

# USS PENNSYLVANIA (SSBN 735)



**Welcome Aboard**

# USS PENNSYLVANIA (SSBN 735)

## CHARACTERISTICS



LENGTH:	560.0 FEET
HULL DIAMETER:	42.0 FEET
DRAFT:	36.2 FEET
DISPLACEMENT (SUBMERGED):	18,750 TONS
MISSILE TUBES:	24
TORPEDO TUBES:	4
COMPLEMENT	
OFFICERS:	16
ENLISTED:	157
TOTAL:	173

USS PENNSYLVANIA has been developed based on extensive considerations of all aspects of survivability and capability required in a sea-based deterrent system designed for operations through the next century.

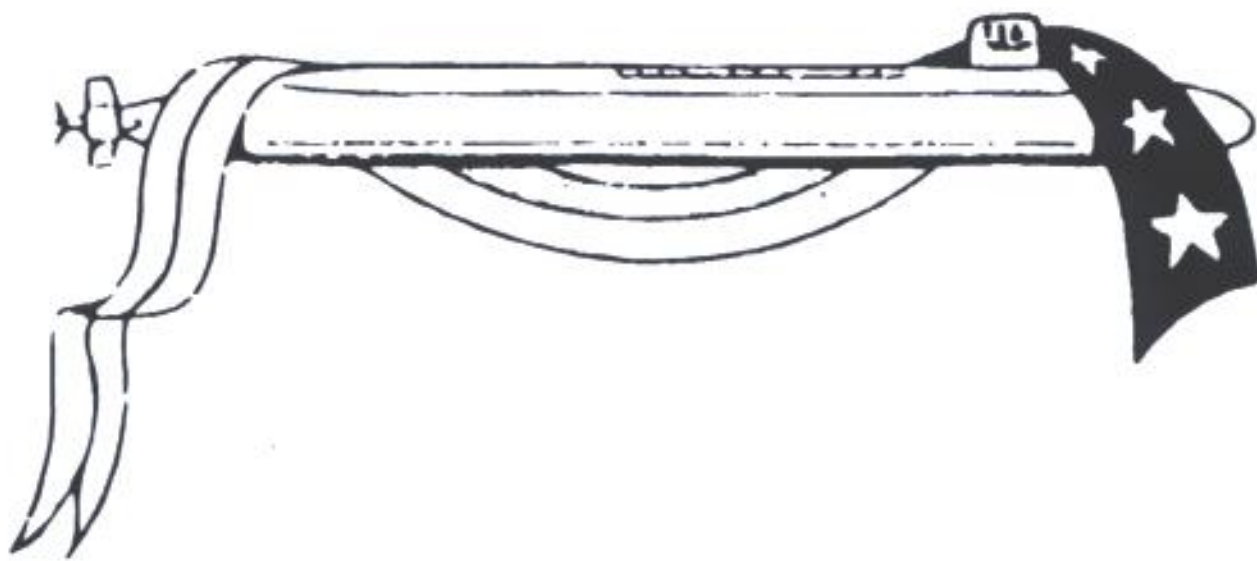
USS PENNSYLVANIA incorporates the new, more quiet machinery that cannot be installed in other fleet ballistic missile submarines because of space and weight constraints.

It has an advanced sonar system, comparable to that developed for the United States Navy's newest attack submarines, capable of providing long-range detection and a more effective tracking technique.

Key features of USS PENNSYLVANIA include: improved maintainability, reliability, and availability resulting from modular replacement concepts of major equipment, improved design, and incorporation of integrated logistics support.

USS PENNSYLVANIA has additional growth potential to accommodate future technology as it becomes available, both in ship systems and in larger missiles.

High patrol speeds will greatly increase ocean operating area, providing the ability to avoid potential enemies, thus enhancing survivability.



On behalf of the officers and crew of USS PENNSYLVANIA (SSBN 735), I wish to extend a warm welcome to our guests aboard one of America's largest and most sophisticated submarines. We are indeed proud of our ship and hope your time with us will be enjoyable.

