



# MODERN NAVAL WARFARE

## SSN-774 Virginia Class



**QUICK REFERENCE HANDBOOK**





MODERN NAVAL WARFARE  
SSN-774 Virginia Class  
Quick Reference Handbook

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# TABLE OF CONTENTS

## TABLE OF CONTENTS

### 1. GENERAL DATA

SHIP DESCRIPTION AND SPECIFICATIONS

1-2

SHIP PERFORMANCE DATA

1-3

BASIC SYMBOLOGY

1-4

COMMUNICATIONS

1-5

### 2. SHIP CONTROL

SUBMERGE THE SHIP

2-2

SURFACE THE SHIP (NORMAL)

2-3

SURFACE THE SHIP (EMERGENCY)

2-4

DEPTH CONTROL

2-5

### 3. SENSORS

DEPLOY THE TOWED SONAR ARRAYS

3-2

TRACK SONAR CONTACTS

3-3

TRACK VISUAL CONTACTS

3-4

TRACK ESM CONTACTS

3-5

TRACK AIS CONTACTS

3-6

TRACK RADAR CONTACTS

3-7



4. FIRE CONTROL

LOAD A TORPEDO TUBE

4-2

LAUNCH A MK48 ADCAP TORPEDO

4-3

LAUNCH A HARPOON ANTI SHIP MISSILE

4-4

LAUNCH A TOMAHAWK LAND ATTACK MISSILE

4-5

DEPLOY COUNTERMEASURES

4-6

5. OPERATIONS

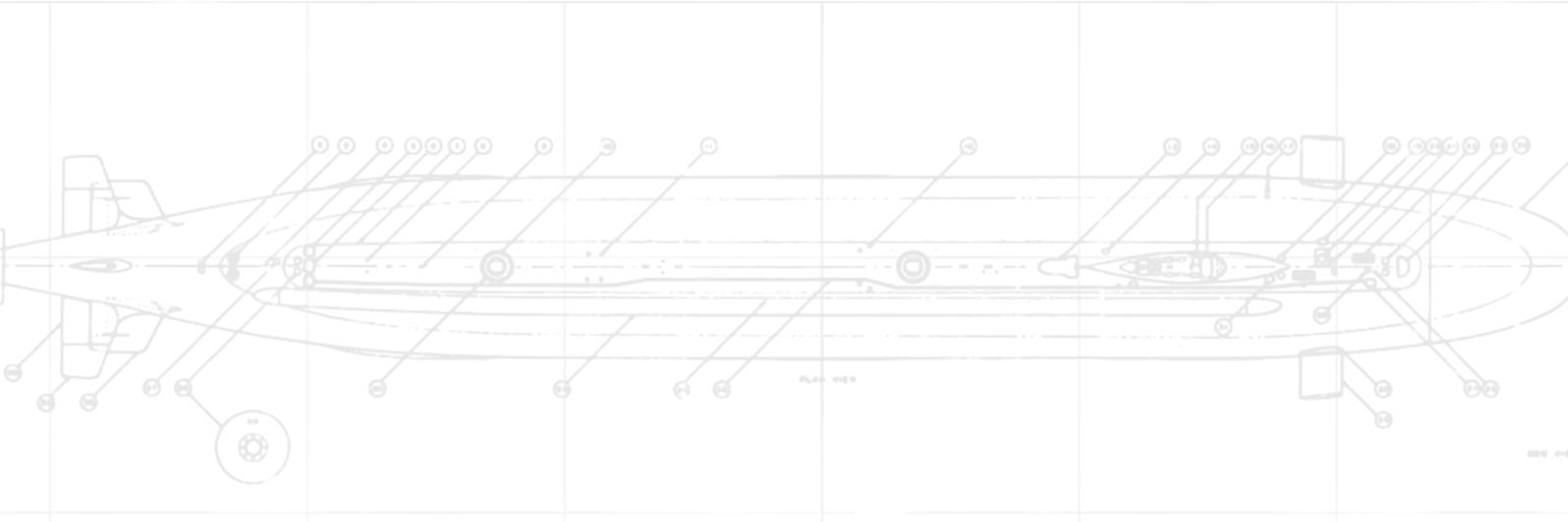
RECEIVE MISSION ORDERS OR MISSION UPDATES

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Revision

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SECTION

# 1. GENERAL DATA



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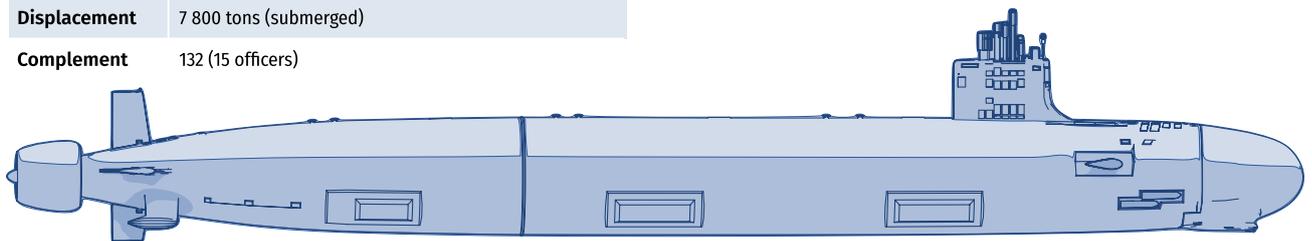
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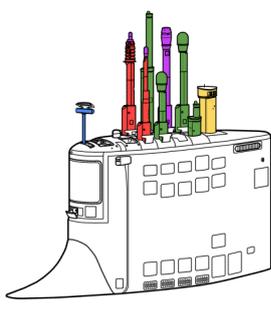
## SHIP DESCRIPTION AND SPECIFICATIONS

<b>Length</b>	377 ft	115 m
<b>Beam</b>	34 ft	10.4 m
<b>Draft</b>	32 ft	9.7 m
<b>Keel to Sail</b>	60 ft	18 m
<b>Displacement</b>	7 800 tons (submerged)	
<b>Complement</b>	132 (15 officers)	

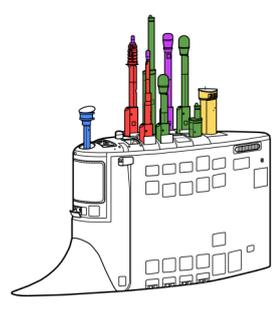
<b>Reactor</b>	GE S9G pressurized water reactor (210 MWt)
<b>Turbines</b>	2 x Steam turbines 40,000 SHP (29.8 MW)
<b>Screw</b>	Single shaft Pump-Jet propulsor



### MASTS CONFIGURATION



**Block 1 - 3**



**Block 4+**

■ PERISCOPE   ■ RADAR   ■ COMMUNICATIONS   ■ ESM FECH   ■ HARBOR

<b>Combat system</b>	AN/BYG-1 combat control system
<b>Sonar</b>	BQQ-10 (ARCI) sonar suite with: - Spherical bow array (Block 1-2) or Large aperture bow (LAB) conformal array (Block 3+) - Wide Aperture flank array (LWAA) with range estimate (RAPLOC) - Fat line TB-16 towed array (Block 1-2) or TB-34 fiber optic towed array (Block 3+) - Thin line TB-23 towed array (Block 1) or TB-29A towed array (Block 2+) - High frequency bow array (HFBA) with sensors both on the sail and the chin area of the bow - AN/WLY-1 acoustic intercept receiver
<b>Visual</b>	2 x AN/BVS-1 photonics mast or 1 x AN/BVS-1 photonics mast and 1 x LPPM low profile photonics mast (on some subs)
<b>ESM</b>	AN/BLQ-10 ESM suite with AN/BSD-2 mast
<b>Radar</b>	AN/BPS-16 radar (Block 1-3) or AN/BPS-17 radar (Block 4+)

<b>Torpedo tubes</b>	4 x 21 inch (533 mm)	MK-48 ADCAP HWT UGM-84 Harpoon ASM UGM-109 TLAM MK-67 SLMM
<b>Missile tubes</b>	12 x VLS tubes (Block 1-2) 2 x VPT with 6 missiles each (Block 3-4)	UGM-109 TLAM
<b>Decoy launchers</b>	14 x ECL 6-inch	ADC MK-3 ADC MK-4 ADC MK-6
<b>Other launchers</b>	2 x internal 3-inch	ADC MK-2 ADC MK-5 XBT SLEB SLOT

### NOTES

- US Navy numbering guidelines (or tradition) indicate that all odd numbered items (e.g. torpedo tubes or masts) belong to the starboard side of the vessel and all even to the port. Based on that torpedo tubes on a US Navy sub are #1 and #3 on the starboard and #2 and #4 on the port.
- The LPPM photonics mast has been tested on several Virginia class subs but it is not yet standard fit.
- In the game all the subs are fitted with the equipment they had when entered service.

