SSN-688 Los Angeles-class

The LOS ANGELES class SSN specifically included ASW against Soviet submarines trying to sink the US carrier and ASUW against capital ships in the Soviet surface action group [SAG]. The LOS ANGELES class SSN was designed almost exclusively for Carrier Battlegroup escort; they were fast, quiet, and could launch Mk48 and ADCAP torpedoes, Harpoon Anti-Ship Missiles (no longer carried), and both land attack and anti-ship (no longer carried) Tomahawk cruise missiles. The new submarines showed another step improvement in quieting and an increase in operating speed to allow them to support the CVBG. Escort duties included conducting ASW sweeps hundreds of miles ahead of the CVBG and conducting attacks against the SAG.

Submarines of the LOS ANGELES Class are among the most advanced undersea vessels of their type in the world. While anti-submarine warfare is still their primary mission, the inherent characteristics of the submarine's stealth, mobility and endurance are used to meet the challenges of today's changing global geopolitical climate. Submarines are able to get on station quickly, stay for an extended period of time and carry out a variety of missions including the deployment of special forces, minelaying, and precision strike land attack.

These 360 foot, 6,900-ton ship are well equipped to accomplish these tasks. Faster than her predecessors and possessing highly accurate sensors, weapons control systems and central computer complexes, the LOS ANGELES Class is armed with sophisticated MK-48 Advanced Capability anti-submarine/ship torpedoes, Tomahawk land attack cruise missiles, and mines.

These submarines were built in three successive variants:

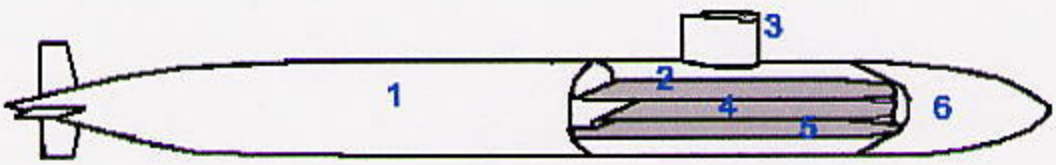
- SSNs 618-718 - Orginal Los Angeles class
- SSNs 719-750 - Starting with SSN 719 and beyond the last 31 hulls of the class have 12 vertical launch tubes for the Tomahawk cruise missile, along with an upgraded reactor core.
- SSNs 751-773 - The final 23 hulls [SSN 751 and later] referred to as "688I" (for improved), are quieter, incorporate an advanced BSY-1 sonar suite combat system and the ability to lay mines from their torpedo tubes. They are configured for under-ice operations in that their forward diving planes have been moved from the sail structure to the bow and the sail has been strengthened for breaking through ice.

The USS MEMPHIS (SSN 691) has been modified to serve as a test and evaluation platform for advanced submarine systems and equipment, while retaining her combat capability.

The submarines are outfitted with a wide variety of antennas, transmitters and receivers necessary to support accomplishment of their assigned tasks. Interior communication is possible on a wide range of

circuits and sound powered phones which do not require electrical power and are reliable in battle situations. Various alarm and indicating circuits enable the Officer of the Deck and the Engineering Officer of the Watch to continuously monitor critical parameters and equipment located throughout the ship.

The nuclear power plant gives these boats the ability to remain deployed and submerged for extended periods of time. To take advantage of this, the ship is outfitted with auxiliary equipment to provide for the needs of the crew. Atmosphere control equipment replenishes oxygen used by the crew, and removes carbon dioxide and other atmosphere contaminants. The ship is equipped with two distilling plants which convert salt water to fresh water for drinking, washing and the propulsion plant. Sustained operation of the complex equipment and machinery on the ship requires the support of repair parts carried on board. The ship carries enough food to feed a crew of over one hundred for as long as 90 days.



Los Angeles class submarines are divided into two watertight compartments. The forward compartment houses all the living spaces, weapons systems, control centers, and sonar/fire control computers. The after compartment houses the nuclear reactor and the ship's propulsion equipment.