I invite you to ask questions! You'll find that the entire crew is ready, willing and able to explain the details of their operational responsibilities and the routine of submarine life. You will find these men are highly trained and capable of fielding a wide variety of questions. They routinely match their collective skills against the power of the sea, and I believe you will be as impressed by them as you will be by the PENNSYLVANIA herself.

We hope during your stay aboard PENNSYLVANIA you'll get a thorough introduction to our nation's "Silent Service".

B. R. GEHRKE  
Commander, USN

M. D. BUDNEY  
Commander, USN



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**Michael D. Budney**  
**Commander, United States Navy**

# **Commander Michael D. Budney**

## **United States Navy**

Commander Michael D. Budney, a native of Horseheads, New York, received his commission from the United States Naval Academy in 1980, earning a Bachelor of Science degree in Physics.

Following nuclear power and basic submarine training, Commander Budney reported to USS FRANCIS SCOTT KEY (SSBN 657) (GOLD) in May 1982, where he served as Chemistry and Radiological Controls Assistant. FRANCIS SCOTT KEY conducted two strategic deterrent patrols and a refueling overhaul during his tour. In August 1985 he transferred to the Naval Postgraduate School in Monterey, California where he earned a Master of Science in Electrical Engineering, specializing in Communications Engineering.

After completion of the Submarine Officer Advanced Course, Commander Budney returned to sea duty in June 1988 as Navigation/Operations Officer aboard USS MEMPHIS (SSN 691). During his tour MEMPHIS conducted two Northern Atlantic deployments. In April 1991 he transferred to US SIMON LAKE (AS 33) in Holy Loch, Scotland, for assignment as Radiological Controls Officer. He also served as SIMON LAKE's Navigation/Operations Officer, from February to May 1992.

Commander Budney was next assigned as Executive Officer aboard USS MONTPELIER (SSN 765), from May 1993 to July 1995. During his tour MONTPELIER conducted a Mediterranean deployment with the THEODORE ROOSEVELT battlegroup, and won the 1994 and 1995 CINCLANTFLT Golden Anchor Awards. Commander Budney most recently served as the Special Assistant for Undersea Warfare on the CNO Executive Panel, from August 1995 to August 1997.

Commander Budney's awards include the Meritorious Service Medal (two awards), the Navy Commendation Medal (three awards), and the Navy Achievement Medal.

Commander Budney is married to the former Susan Marie Bauer of Horseheads, New York. They have two daughters, Christa and Kaitlyn.



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**Bradley R. Gehrke**  
**Commander, United States Navy**

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# **Commander Bradley R. Gehrke**

## **United States Navy**

Commander Gehrke, a native of Odebolt, Iowa, attended the United States Naval Academy where he earned a Bachelor of Science Degree in Electrical Engineering in 1980. Following graduation he completed Nuclear Power training and attended Submarine School.

In 1982, Commander Gehrke reported to USS NARWHAL (SSN 671) where he served as Damage Control Assistant and Operations Officer while deploying to the Mediterranean and North Atlantic. He then attended the Defense Language Institute and Naval Postgraduate School in Monterey, California where he earned a Master's Degree in National Security Affairs and gained proficiency in Mandarin Chinese.

Following completion of the Submarine Officer Advanced Course, Commander Gehrke reported for duty as Navigator aboard USS TECUMSEH (SSBN 628) from April 1988 to May 1991. During this tour, he completed six strategic deterrent patrols. He next served on the staff of Commander Submarine Group Six conducting tactical weapons certifications for the MK 48 ADCAP Torpedo and Tomahawk and Harpoon Missile Weapons Systems.

In July 1993, Commander Gehrke relieved as Executive Officer of USS SCRANTON (SSN 756). During his tour, he completed deployments to the Mediterranean and North Atlantic. His most recent assignment was at U.S. Atlantic Command in Norfolk, Va. working as a Current Operations Action Officer and Executive Assistant to the Director for Operations.

Commander Gehrke's awards include the Defense Meritorious Service Medal, the Meritorious Service Medal, Navy Commendation Medal (four awards) and the Navy Achievement Medal.

Commander Gehrke is married to the former Susie Rast of Charleston, SC. They have two daughters, Brittany and Lauren.