## SHIP PERFORMANCE DATA

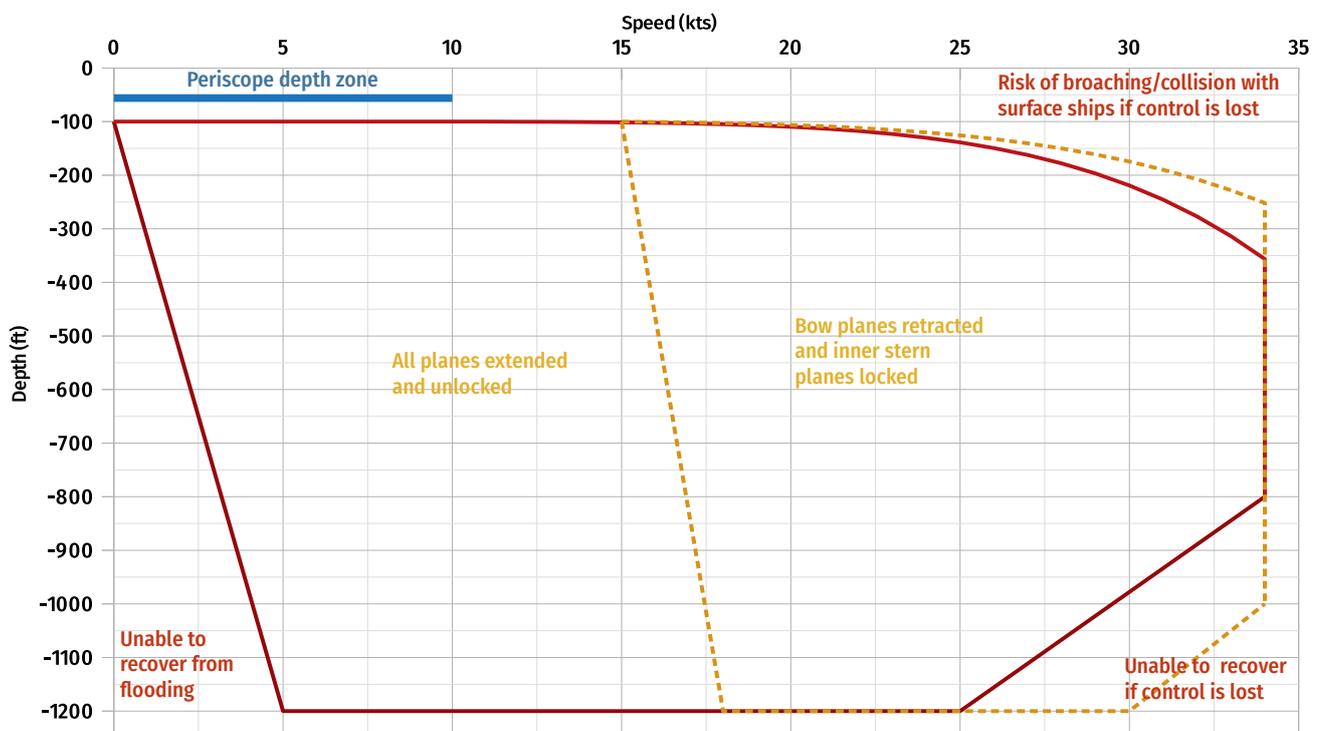
Depth data		
Periscope depth	56 ft	17 m
Safe shallow depth	100 ft	30.5 m
Standard shallow depth	155 ft	47.2 m
Standard deep depth	600 ft	183 m
Max operating depth	1 200 ft	366 m
Crush depth (est.)	1 550 ft	472.5 m

Speed data and bell orders		
	Surfaced	Submerged
Ahead 1/3	4 kts	5 kts
Ahead 2/3	8 kts	10 kts
Ahead Standard	12 kts	15 kts
Ahead Full	16 kts	25 kts
Ahead Flank	20 kts	34 kts

MK48 ADCAP torpedo launch parameters		
Max depth	> 1 200 ft	> 366 m
Max speed	> 40 kts	
Launch methods	Torpedo tube	

UGM-84 Harpoon ASM missile launch parameters		
Max depth	150 ft	45.7 m
Max speed	10 kts	
Launch methods	Torpedo tube	

UGM-109 Tomahawk TLAM missile launch parameters		
Max depth	150 ft	45.7 m
Max speed	10 kts	
Launch methods	Torpedo tube, VLS, VPT	

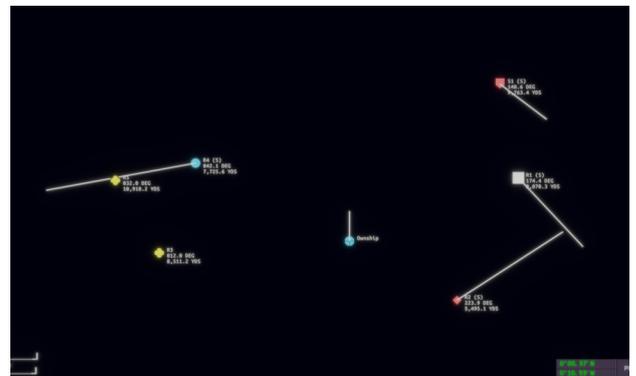




# BASIC SYMBOLOGY

MIL-STD-2525 / APP-6 SYMBOLOGY TABLE							
	AIR	SURFACE	SUB SURFACE	TORPEDO	DECOY	UUV	MISSILE
Assumed Friendly							
Friendly							
Suspect							
Hostile							
Pending							
Unknown							
Neutral							
Ownship	-	-		-	-	-	-

NTDS SYMBOLOGY TABLE			
	AIR	SURFACE	SUB SURFACE
Assumed Friendly			
Friendly			
Suspect			
Hostile			
Pending			
Unknown			
Neutral			
Ownship	-	-	



**NOTES**

- MIL-STD-2525 / APP-6 is the latest NATO symbology standard for tactical computer systems. Most systems currently use this set. In MNW we feature only a small subset of the full specification.
- NTDS (Naval Tactical Data System) is a symbology design for use on the system with same name back in the 1960s. Some older consoles still use it today.