1. Engine Room. The engine room houses all the propulsion machinery, as well as the Ship's Service Turbine Generators that supply the ship's electricity, and the evaporator, which distills water for the propulsion plant and other shipboard use.

2. Control Room/Attack Center. Located in the upper level of the forward compartment is the control room--the heart of the ship. The Officer of the Deck stands his watch here, controlling all activities on board. In control, the ship's location is continually determined and plotted, the course and depth are controlled, and all sonar contacts are tracked. The control room also functions as the attack center, where all of the ship's weapon systems are controlled from.. The sail helps to add stability to the submerged vessel. Additionally it houses all of the periscopes and antennae. In the forward top portion of the sail is the bridge. When the ship is on the surface, the Officer of the Deck will shift his watch to the bridge. Here he has clear view of all the surrounding waters, in addition to getting a breath of fresh air and seeing the welcome sun.

4. Mess Decks, Berthing, and Wardroom. The middle level of the forward compartment is dedicated to the crew's living spaces. Here is found the mess decks and galley which, when underway, serve four meals a day, one every six hours (allowing for all watchstanders to get a hot meal). Also here are the berthing spaces. Here is the only personal space that a crewman gets--his bed (known as a "rack". These racks are stacked three tall throughout the berthing spaces and have only a curtain to close them off from the rest of the boat. With this as the only private area on board, it is not uncommon to find pictures of family and friends put up on the wall in a rack along with personal cassette and CD players for entertainment. The wardroom> is the officers own room. Here is a big table around which the officers eat, train, and work

5. Torpedo Room. The lower level of the forward compartment is the Torpedo Room. This room stores the ship's weapons which include Mk48 ADCAP torpedoes, Tomahawk cruise missiles, and mines. The

torpedo room houses the handling equipment and access to the ship's four torpedo tubes. Weapons are moved from their stowage positions, loaded into the tubes, and readied for launch all in this room by the ship's Torpedomen. The torpedo room also houses controls for the vertical launch tubes which add 12 more Tomahawk cruise missiles to the ship's load.

6. Sonar Sphere. Housed in the very forward end of the submarine is the sonar sphere. This is an array of over 1,000 hydrophones which makes up part of the advanced BQQ-5E sonar suite. Out in front of the ship, positions the sphere as far as possible from the ship's own noise, thereby giving it the best listening conditions.

SSN 688-class submarines, which will comprise 68% of the attack submarine force in 2015, must be modernized to ensure that they remain effective against increasingly sophisticated undersea adversaries. The use of COTS and open systems architecture (OSA) will enable rapid (annual) updates to both software and hardware, and the use of COTS-based processors means that sonar system computing power can grow at the same rate as commercial technology.

The creation of the Acoustic Rapid COTS Insertion (A-RCI) program was based on a detailed review of the U.S. acoustic advantage compared to foreign nuclear and diesel electric submarines. This program is the centerpiece of the Los Angeles (SSN 688)-class modernization effort. SSN 688 class submarines, which will comprise 68% of the attack submarine force in 2015, must be modernized to ensure that they remain effective when operating against increasingly sophisticated undersea adversaries. The use of COTS and Open Systems Architecture (OSA) will enable rapid (annual) updates to both software and hardware, and the use of COTS-based processors means that sonar system computing power can grow at the same rate as the commercial world.

A-RCI is a four phased transformation of existing sonar systems (AN/BSY-1, AN/BQQ-5, or AN/BQQ-6) to a more capable and flexible COTS/OSA-based system. It also will provide the submarine force with a common sonar system. The process is designed to minimize the impact of fire-control and sonar system upgrades on a ship's operational schedule, and will be accomplished without the need for major shipyard availabilities. Phase I, which commenced in November 1997, will enhance towed-array processing. Phase II will provide additional towed- and hull-array software upgrades. Phase III will upgrade the spherical array, and Phase IV will upgrade the high-frequency sonar system on SSN 688I-class submarines. Each phase will install improved processing and control and display workstations. The current installation plan completes all SSNs through Phase III by FY03.