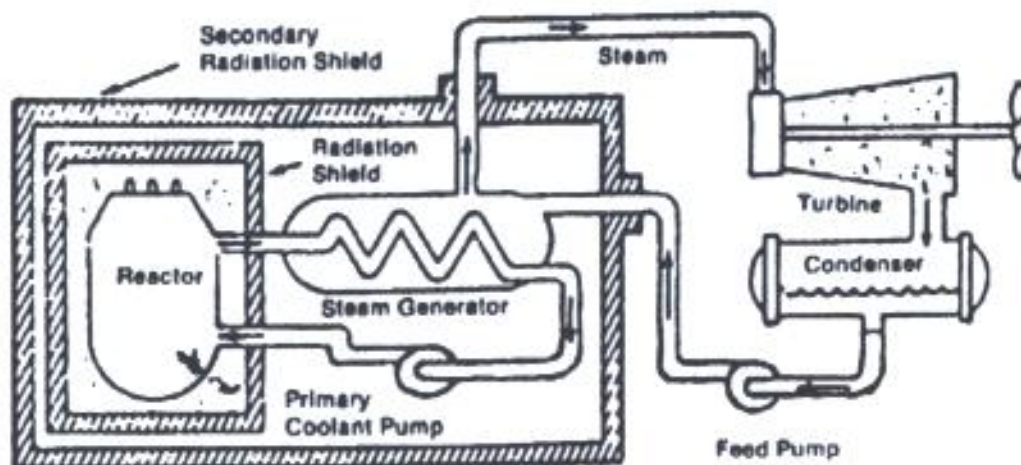
# DESCRIPTION OF NAVAL NUCLEAR PROPULSION PLANTS

The propulsion plant of a nuclear powered ship is based upon use of a nuclear reactor to provide heat. The heat comes from the fissioning of nuclear fuel contained within the reactor. Since the fissioning process also produces radiation, shields are placed around the reactor so that the crew is protected.

The nuclear propulsion plant in this ship uses a pressurized water reactor design which has two basic systems: The primary system and the secondary system. The primary system circulates ordinary water and consists of the reactor, piping loops, pumps and steam generators. The heat produced in the reactor is transferred to the water under high pressure so it does not boil. This water is pumped through the steam generators and back into the reactor for reheating.

In the steam generators, the heat from the water in the primary system is transferred to the secondary system to create steam. The secondary system is isolated from the primary system so that the water in the two systems does not intermix.

In the secondary system, the steam flows from the steam generators to drive the turbine generators, which supply the ship with electricity, and to the main propulsion turbines, which drive the propeller. After passing through the turbines, the steam is condensed into water which is fed back to the steam generators by the feed pumps. Thus, both the primary and secondary systems are closed systems where water is recirculated and reused.



There is no-step in the generation of this power which requires the presence of air or oxygen. This allows the ship to operate completely independent from the earth's atmosphere for extended periods of time.



## HOW A SUBMARINE IS ORGANIZED

Few modern institutions can rival the nuclear submarine for complexity and absolute self-sufficiency. The often inhospitable environment of the vast sea only intensifies the need for coordination of each crewman's activities. The keystone of the submarine organization is the Commanding Officer, the Captain of the ship. The responsibility for each operation of the submarine, in fact, the responsibility of each individual aboard, converge at the command level and create the Commanding Officer's ultimate charge: to successfully carry out the missions assigned. Whatever measures are required, in his judgement, to accomplish this task, the Commanding Officer is empowered to employ. It is this necessary conferral of discretion in an isolated circumstance that lends to the submarine command a sense of creativity and individuality.

Second in command is the Executive Officer, always next senior in rank to the Captain and not far from attaining his own command. The Exec, or XO, as he is informally called, offers his wide ranging experience to the submarine organization through direct coordination of the administrative and training activities of the ship. His knowledge and position extend his responsibilities and interests to every aspect of submarining.

The remainder of the ship's force is composed of six departments: Navigation/Operations, Strategic Weapons, Engineering, Tactical Systems, Supply and Medical. The first four are ordinarily led by the more senior officers of the ship who rank just below the Executive Officer. The more junior officers are assigned within these departments to act as division officer. Divisions are the smallest organizational units aboard, and consist of groups of enlisted specialists organized according to skills.