## COMMUNICATIONS

### Virginia class communication masts and wires

Antenna Bands and systems

**AN/BRA-34** VLF, LF, MF, HF, VHF, UHF, GPS

**OE-562 SubHDR** SHF, EHF, GPS, GBS

**Trailing wire** ELF, VLF

### ELF communication codes

**MAD** MAINTAIN RADIO SILENCE

**DLA** BREAK RADIO SILENCE AND CONTACT HQ

**NMH** RETURN TO BASE

**CHQ** EXPECT ORDER UPDATES (LOW PRIORITY)

**QAN** EXPECT ORDER UPDATES (MEDIUM PRIORITY)

**SZX** EXPECT ORDER UPDATES (HIGH PRIORITY)

**PBM** EXPECT EMERGENCY ACTION MESSAGE (EAM)

**SAK** PRIMARY OBJECTIVES SUCCEEDED

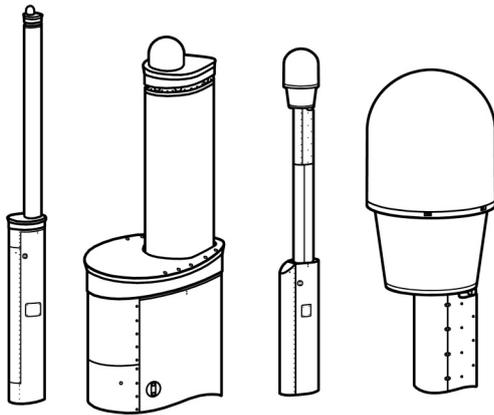
**IKG** PRIMARY OBJECTIVES FAILED

**LAR** SECONDARY OBJECTIVES SUCCEEDED

**DSK** SECONDARY OBJECTIVES FAILED

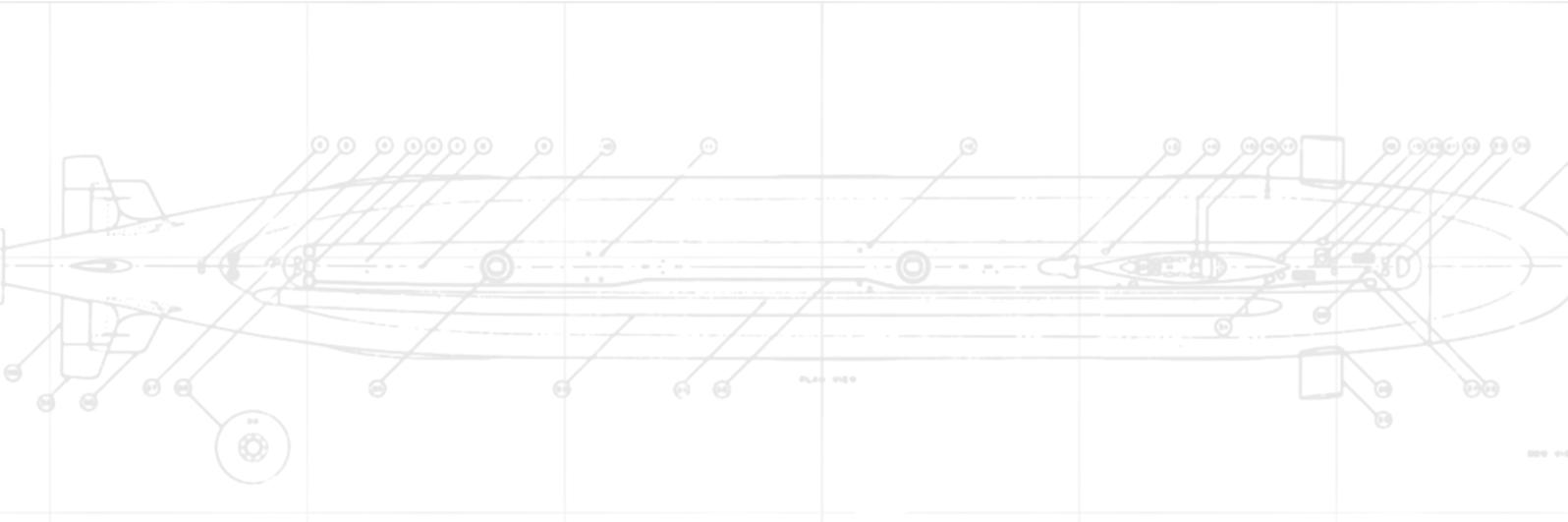
AN/BRA-34

SubHDR



### Communication bands

	Frequency	Data rate	Notes
<b>ELF</b>	3 – 30 Hz	~0.01 bit/s	Receive data only, worldwide range, underwater up to ~100m / ~300ft
<b>VLF</b>	3 – 30 kHz	~50 bit/s	Receive data only, very long range, underwater up to ~20m / ~65ft
<b>LF</b>	30 – 300 kHz	~1 kbps	Receive only, very long range
<b>MF</b>	300 kHz – 3 MHz	~10 kbps	Long range
<b>HF</b>	3 – 30 MHz	~5 kbps	Long range
<b>VHF</b>	30 – 300 MHz	~100 kbps	Line of sight medium range
<b>UHF</b>	300 MHz – 3 GHz	~10 Mbps	Line of sight medium range, satellite communication
<b>SHF</b>	3 – 30 GHz	~100 Mbps	Line of sight short range, satellite communication
<b>EHF</b>	30 – 300 GHz	~1 Gbps	Line of sight short range, satellite communication



SECTION

# 2. SHIP CONTROL



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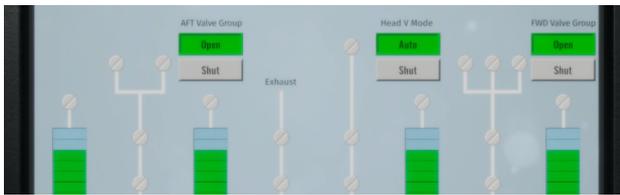


## SUBMERGE THE SHIP

1. Go to the Pilot station [F2].
2. On the bottom of the display, click on the Steering tab.
3. Using the EOT (Engine Order Telegraph) order ahead 2/3.



4. Select the Masts tab and click both FWD and AFT Valve Group Open buttons. They will return to Shut automatically once submerged.



5. Return to the Steering tab and under Ordered Depth click the Depth button.
6. Enter 150 or another depth to submerge to using the keypad on the screen.

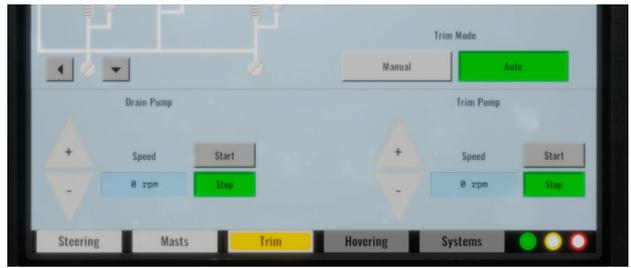


7. Click the green Order button.
8. The initial 40 feet of submerging will be slow



as the air is vented from the MBTs and they fill with water.

9. When reaching depth it is advised to slow and check that the auto-trim system (Trim tab) has adjusted and can maintain depth at slow speeds.



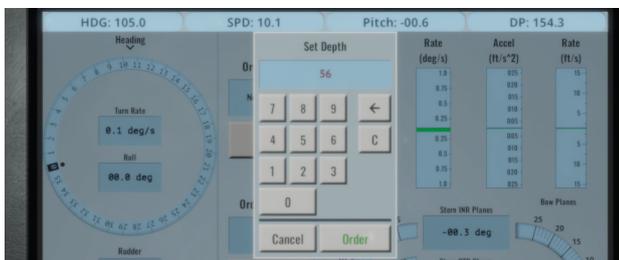
10. If the auto-trim fails to properly trim the ship refer to QRS for "Manual Trim Mode".

**NOTES**

- Before beginning verify that the Sternplanes are unlocked and the Bowplanes are extended and unlocked (they both are by default).

## SURFACE THE SHIP (NORMAL)

1. Go to the Pilot Station [F2].
2. On the bottom of the display, click on the Steering tab.
3. Click on the Depth button, in the middle of the screen.



4. Enter 56 ft (periscope depth) using the keypad on the screen.
5. Click the green Order button.
6. Wait a few minutes, for the submarine to reach the ordered 56 ft.
7. Hit the Surface Ops button.
8. Go to the Masts tab and raise the Snorkel Mast and one Periscope (HD#1 or HD#2).



9. Go to Periscope Station [F6] and check if the snorkel is out of the Water, if not wait until it does.
10. Go back to the Pilot Station [F2], Masts tab.



11. Turn on the low-pressure blowers (click Start at both FWD and AFT LP Blower).
12. Wait for the low pressure blowers to slowly empty the MBTs.
13. The ship should be surfaced.
14. Click on the zebra band at the top of the screen to move to one of the top displays. On Block 4 and later the top display is embedded at the upper part of the main display.
15. Click on the Rigging TAB.
16. Click on the Surface button.

### NOTES

- The normal surfacing process uses low pressure blowers rather than high pressure tanks to empty the Main Ballast Tanks (MBT).
- It is the quietest and probably safest method to surface a submarine.
- It also takes a VERY long time to complete. It might take more than 15 mins for the MBTs to become completely empty.



## SURFACE THE SHIP (EMERGENCY)

1. Press [F1] to get to walk mode, look in the direction of the pilot's station above the two seats.



2. Use your mouse to find the Manual Control overlay, click the right mouse button, and it zooms onto two levers; those are the Emergency Blow Activators or "Chicken Switches".
3. Click with the left button of your mouse on each of them. You will blow the Main Ballast Tanks with high pressure air and surface very fast.
4. Go to the Pilot Station [F2], Steering tab.
5. Click on the Surface Ops button.

and later the top display is embedded at the upper part of the main display.