Between 1998 and 2001 the US will retire 11 Los Angeles class submarines that have an average of 13 years left on their 30-year service lives. SSN-688 class submarines could operate for much longer than 30 years; one of the shipbuilders stated that 10 to 20 years of additional service would not be unreasonable. Past Navy actions indicate that extending a submarine's service life may be feasible. After a 5-year study was completed on the SSN-637 class submarine--the predecessor of the SSN-688 class--the design life was extended from 20 years to 30 years, with a possible extension to 33 years on a case-by-case basis. The 18 SSN-688 class submarines that will be refueled at their mid-life could make good candidates for a service life extension because they could operate for nearly 30 years after the refueling. After these submarines serve for 30 years, they could undergo a 2-year overhaul and serve for one more 10-year operating cycle, for a total service life of 42 years. The cost for the additional overhaul of SSN-688 class submarines would be about $406 million per boat.

Eight older Los Angeles-class submarines, without a vertical launch system, could be refueled at a cost of $210 million more than it would cost to inactivate them.

- FY2000 - SSN 713 Houston
- FY2001 - SSN 698 Bremerton
- FY2001 - SSN 699 Jacksonville
- FY2001 - SSN 714 Norfolk
- FY2005 - SSN 716 Salt Lake City
- FY2006 - SSN 717 Olympia
- FY2007 - SSN 718 Honolulu
- FY2008 - SSN 710 Augusta

These submarines can still be used in strike missions, however, by firing Tomahawk land attack missiles through their torpedo tubes.

The existing DOD guidance calls for a force of 50 attack submarines, although some studies have called for raising the number of subs to as many as 72. Existing plans are sufficient to meet the goal of 50 boats, although higher numbers would require modification to these plans. According to Navy secretary Richard Danzig, as of October 1999 the Joint Chiefs of Staff were studying options for increasing the size and capability of the submarine force. The three options under review include by converting older Ohio-class SSBN submarines to so-called SSGNs at a cost of $420 million; refueling and extending by 12 years the service life of perhaps eight Los Angeles-class (SSN 688) subs at a cost per copy of $200 million; or building new Virginia-class (SSN 774) subs at a rate of at least four over the next five years, at a cost of roughly $2 billion per boat. The FY2000 Defense Authorization bill requires the Navy to study converting four of the oldest Tridents to the new SSGN configuration.

The JCS Submarine Force Structure Study, completed in November 1999, concluded that the optimal force structure would be 68 attack submarines by 2015 and 76 by 2025, with the minimum being at least 55 by 2015 and 62 by 2025. The first would be to refuel some Los Angeles-class submarines previously scheduled to be decommissioned.

Specifications

Builders	Newport News Shipbuilding Co. General Dynamics Electric Boat Division.
Power Plant	One S6G reactor one shaft at 35,000 shp Improved Performance Machinery Program Phase I [on 688 Improved]
Length	360 feet (109.73 meters)
Beam	33 feet (10 meters)
Displacement	6,927 tons (6210 metric tons) submerged
Speed	Official: 20+ knots (23+ miles per hour, 36.8 +kph) Actual: 30-32 knots maximum submerged speed
Operating Depth	official: "greater than 800 feet" Actual: 950 feet [300 meters] test depth Actual: 1475 feet [450 meters] collapse depth
Hull	HY-80 Steel
Crew	13 Officers, 116 Enlisted