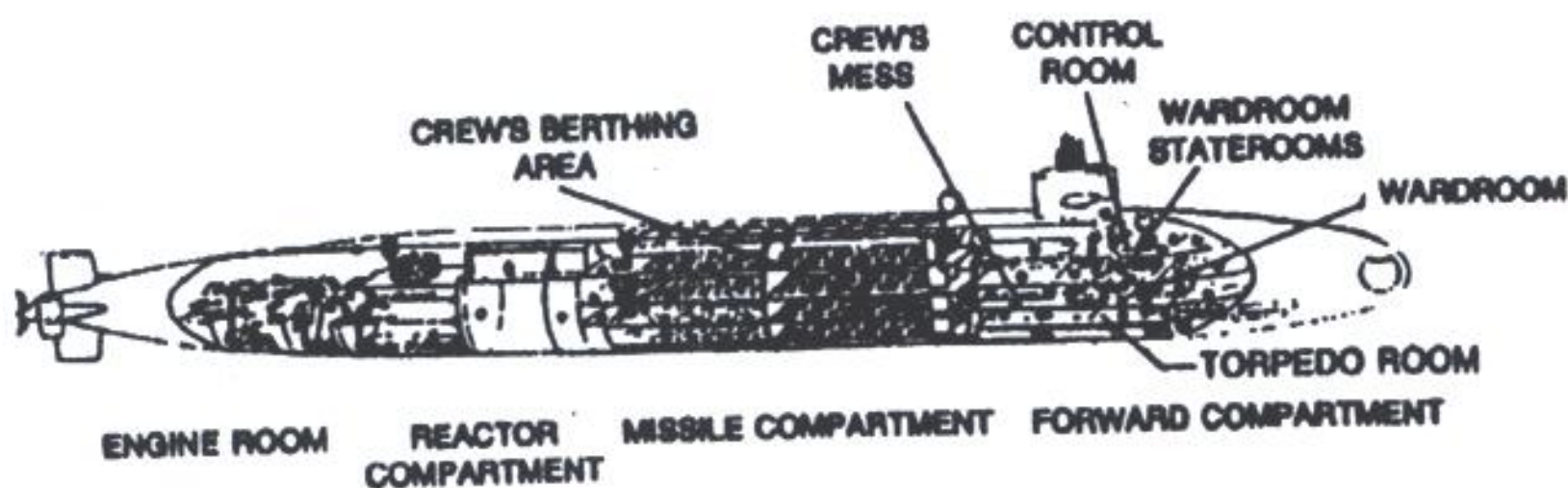
Every piece of material on the ship from the propeller to the paint job is assigned to a division and finally to an individual technician for its care. Each of these men soon becomes an expert not only in the technical functions to which his special training has been directed, but also in the demands of administration, leadership and instruction of his shipmates.

There is a second organization aboard the ship: the watch organization. Whereas the first organization is designed to maintain equipment, train and administer to the various groups of men, the watch organization is designed to conduct and coordinate the actual operations of the ship around the clock. This organization is ordinarily divided into three similar groups called sections. At any given time on the submarine one of these sections "has the watch". Each watch section is headed by the Officer of the Deck who carries out the Commanding Officer's orders during the hours of his watch. It is the Officer of the Deck who orders the ship's course, speed and depth, and conducts all combined shipboard evolutions. He is assisted by a second officer, the Engineering Officer of the Watch, who controls the reactor plant and all engineering evolutions in the propulsion plant.

Each watch section consists, for example, of helmsmen, who steer the ship; throttle men, to control the steam turbine engines; sonar operators, who silently probe the ship's environs; reactor operators, who control the ship's remarkable energy source; missile technicians, to service and launch PENNSYLVANIA's missiles; radio operators, who continually maintain an invisible link with command centers ashore; and electricians, who supply power from the reactor for virtually every service on the ship. These watchstanders, among others, stand alertly by their equipment and stations throughout the duration of each watch.