8. Click on the Rigging TAB.
9. Click on the Surface button.

6. In a few seconds the ship should be surfaced.
7. Click on the zebra band at the top of the screen to move to one of the top displays. On Block 4

**NOTES**

- This surface method uses high pressure tanks to surface. It is very fast but makes a lot of noise.
- Also the high pressure tanks have air capacity for 3 - 4 surfaces. After that you need to use the snorkel to charge them again.
- If you dive with the HP tanks empty you may not be able to resurface in a case of emergency.

## DEPTH CONTROL

1. Go to the SONAR Station [F5].
2. Select the Fathometer tab (second icon from the top right of the station screen).



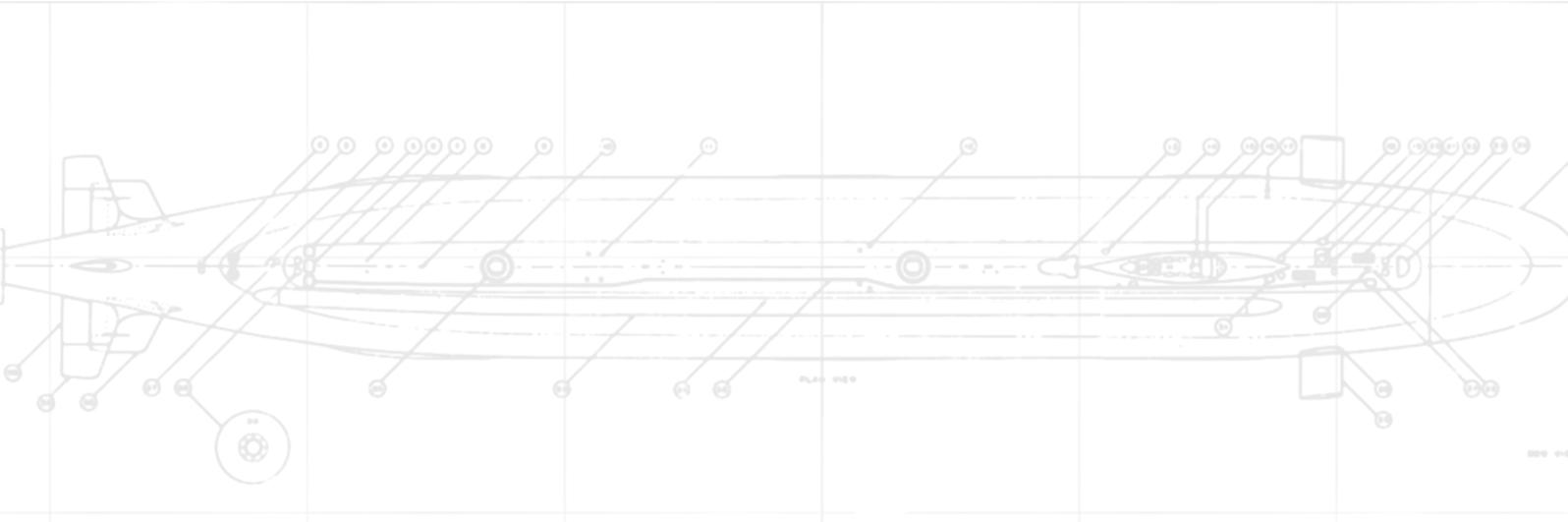
3. Choose Feet on the drop-down menu right of MEASUREMENTS.
4. Click on STANDBY and then on CONTINUOUS.
5. Wait until the depth reading stabilizes and click on STOP. Now, you have an estimation of the depth under the keel where it says CURRENT DEPTH.
6. Go to the Pilot Station [F2].
7. On the bottom of the display, click on the Steering tab.



8. Click on the Depth button, in the middle of the screen.
9. Enter 150 ft or any other depth value using the keypad on the screen. Verify that the value you input does not exceed the measured value at the fathometer.
10. Click the green Order button.
11. Wait until the ship reaches the ordered depth.

### NOTES

- This checklist assumes that the submarine is already dived and it is trimmed correctly.
- On the Virginia class submarines most of the helm controls are done through an advanced "Fly By Wire" system, the same way as in most modern aircraft.
- The system will automatically clamp any ordered values outside the safety limits.



SECTION

# 3. SENSORS



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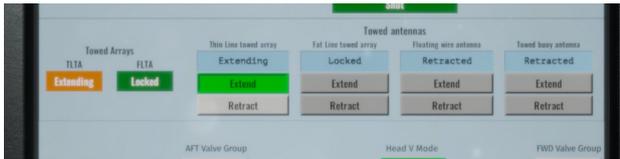


## DEPLOY THE TOWED SONAR ARRAYS

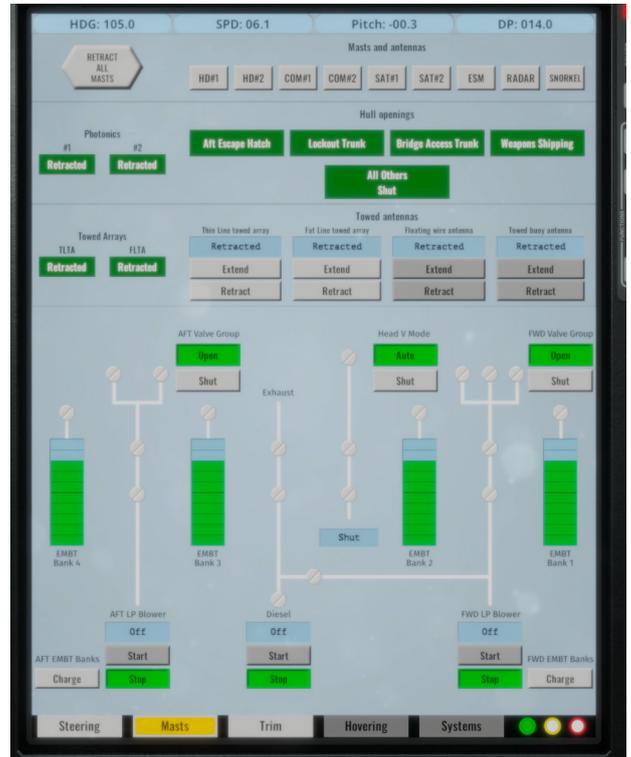
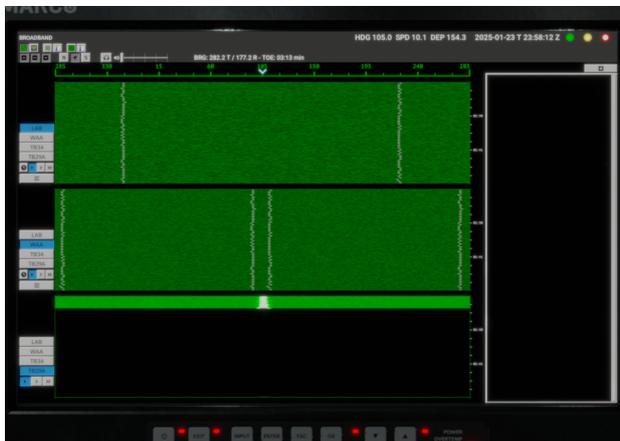
1. Go to the Pilot Station [F2].
2. On the bottom of the display, click on the Masts tab.



3. Click Extend on either towed array to start extending it. By pressing the button the reel process stops. When the array is extended fully the process will stop automatically.



4. Go to the SONAR Station [F5].
5. Select the Broadband tab (first icon from the top left of the station screen).
6. On the selectors next to one of the waterfall displays select either TB34 (fat line array) or TB29A (thin line array) depending on which one is extended.



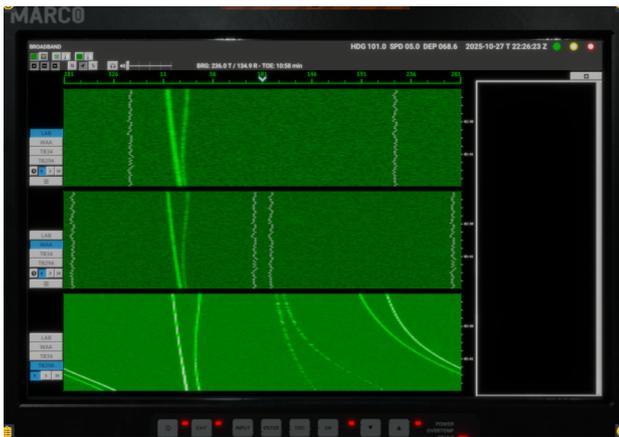
7. After some time there should be broadband data coming in.
8. If the array is fully extended, stopped or cut you can repeat the process to deploy the second one.