	Departments Combat Engineering Executive NAVOPS Medical Supply
Armament	Harpoon and Tomahawk ASM/LAM missiles from VLS tubes MK-48 torpedoes from four 533-mm torpedo tubes (*Seawolf* has 8)
Combat Systems	AN/BPS-5 surface search radar AN/BPS-15 A/16 navigation and fire control radar TB-16D passive towed sonar arrays TB-23 passive "thin line" towed array AN/BQG-5D wide aperture flank array AN/BQQ-5D/E low frequency spherical sonar array AN/BQS-15 close range active sonar (for ice detection); MIDAS Mine and Ice Detection Avoidance System SADS-TG active detection sonar Type 2 attack periscope (port) Type 18 search periscope (starboard) AN/BSY-1 (primary computer); UYK-7; UYK-43; UYK-44 WLR-9 Acoustic Intercept Receiver ESM
Unit Cost	$900 million [1990 prices]
Unit Operating Cost Annual Average	~$21,000,000 [source: [FY1996 VAMOSC]

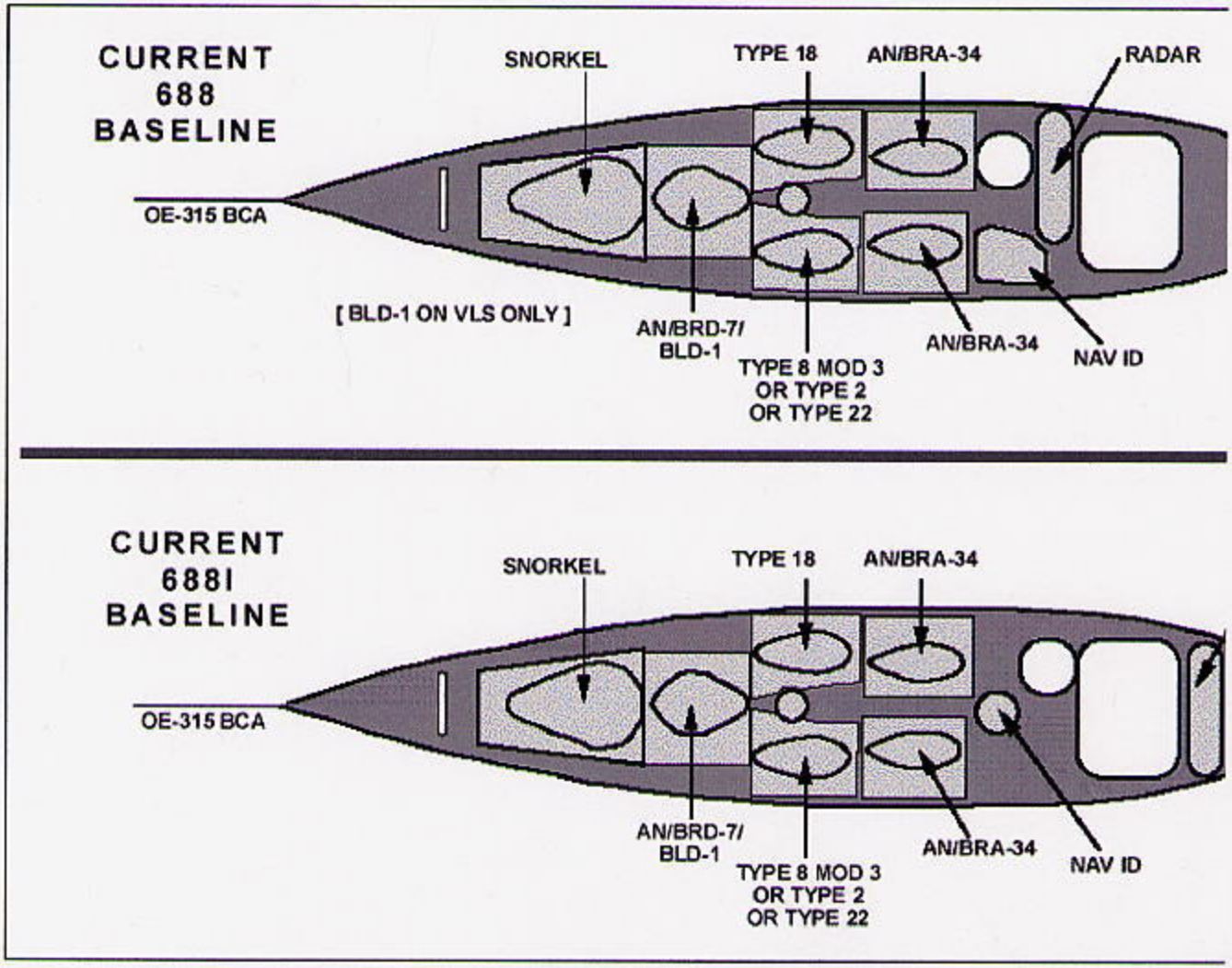
Ships

Name	Number	Builder	Homeport	Ordered	Commissioned	Decom
Los Angeles	SSN 688	Newport News	Pearl Harbor	08 Jan 1971	13 Nov 1976	
Baton Rouge	SSN-689	Newport News	Norfolk	08 Jan 1971	25 Jun 1977	13 Jan
Philadelphia	SSN 690	Electric Boat	Groton	08 Jan 1971	25 Jun 1977	
Memphis	SSN 691	Newport News	Groton	04 Feb 1971	17 Dec 1977	
Omaha	SSN-692	Electric Boat	Pearl Harbor	31 Jan 1971	11 Mar 1978	05 Oct
Cincinnati	SSN-693	Newport News	Norfolk	04 Feb 1971	10 Jun 1978	29 Jul
Groton	SSN-694	Electric Boat	Groton	31 Jan 1971	08 Jul 1978	07 Nov

Birmingham	SSN-695	Newport News	Pearl Harbor	24 Jan 1972	16 Dec 1978	22 Dec
New York City	SSN-696	Electric Boat	Pearl Harbor	24 Jan 1972	03 Mar 1979	30 Apr
Indianapolis	SSN 697	Electric Boat	Pearl Harbor	24 Jan 1972	05 Jan 1980	17 Feb
Bremerton	SSN 698	Electric Boat	Pearl Harbor	24 Jan 1972	28 Mar 1981	
Jacksonville	SSN 699	Electric Boat	Norfolk	24 Jan 1972	16 May 1981	
Dallas	SSN 700	Electric Boat	Groton	31 Jan 1973	26 Jun 1981	