The tempo of the watch is the heartbeat of the ship and, since one third of a submariner's time is spent standing his watch, it is also the principal determinant of his day to day routine.

## GENERAL LAYOUT OF THE SHIP



# A DAY IN THE LIFE OF A SUBMARINER

George Lee is a fictitious name for a typical PENNSYLVANIA submariner. He is, we will imagine, a second class Quartermaster. As such, he works in the Quartermaster Division in the Navigation Department. (In the Navy, quartermasters are specialists in navigation.)

Today he has the 0600 to 1200 watch (6 a.m. to 12 p.m.). George is awakened at 0430 by messenger; this gives him 60 minutes to perform necessary personal hygiene, dress and have breakfast before reporting to the watch at 0530. In keeping with a tradition, he reports to his watch station in the control room 30 minutes before his watch begins in order to be briefed on the activities occurring during the previous watch and those anticipated during the upcoming watch. During his six hour watch, Quartermaster Lee plots the ship's position on the chart and assists the Officer of the Deck by recording and maintaining the ship's log.

Also during his watch, several unannounced ship's drills are conducted to test the crew's reaction to casualty and combat situations of various sorts: fire, flooding, loss of power, toxic gas, and so on. Every drill is an "all hands" effort, even those catching up on lost sleep are summoned by the ship's alarm. Fire hoses are unrolled, medical bags opened, gas masks worn, equipment operated; nothing that can possibly be done to enhance the realism is neglected.

Once his watch is completed and he is relieved, George cleans up for the noon meal. Today's meal is followed by a short cleanup period, a critique of the day's drills, then General Military Training in the Crew's Mess. A "School of the Boat" lecture is then given by the Auxiliary Division Chief Petty Officer on the ship's hydraulic system. Since he is submarine qualified, George passes on the lecture in order to spend some time preparing for the upcoming Petty Officer First Class advancement examination. At 1500 (3 p.m.), he has an appointment to examine a newly reported seaman on his knowledge of the ship's periscopes and antennas, for the seaman's submarine qualifications. Upon completion, George's immediate supervisor, a Chief Quartermaster, directs him to make some changes to several navigation charts and publications and to prepare an order for some new training materials, which lasts until just past dinner.

The movie after dinner is one George has seen so he reads a few pages of a best selling Western novel he obtained from the ship's library, dozing off for a few hours sleep before being called upon to stand his next watch - the mid watch, from midnight until six in the morning.

The schedule of our mythical George Lee is not at all imaginary nor exceptional. It is typical of what a submariner does during a usual workday at sea. It is perhaps a fair answer to the oft posed question: "What on earth do you do out there for sixty five days?"

## **INFORMATION FOR THOSE RIDING UNDERWAY**

**DINING:** The messing schedule will be provided. The first thirty minutes following the start of the mess hour is reserved for watch reliefs. Food is not allowed to be taken to any space other than the Crew's Mess or Wardroom.

**BUNKING:** Please use only your assigned bunk. If you have any problems, please contact the Chief of the Boat. If you would like to be awakened at a certain time, leave your name with the Chief of the Watch located in the control room.

**LAUNDRY:** If, due to abnormal circumstance, you should require the use of the ship's laundry facilities please contact the Chief of the Boat.

**HEAD:** Please avoid excessive consumption of potable water. If you shower, take a Navy shower. Insure no articles such as pencils, cigarette butts, rags, etc., fall into the commode, as such articles can foul the valves and/or piping associated with the sanitary system. Flush all commodes thoroughly.

**SMOKING:** Smoking is restricted to the after starboard corner of Auxiliary Machinery Room Number One and is further restricted to only 5 active smokers at any one time.