**NOTES**

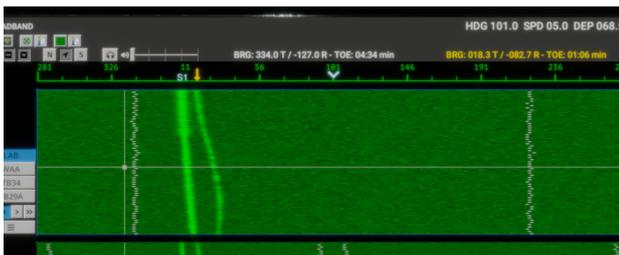
- Both towed sonar arrays can be deployed at the same time but they must be extended one by one.
- High speeds and rapid maneuvers might cut the towed sonar arrays. The thin line arrays are in general more sensitive than the fat line ones.
- After any maneuver the towed needs some time to reach the new course and stabilize.

## TRACK SONAR CONTACTS

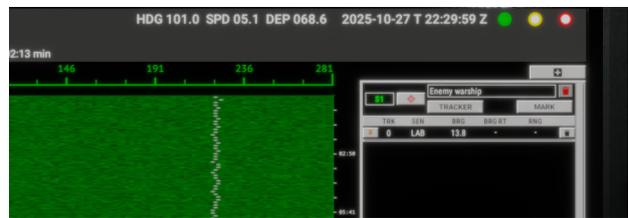
1. Go to the SONAR Station [F5].
2. Select the Broadband tab (first icon from the top left of the station screen).



3. On the selectors next to one of the waterfall displays select any Sonar array; it can be LAB, WAA, TB34 or TB29A. To use the towed sonar arrays (the last two) they must first be extended.
4. Move the mouse over any of the waterfall displays. A white cross line follows the movement of your mouse, the mouse position is the white square.
5. Click on the screen where the mouse is. A yellow inverted arrow appears on the top of the heading display. This is the selected bearing.



6. On the top upper right side of the SONAR screen, there is a  $\pm$  button, press it.
7. A contact information box appears on the right side of the panel, with the S (sierra) track number Sx, where x is the number attributed to this contact (e.g. S1).



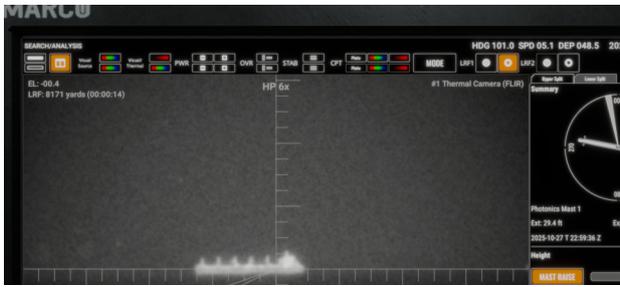
8. You can add information like a description/name and a type using the NATO MIL-STD-2525 symbols.
9. If at the selected bearing there is a distinct vertical line over the broadband noise (a contact) you can click on the TRACKER button. A new track information line should appear within the sierra contact box.
10. The contact is now being automatically tracked and sent to the AN/BYG-1 Combat System.

### NOTES

- You can add more than one tracker from a different array on each sierra contact.
- The towed sonar arrays for each contact get also a mirror trace. You can distinguish which is the real one either by comparing to other sensors or by turning the submarine. After the turn the true trace will stay at the correct bearing will the false one will not.
- The WAA array at certain conditions can give an estimate of the target range. That is why the technology is also called RAPLOC (Rapid Passive Localization).

## TRACK VISUAL CONTACTS

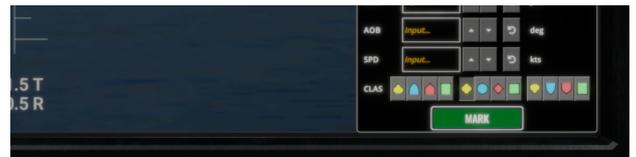
1. Go to the Periscope station [F6] or the Command Station [F3] (in that case, select on the left the Binocular icon).
2. On the top of the screen, you have on the left 2 icons looking like a USB port, one on top of the other. Those are to select the scope(s) you want to use (you can use both). The next icon opens the periscope controls panel.



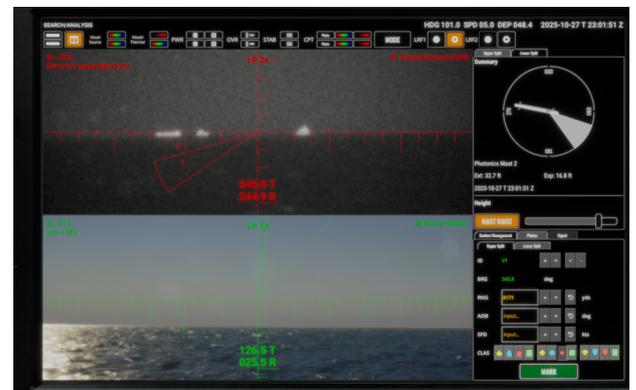
3. The screen is divided into two, on the left a black screen with a reticle and a pie representing the Field of View. On the right, there are 3 panels. On top, a polar view of your boat, and a white pie slice. On top of this panel 2 tabs (upper split and lower split). In the center, a panel to raise and lower the periscope mast. Finally, at the bottom, a panel manages all visual contacts (add, remove, classify, ...).
4. Click on MAST RAISE and adjust the height of the mast. After a few seconds, you see the view from the perspective as it rises.
5. To move the periscope to port or starboard, click and hold the left mouse button and drag the mouse right or left.
6. On the top of the screen, Visual Source allows you to switch from Color view to IR, Visual Thermal to activate the thermal view (to easily spot a ship or a plane at a distance). PWR change the magnification, and the FoV, OVR

change the color of the periscope display. STAB des/activate the image stabilisation. Finally, LRF1 and LRF2 are LASER rangefinders for each photonics. There are two white round buttons: one, a black square, switch the LRF from off to standby mode; the other, on its left, fires a beam to measure the distance to a target.

7. To detect a target, switch to thermal and rotate the periscope. You can zoom in using PWR. Center the ship on the screen, then use the LRF to measure its range. If you are in thermal, you can see the LASER beam. The range is displayed on the display.

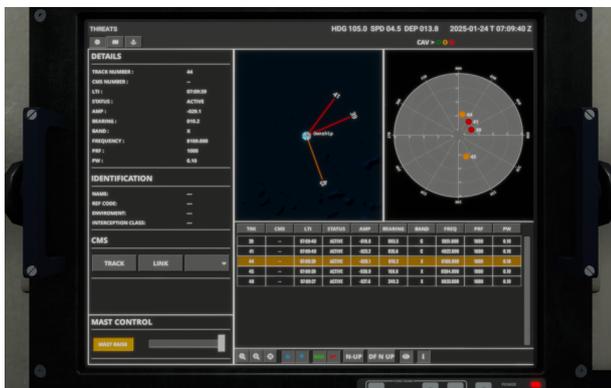


8. To mark the target, click on MARK at the bottom right of the screen. The field ID should show V1. To add another contact, click on the  $\pm$  on the ID line, then on MARK.
9. The contact data were now sent to the AN/BYG-1 Combat System. There are no auto trackers for visual tracking. All the bearing updates should be done manually by marking again the target at the new position.

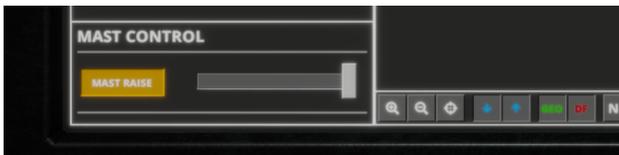


## TRACK ESM CONTACTS

1. Press [F7] to go to the ESM Station.
2. On the top left, there are 3 icons (THREATS, COMMUNICATIONS and AIS). Click the left one. THREATS should appear at the top left of the icons row.



3. On the lower left panel MAST CONTROL, click on the MAST RAISE button and drag the cursor to the right; the mast will be fully raised.