La Jolla	SSN 701	Electric Boat	San Diego	10 Dec 1973	30 Sep 1981	
Phoenix	SSN-702	Electric Boat	Norfolk	31 Oct 1973	12 Dec 1981	29 Jul
Boston	SSN 703	Electric Boat	Groton	10 Dec 1973	30 Jan 1982	18 Jan
Baltimore	SSN 704	Electric Boat		31 Oct 1973	24 Jul 1982	10 Jul
City Of Corpus Christi	SSN 705	Electric Boat	Groton	31 Oct 1973	08 Jan 1983	
Albuquerque	SSN 706	Electric Boat	Groton	31 Oct 1973	21 May 1983	
Portsmouth	SSN 707	Electric Boat	San Diego	10 Dec 1973	01 Oct 1983	
Minneapolis-St. Paul	SSN 708	Electric Boat	Norfolk	31 Oct 1973	10 Mar 1984	
Hyman G. Rickover	SSN 709	Electric Boat	Norfolk	10 Dec 1973	21 Jul 1984	
Augusta	SSN 710	Electric Boat	Groton	31 Oct 1973	19 Jan 1985	
San Francisco	SSN 711	Newport News	Pearl Harbor	01 Aug 1975	21 Apr 1984	
Atlanta	SSN 712	Newport News	Norfolk	01 Aug 1975	06 Mar 1982	22 Jan
Houston	SSN 713	Newport News	San Diego	01 Aug 1975	25 Sep 1982	
Norfolk	SSN 714	Newport News	Norfolk	20 Feb 1976	21 May 1983	
Buffalo	SSN 715	Newport News	Pearl Harbor	23 Feb 1976	05 Nov 1983	
Salt Lake City	SSN 716	Newport News	San Diego	15 Sep 1977	12 May 1984	
Olympia	SSN 717	Newport News	Pearl Harbor	15 Sep 1977	17 Nov 1984	
Honolulu	SSN 718	Newport News	Pearl Harbor	15 Sep 1977	06 Jul 1985	
Providence	SSN 719	Electric Boat	Groton	16 Apr 1977	27 Jul 1985	
Pittsburgh	SSN 720	Electric Boat	Groton	16 Apr 1977	23 Nov 1985	
Chicago	SSN 721	Newport News	Pearl Harbor	13 Aug 1981	27 Oct 1986	
Key West	SSN 722	Newport News	Pearl Harbor	13 Aug 1981	12 Sep 1987	
Oklahoma City	SSN 723	Newport News	Norfolk	13 Aug 1981	09 Jul 1988	
Louisville	SSN 724	Electric Boat	Pearl Harbor	11 Feb 1981	08 Nov 1986	
Helena	SSN 725	Electric Boat	Pearl Harbor	19 Apr 1982	11 Jul 1987	
Newport News	SSN 750	Newport News	Norfolk	19 Apr 1982	03 Jun 1989	
IMPROVED 688 - 688I						
San Juan	SSN 751	Electric Boat	Groton	30 Nov 1982	06 Aug 1988	