# **GENERAL INFORMATION FOR ALL VISITORS**

**WARNING SIGNS:** Please observe all warning signs. Consult a member of ship's force for assistance in any matter.

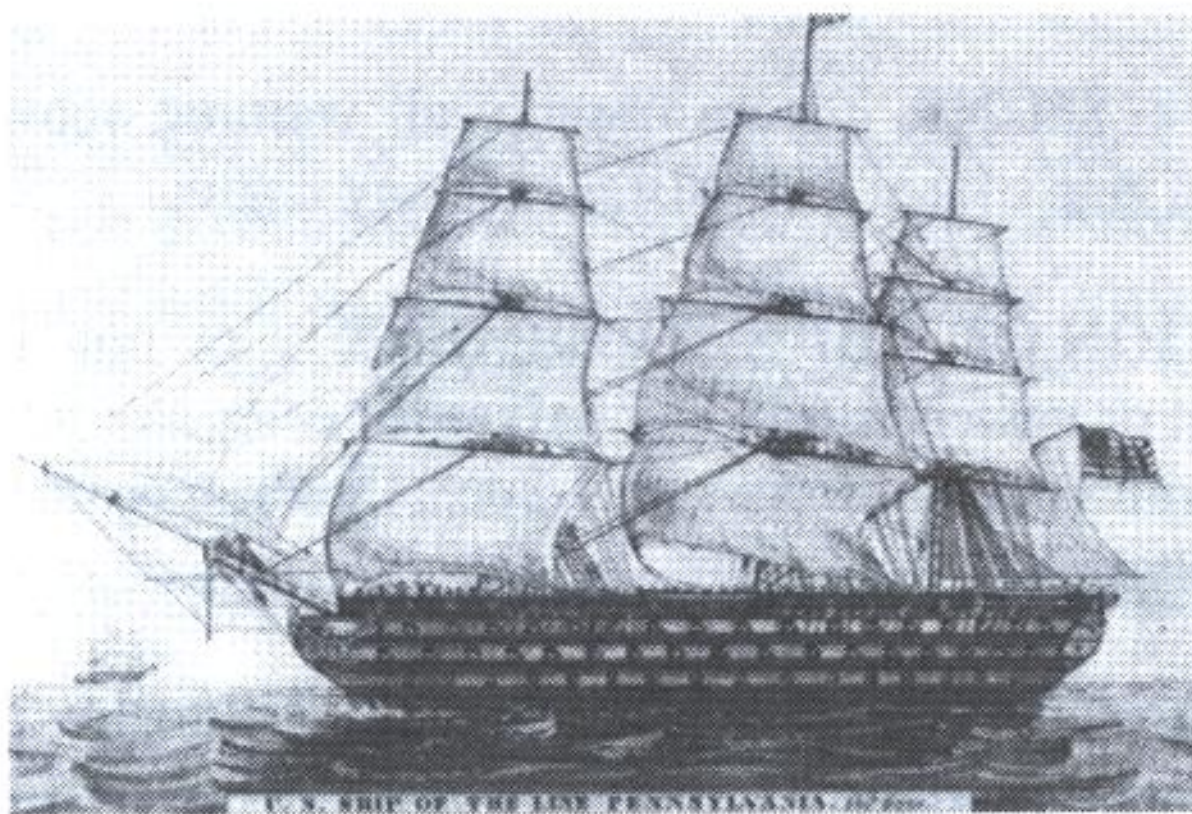
**OPERATION OF SHIP'S EQUIPMENT:** Do not operate any equipment or switches, turn any valves, or enter any restricted areas without prior approval from ship's force. Observe posted precautions and procedures.

**EMERGENCIES:** Should any emergency situation arise, alarms will be sounded and the word will be passed over the Ship's General Announcing System. You are requested to **STAND FAST BUT CLEAR** of any passageways and operational spaces. Do not obstruct ladders, hatches or the watertight door. Please follow the instructions of the man in charge of the scene without hesitation.