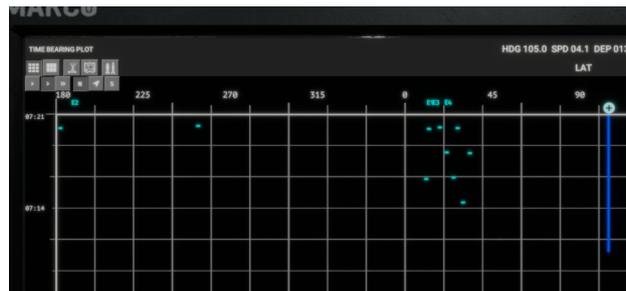
4. All RADAR electronic emissions are displayed on the map with the characteristics of the emitter where different color lines (white < yellow < red) denote the signal strength and direction of the threat.
5. Right of the map, there is a polar projection of all ESM contacts. It displays the contacts in relation to their strength and bearing. If there is no polar projection you can enable it by clicking on the DE button at the bottom of the display.
6. Below the map, there is a list of all RADAR

contacts detected by the ESM. Click on the one you are interested in (the line turns yellowish).

7. The DETAILS panel on the left gives you all the information about the RADAR (band, bearing, amplitude etc.).
8. Below the THREATS data panel under the CMS section, there is a TRACK button; click on it (the TRACK button turns yellowish).
9. The contact is now being automatically tracked and sent to the AN/BYG-1 Combat System.



10. If you go to the Fire Control Station [F9], choose either the TIME BEARING PLOT panel or the TARGET MOTION ANALYSIS panel, the ESM contact(s) appear with the prefix E (echo) followed by a number E1, E2, etc.



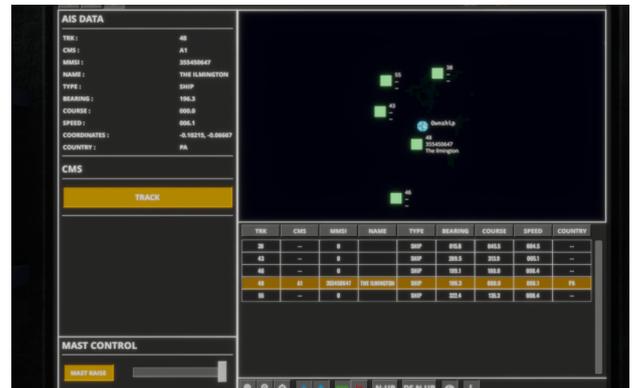
### NOTES

- Verify that you are no deeper than periscope depth to raise the ESM Mast.



## TRACK AIS CONTACTS

1. Press [F7] to go to the ESM Station.
2. On the top left, there are 3 icons (THREATS, COMMUNICATIONS and AIS). Click the right one. AIS should appear at the top left of the icons row.



3. On the lower left panel MAST CONTROL, click on the MAST RAISE button and drag the cursor to the right; the mast will be fully raised.
4. All ships (primarily civilian vessels) transmitting AIS appears on the map on the right with a green icon.
5. Below the map, there is a list of all AIS contacts received by the ESM receivers. Click on the one you are interested in (the line turns yellowish).
6. The AIS DATA panel on the left gives you all the information about the ship (name, course, speed etc.).
7. Below the AIS DATA data panel under the CMS section, there is a TRACK button; click on it (the TRACK button turns yellowish).
8. The contact is now being automatically tracked and sent to the AN/BYG-1 Combat System.

9. If you go to the Fire Control Station [F9], choose either the TIME BEARING PLOT panel or the TARGET MOTION ANALYSIS panel, the AIS contact(s) appear with the prefix A (alpha) followed by a number A1, A2, etc.



### NOTES

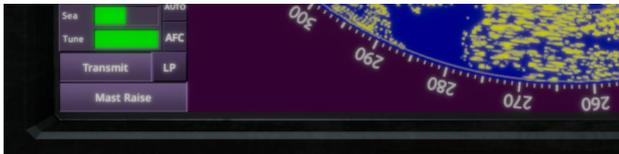
- Verify that you are no deeper than periscope depth to raise the ESM Mast.
- All vessels over 300 gross tonnage (GT) are required to transmit basic AIS information including name, course, speed and coordinates. For tactical reasons most military vessels usually keep their AIS transmitters secure.

## TRACK RADAR CONTACTS

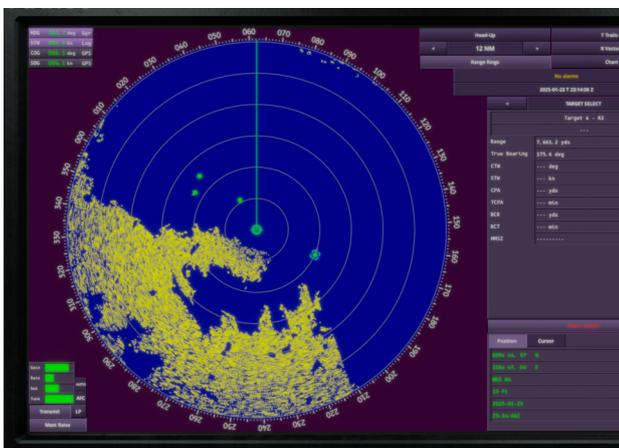
1. Press [F8] to go to the Radar Station.
2. On the bottom left click Mast Raise to raise the radar mast.



3. When the mast is raised and "Radar Standby" is shown on screen, click Transmit to start emitting.



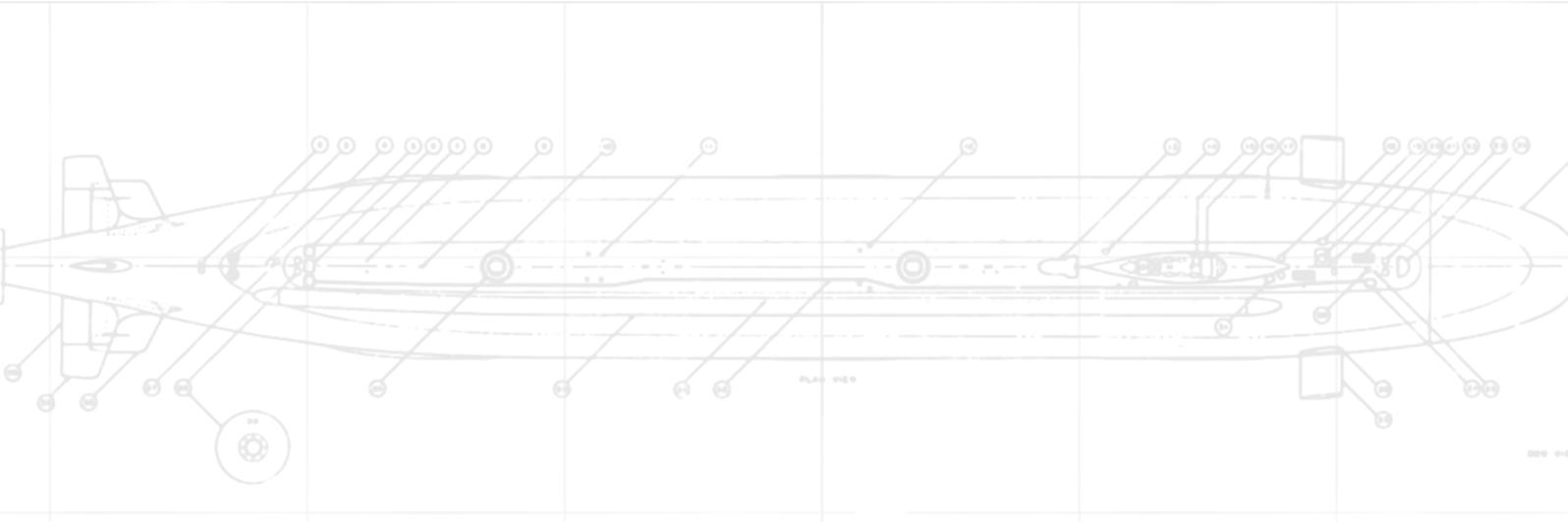
4. A few seconds later the display should display returns in the form of green squares.