Pasadena	SSN 752	Electric Boat	Pearl Harbor	30 Nov 1982	11 Feb 1989
Albany	SSN 753	Newport News	Norfolk	20 Nov 1983	07 Apr 1990
Topeka	SSN 754	Electric Boat	Pearl Harbor	28 Nov 1983	21 Oct 1989
Miami	SSN 755	Electric Boat	Groton	28 Nov 1983	30 Jun 1990
Scranton	SSN 756	Newport News	Norfolk	26 Nov 1984	26 Jan 1991
Alexandria	SSN 757	Electric Boat	Groton	26 Nov 1984	29 Jun 1991
Asheville	SSN 758	Newport News	Pearl Harbor	26 Nov 1984	28 Sep 1991
Jefferson City	SSN 759	Newport News	San Diego	26 Nov 1984	29 Feb 1992
Annapolis	SSN 760	Electric Boat	Groton	21 Mar 1986	11 Apr 1992
Springfield	SSN 761	Electric Boat	Groton	21 Mar 1986	09 Jan 1993
Columbus	SSN 762	Electric Boat	Pearl Harbor	21 Mar 1986	24 Jul 1993
Santa Fe	SSN 763	Electric Boat	Pearl Harbor	21 Mar 1986	11 Dec 1993
Boise	SSN 764	Newport News	Norfolk	06 Feb 1987	07 Nov 1992
Montpelier	SSN 765	Newport News	Norfolk	06 Feb 1987	13 Mar 1993
Charlotte	SSN 766	Newport News	Pearl Harbor	06 Feb 1987	16 Sep 1994
Hampton	SSN 767	Newport News	Norfolk	06 Feb 1987	16 Nov 1993
Hartford	SSN 768	Electric Boat	Groton	30 Jun 1988	10 Dec 1994
Toledo	SSN 769	Newport News	Groton	10 Jun 1988	24 Feb 1995
Tucson	SSN 770	Newport News	Pearl Harbor	10 Jun 1988	18 Aug 1995
Columbia	SSN 771	Electric Boat	Pearl Harbor	14 Dec 1988	09 Oct 1995
Greenville	SSN 772	Newport News	Pearl Harbor	14 Dec 1988	16 Feb 1996
Cheyenne	SSN 773	Newport News	Norfolk	28 Nov 1989	13 Sep 1996