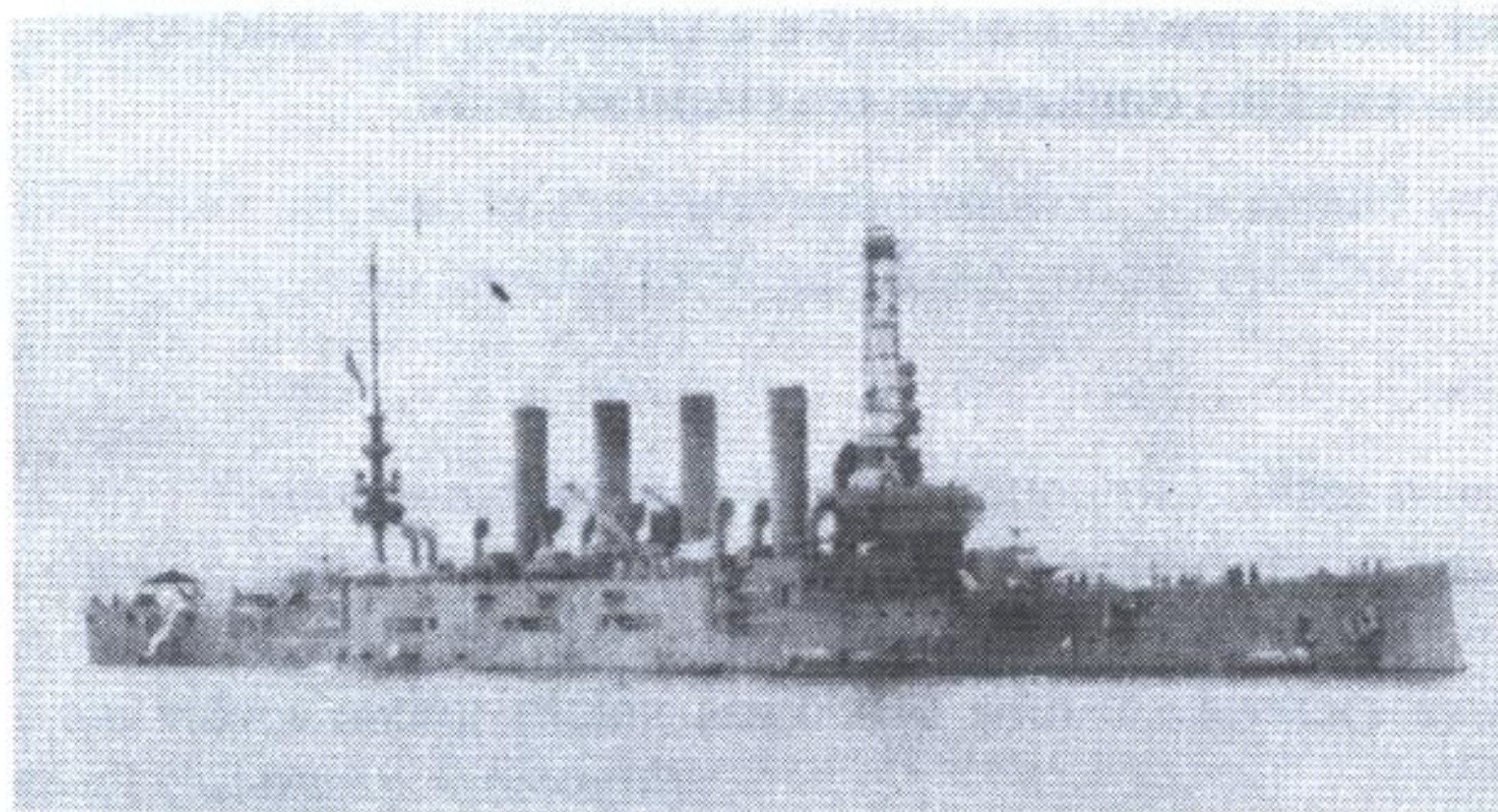
**SECURITY:** Certain aspects of the ship's operation characteristics and certain areas of the ship are classified. The Radioroom, Sonar Room and the Engineroom are classified areas.

# HISTORY OF SHIPS NAMED PENNSYLVANIA

From warship to cruiser, and into the modern era of the submarine...the call has long gone out for "Good Men" to serve on ships named PENNSYLVANIA.



There have been three commissioned Navy vessels named *Pennsylvania* before the present Ohio-class submarine. The first *Pennsylvania* was the largest sailing warship built for the United States Navy. It was launched in July of 1837 from the Philadelphia Navy Yard. After 24 years of service, it was burned to the waterline in 1861 to prevent it from falling into Confederate hands during the Civil War.



