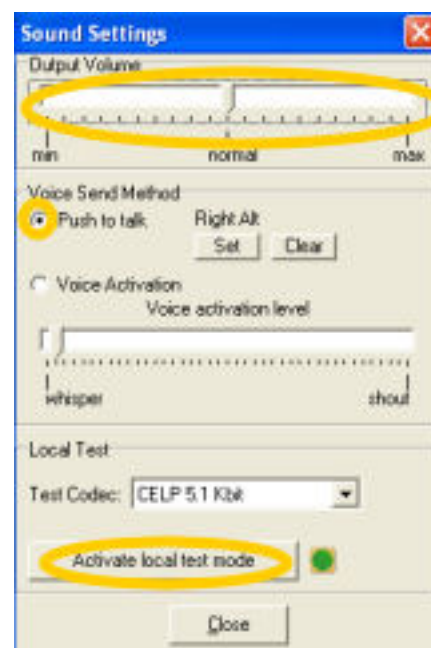
2. Set-up and test your mic offline



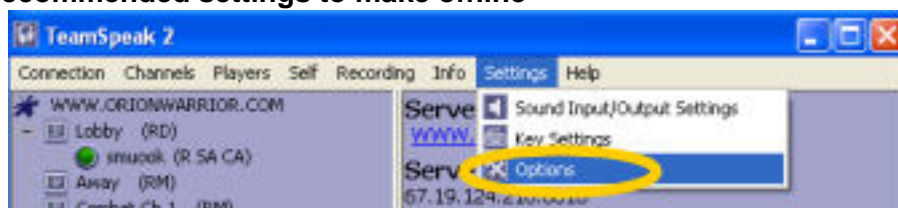
The output volume is what others players hear.

Always use **Push to talk** mode... Voice activation tends to cause static, feedback, and unwanted noise in your microphone.

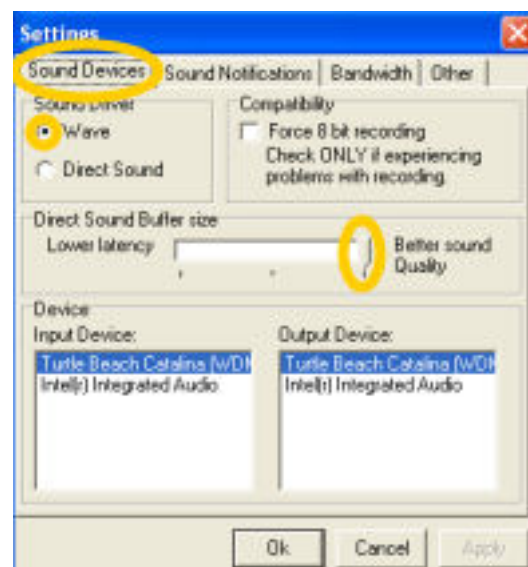
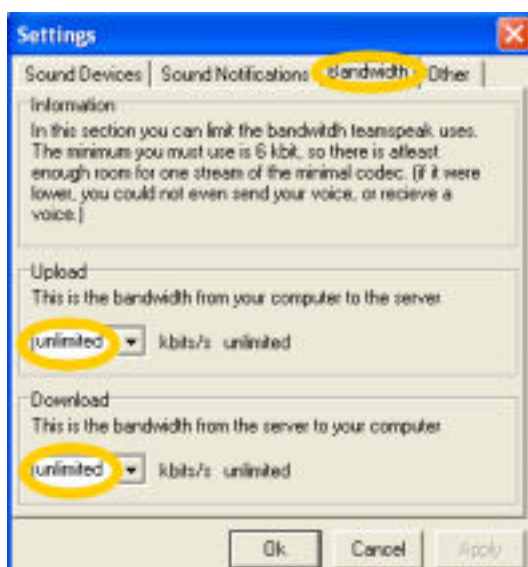
Local Test Mode allows you to test your setup with the Push to talk key. The test codec listed is only in the test mode and not necessarily what the server will use while you transmit. TS tends to have more codecs available for server use which tends to be why people say it sounds the best.



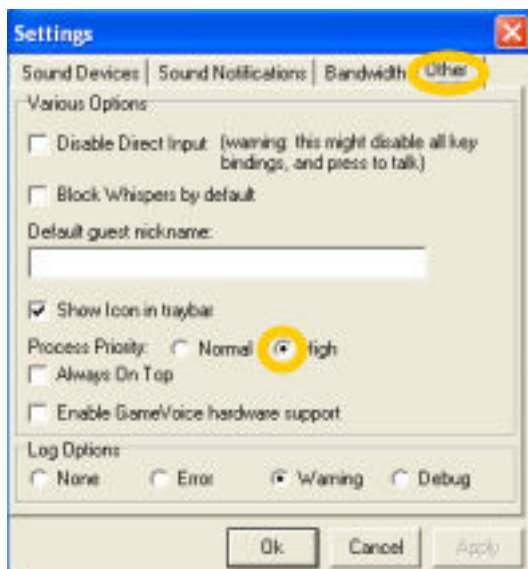
3. Other recommended settings to make offline



Setting to **WAVE** will minimize echoing. Make sure the slider is all the way over to the right for max quality

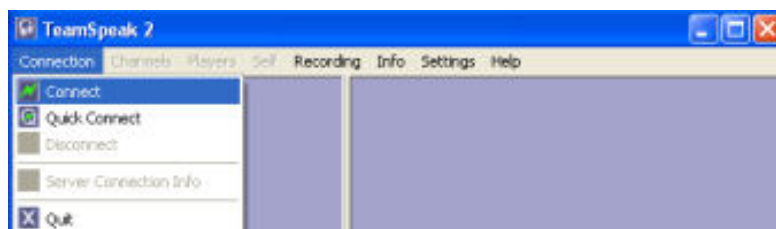


Ensure your bandwidth is unlimited if you have a good internet connection.



Set your processor priority to high to minimize lag.

4. click: **CONNECTION** => **CONNECT** => **ADD SERVER**



use the info provided below and select Anonymous



5. Then click **CONNECT** to log in.
You will be logged in as a non-registered user into the LOBBY.

Register yourself with your nickname you use on Orion Warrior.

This will allow you to have the same settings everytime you enter the server.

You have to change your connection settings to login as a registered user:

Change the password to the one you just registered with.

Select AUTO-RECONNECT.

TeamSpeak Login Settings

For the OrionWarrior TeamSpeak Server :

IP : 67.18.58.10:8801
Pass : steelontarget

For the Central DW TS Server :

IP : central.tmspk.com:9234
Pass : Arrakis

G : Multiplayer with Hyperlobby

Hyperlobby is a free Online Matchmaking System for various games including Dangerous Waters™. All you have to do is download the client, install it, log on and enjoy Multiplayer Battles. To give you a quick start on using Hyperlobby I included a short Step-by-Step tutorial on how to install and use Hyperlobby. At this time you will have to consult the online Hyperlobby manual for details and further questions. The HL manual or part of it, may be included at a later time within this manual if Jiri the creator of Hyperlobby agrees on that. Further, just as this manual undergoes development and updates, so does Hyperlobb, so check back regularly there for updates and changes.

Step-by-Step Instructions to get started with Hyperlobby and enjoy MP Battles.

1. Download the latest Hyperlobby client through this link : [Hyperlobby Client](#)
2. Follow the instructions and install the client
3. Start the Hyperlobby client
4. Follow the Instructions in the [Hyperlobby manual](#) to set up an account.
5. Connect to the Dangerous Waters Game Room

Find other players and enjoy your game