5. Click on one to select it (the symbol is now framed). On the TARGET SELECT panel on the right you get basic information like range and bearing.
6. Below that panel click on the TRACK TARGET button.
7. The contact is now being automatically tracked and sent to the AN/BYG-1 Combat System.
8. If you go to the Fire Control Station [F9], choose either the TIME BEARING PLOT panel or the TARGET MOTION ANALYSIS panel, the Radar contact(s) appear with the prefix R (romeo) followed by a number R1, R2, etc.

### NOTES

- Always be at the surface when raising the radar mast.
- Both the AN/BPS-16 and AN/BPS-17 radar systems are designed for surface navigation and they cannot be operated submerged.
- Also they are not intended for fire control purposes although they are interfaced with the AN/BYG-1 submarine combat system.



**SECTION**

# 4. FIRE CONTROL



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## LOAD A TORPEDO TUBE

1. Go to the Fire Control Station [F9].
2. Select Weapons at the top selection (right most button).
3. Select the TUBES page from the second row of buttons at the top.
4. On the Virginia class submarines you have 4 torpedo tubes available, 2 and 4 on the port and 1 and 3 on the starboard.



5. If the tube is already loaded with a weapon like a Harpoon, click on the EMPTY button and wait until it stops flickering blue. It takes several minutes (> 5 minutes) for any weapon to be unloaded.
6. If the tube is empty after you launched a torpedo and you don't need to wire guide, update the solution or the presets, you can click on OPEN DOOR button to close it. Click on FLOOD TUBE to empty the tube of water; it will flicker blue. You can load a torpedo when it stops flashing.
7. Select the MK48 button; it will start to load the torpedo. It takes several minutes (> 5 minutes)



for the torpedo (or any other weapon ) to be loaded.

8. You can load any of the weapons available like MK-48 torpedoes, UGM-84 Harpoon anti ship missiles, UGM-109 Tomahawk land attack missiles and MK-67 SLMM mobile mines using the same procedure.

### NOTES

- Loading and unloading weapons in torpedo tubes is a very time consuming process that usually takes more than 5 minutes. It is wise to plan ahead before entering any offensive or defensive scenario.
- The tube pairs at each side use the same launch mechanisms and are connected with an interlock system. As such you can only open one door on each side at a time.
- Some weapons, like the MK-67 SLMM mobile mine, never got qualified to be launched from Virginia class submarines although they are compatible both with the torpedo tubes and the fire control system. They are added for gameplay purposes.
- VLS and VPT tubes are external to the pressure hall and can only be reloaded when docked.

## LAUNCH A MK48 ADCAP TORPEDO

1. Go to the Fire Control Station [F9].
2. Select Weapons at the top selection (right most button).
3. Select Tubes, and on the tubes screen, select a torpedo tube with a loaded torpedo.



4. Click on MAKE READY to power up the torpedo.
5. At the top click on MK48 to go to the torpedo management screen.
6. On the top right Selection panel select the tube ready to fire and the solution, e.g., S1 and click on Assign Solution.
7. Under the Presets change the torpedo presets if needed and depending on the target (e.g. surface) and click Updates Presets.
8. Go back to the TUBES screen.
9. Click on FLOOD TUBE, then when done OPEN DOOR and ARM.
10. Now click FIRE to launch the torpedo.
11. The torpedo is on its way. Do not close the



door (or make any hard maneuvers) or you will lose the wire and any post launch control with it.

12. After launch and while the wire is still connected to the torpedo you can return to the MK48 screen and monitor the weapon's progress, change presets, update solutions or take direct control of the torpedo.



### NOTES

- This guide assumes that you have a fire control solution ready and a tube loaded with a MK-48 torpedo.
- The MK-48 torpedo is designed to be launched at any depth or speed of the host submarine.

## LAUNCH A HARPOON ANTI SHIP MISSILE

1. Go to the Fire Control Station [F9].
2. On the selection buttons at the top, click on the Mission Planner (second button from the right) to open the page.
3. Under Selection on the right verify that the mission Type is ASM.
4. Under Plot select New and enter the Altitude and Coordinates for the initial waypoint. Alternative you can use the mouse cursor to input coordinates.



5. Enter additional waypoints as required and click Save. The final waypoint will indicate the angle of the seeker cone.
6. Select Weapons at the top selection (right most button) and then the TUBES page.
7. Click the MAKE READY button for the tubes loaded with Harpoons you intend to launch.
8. Select the HARP page again within Weapons.
9. Under Selection on the right and on the Tubes select the tube from step 7 and the mission previously saved on Mission and click the Assign Mission button.



10. Under Presets select the missile Attack Mode (HAM or Pop-Up) and click the Update Presets button.
11. Return to the TUBES page and in sequence FLOOD TUBE, OPEN DOOR and ARM the selected tubes.
12. Finally press FIRE to launch the weapon.
13. Each tube door can be closed 5 seconds after launch and drained and reloaded to expedite additional future launches.

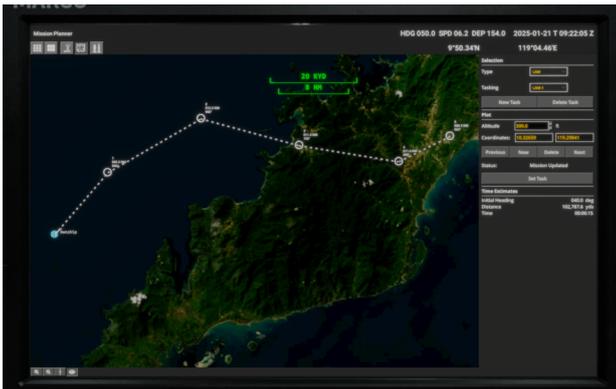


### NOTES

- This guide assumes that you have a tube loaded with a UGM-84 Harpoon missile.
- SOP dictates Harpoon launches should be from 150 feet or less and at speeds up to 10kts.

## LAUNCH A TOMAHAWK LAND ATTACK MISSILE

1. Go to the Fire Control Station [F9].
2. On the selection buttons at the top, click on the Mission Planner (second button from the right) to open the page.
3. Under Selection on the right verify that the mission Type is LAM.
4. Under Plot select New and enter the Altitude and Coordinates for the initial waypoint. Alternative you can use the mouse cursor to input coordinates.



5. Enter additional waypoints as required and click Set Task. The final waypoint will indicate the point of impact (target location) of the missile.
6. Select Weapons at the top selection (right most button) and then the TUBES page.
7. Click the MAKE READY button for the tubes loaded with the TLAMs you intend to launch.
8. Select the TLAM page again within Weapons.
9. Under Selection on the right and on the Tubes select the tube from step 7 and the mission previously saved on Tasking and click the Assign Tasking button.



10. Under Presets select the missile Attack Mode (HAM, Pop-Up or PWA) and click the Update Presets button.
11. Return to the TUBES page and in sequence FLOOD TUBE, OPEN DOOR and ARM the selected tubes.
12. Finally press FIRE to launch the weapon.
13. Each tube door can be closed 5 seconds after launch. If the launch tube was a torpedo tube and not a VLS or VPT it can be drained and reloaded to expedite additional future launches.