Another vessel called *Pennsylvania* was a cruiser (Armored Cruiser 4), built in Philadelphia in 1901, which opened a new era of naval aviation when a plane landed and took off from a platform on its afterdeck in the winter of 1910-1911. In order to clear the use of its name for another vessel, the cruiser was renamed *Pittsburgh* in 1912.



The most enduring ship to bear the name Pennsylvania was a battleship (BB 38), commissioned in 1916. It was one of the most successful ships of the Dreadnought design, known for its simplicity and high standard of excellence. This Pennsylvania originally joined the Atlantic fleet, carrying such important dignitaries as President Woodrow Wilson, Vice-President Thomas Marshall, and various cabinet members. In 1920, it joined the Pacific fleet and became the flagship of the combined fleets.

The battleship *Pennsylvania* was in drydock in Pearl Harbor on December 7, 1941, when the Japanese torpedo planes and dive bombers attacked. It was one of the first ships to start retaliation; nevertheless, it was damaged and had to undergo repairs in San Francisco. Involved in the Aleutian campaign in 1943, Pennsylvania also formed forces of battleships for assaults and occupations of various islands in the Pacific.

In the end, a Japanese torpedo plane caused Pennsylvania to be taken out of active service, whereupon it served as a target ship for atomic bomb tests at Bikini, until being decommissioned in 1946. It received eight battle stars for its service during World War II.



# U.S.S. PENNSYLVANIA

THE FOURTH SHIP TO BEAR THE NAME

THE FIRST PENNSYLVANIA WAS THE LARGEST SAILING WARSHIP EVER BUILT FOR THE UNITED STATES NAVY. LAUNCHED FROM THE PHILADELPHIA NAVY YARD IN 1837, THE 105 GUN VESSEL REMAINED IN SERVICE FOR 24 YEARS

THE SECOND, AN ARMORED CRUISER, WAS BUILT IN PHILADELPHIA IN 1901. THIS VESSEL OPENED A NEW ERA IN NAVAL AVIATION WHEN IN THE WINTER OF 1910 - 1911 A PLANE LANDED AND TOOK OFF FROM A PLATFORM ON HER AFTERDECK. SHE WAS RENAMED PITTSBURGH IN 1912 TO CLEAR THE NAME FOR THE BATTLESHIP BB-38

THE THIRD WAS A BATTLESHIP, COMMISSIONED IN 1916. BB-38 SERVED IN BOTH WORLD WARS AND WAS IN PEARL HARBOR ON DECEMBER 7, 1941. SUFFERING REPEATED DAMAGE FROM ATTACKING JAPANESE TORPEDO PLANES AND DIVE BOMBERS. SHE WAS ONE OF THE FIRST SHIPS TO RETURN FIRE. AFTER REPAIRS, THE BATTLESHIP WENT ON TO PARTICIPATE IN A NUMBER OF MAJOR PACIFIC OPERATIONS AND EARNED EIGHT BATTLE STARS FOR WORLD WAR II SERVICE. ON AUGUST 12, 1945, SHE WAS SEVERELY DAMAGED BY A JAPANESE TORPEDO BOMBER IN BUCKNER BAY, OKINAWA. PENNSYLVANIA, AFTER TEMPORARY REPAIRS, CONTINUED TO SERVE UNTIL AUGUST 1946 WHEN SHE WAS DECOMMISSIONED.

USS PENNSYLVANIA (SSBN735) IS THE TENTH OHIO CLASS NUCLEAR POWERED BALLISTIC MISSILE SUBMARINE.



## USS PENNSYLVANIA

NUCLEAR POWERED FLEET BALLISTIC MISSILE SUBMARINE  
NAMED IN HONOR OF THE STATE OF  
PENNSYLVANIA

BUILT BY  
**GENERAL DYNAMICS**  
*Electric Boat Division*  
GROTON CONNECTICUT

KEEL LAID                                MARCH 2, 1987  
LAUNCHED                                APRIL 23, 1988  
COMMISSIONED                        SEPTEMBER 9, 1989

CHRISTENED APRIL 23, 1988 BY  
MARILYN K. GARRETT





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