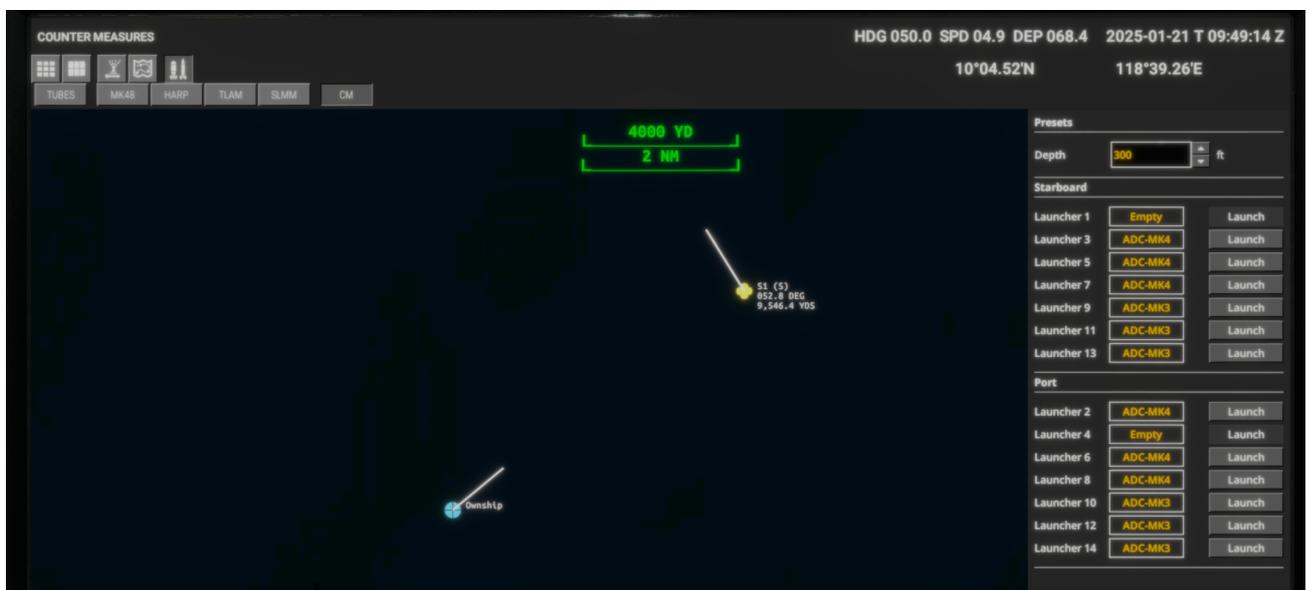


### NOTES

- This guide assumes that you have a tube (torpedo tube, VLS or VPT) loaded with a UGM-109 Tomahawk (TLAM) missile.
- SOP dictates TLAM launches should be from 150 feet or less and at speeds up to 10kts.

## DEPLOY COUNTERMEASURES

1. Go to the Fire Control Station [F9].
2. Select Weapons at the top selection (right most button).
3. Select the CM page from the second row of buttons at the top.



4. On the Virginia class submarines you have 14 6-inch external launchers for countermeasures, 7 on each dihedral plane (port and starboard).
5. At the Presets panel on the right select a preset Depth for the countermeasure to go to.
6. Below that panel you will see the type of countermeasure loaded on each of the launchers. You can launch it by pressing the Launch button next to the type.

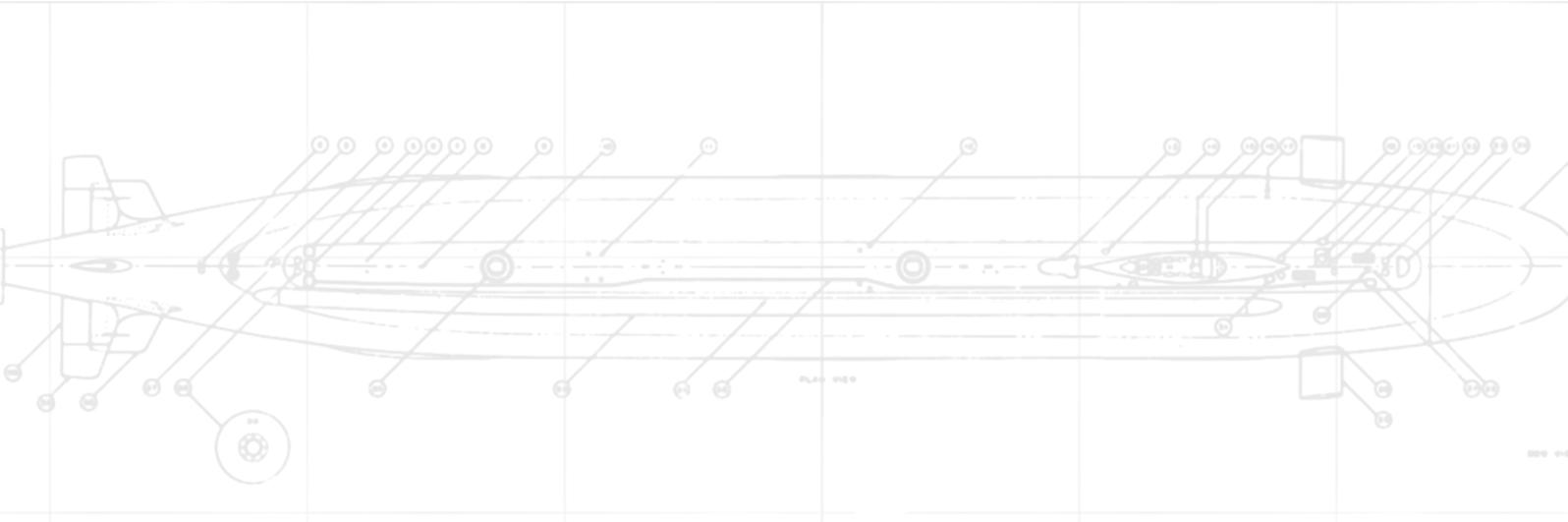
### NOTES

- The 6-inch external countermeasure launchers can only be reloaded when in port. Use your inventory carefully.
- Not all countermeasures are equally effective on all situations. In some cases launching a pair of different types gives the best chances of survival.
- Not all countermeasures hover at a preset depth. The ones that don't will ignore the depth preset and decent slowly from the launch depth.
- Some countermeasure type (e.g. noisemakers) might interfere with your own sensors as much as with the enemy's.

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SECTION

# 5. OPERATIONS



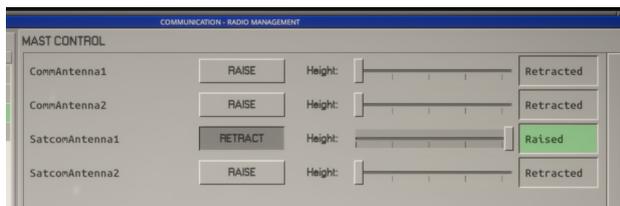
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## RECEIVE MISSION ORDERS OR MISSION UPDATES

1. Press [F10] to go to the Radio Station.
2. On the bottom, there are 3 buttons (Messages, Antenna Control and Information). Click on the Antenna Control.

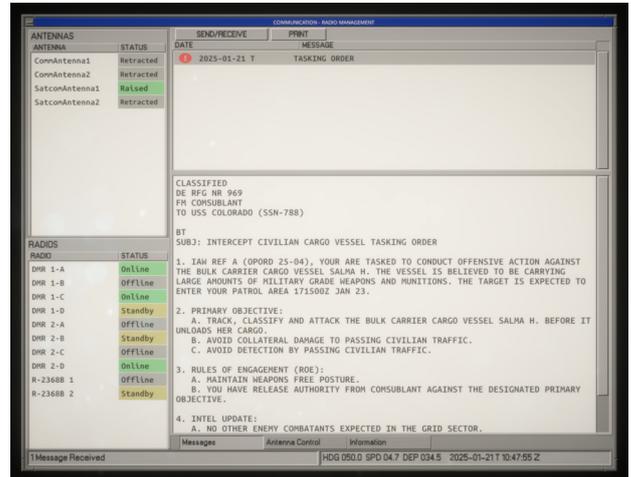


3. On the top left panel MAST CONTROL, click on the RAISE button on any of the two SATCOM masts and drag the cursor to the right; the mast will be fully raised.

4. If there is an available satellite one of the radios on the bottom left panel will connect and its status will turn to "Receiving". Since SATCOMs have relatively high data rate the connection might last for only a few seconds.



5. Go back to the messages panel by clicking on the Messages button.
6. Click on the SEND/RECEIVE button, located at the top to download all the messages. After all the messages are downloaded you are free to retract all masts and go to a safer depth.
7. By clicking on any title in the list you should see the full message in the central panel. The mission briefing is the one labeled "TASKING ORDER" but depending on the mission type, the weather and asset availability you may receive more messages containing mission updates.



8. For each message you can click the PRINT button at the top to send a copy to the Mission Log Palette located at the bottom left side of the main screen. This way you can read the message wherever you are without having to go back to the Radio Station.



### NOTES

- Verify that you are no deeper than periscope depth to raise any of the communication masts.
- Communication satellites transmit updates every 15 minutes. However for gameplay purposes you can receive the mission orders message as soon as you raise the SATCOM mast when a mission starts.
- By extending the trailing wire antenna you may receive messages deep through the ELF band. However the data rate is so low that only 3 letter coded messages can be received. Consult the relevant "ELF COMMUNICATION CODES" table for interpretation of the message.

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