SSN-688 Los Angeles-class Image Gallery

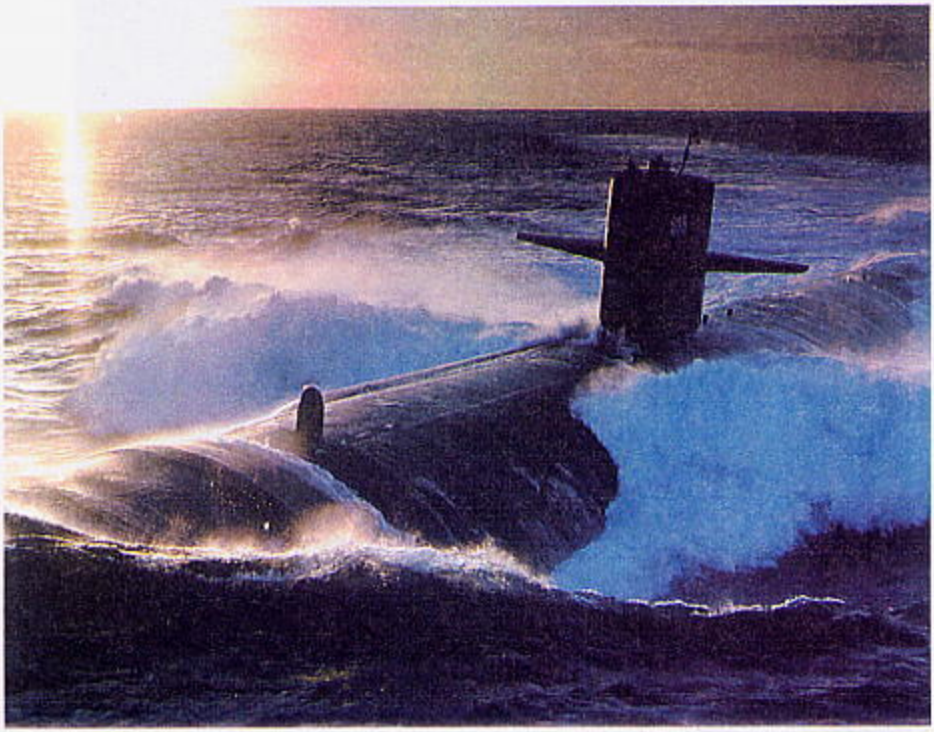


USS LOS ANGELES (SSN 688)

(First and Finest)

WELCOME ABOARD

USS LOS ANGELES
(SSN 688)



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

~ ~ John Paul Jones ~ ~

MARK DAVID JENKINS
COMMANDER, U.S. NAVY

COMMANDER MARK DAVID JENKINS, U.S. NAVY

Commander Mark D. Jenkins is the son of Thomas and Betty Jenkins and is from Dalton, Pennsylvania. He graduated from the University of Notre Dame in 1981 with a Bachelor of Science Degree in Mechanical Engineering and then commenced nuclear submarine training at the Naval Nuclear Power School in Orlando, Florida, followed by nuclear prototype training in Ballston Spa, New York.

Commander Jenkins reported to USS TUNNY (SSN 682) in December 1982. While assigned to TUNNY, he served as the Main Propulsion Assistant, Damage Control Assistant, and Weapons Officer, qualified in Submarines, qualified as Engineering Officer and completed three Western Pacific Deployments.

After attending the Submarine Officer Advanced Course, Commander Jenkins reported to USS Marino G. Vallejo (SSBN 658) (BLUE) in June 1986 as Engineering Officer, completing four strategic deterrent patrols. In August 1988, he reported to USS LOS ANGELES (SSN 688) as Navigator and Operations Officer, where he completed two Western Pacific Deployments and two Northern Pacific Deployments.

Commander Jenkins then reported to the Pacific Fleet Nuclear Propulsion Examining Board in August 1990. Then in March 1993, Commander Jenkins reported to USS ALABAMA (SSBN 731) (BLUE) as Executive Officer, completing three strategic deterrent patrols.

In December 1994, Commander Jenkins reported to Commander Submarine Force, U.S. Pacific Fleet's staff as a member of the Tactical Readiness Evaluation team.

Commander Jenkins' awards include the Meritorious Service Medal, the Navy Commendation Medal (six awards), and the Navy Achievement Medal.

Commander Jenkins is married to the former Florence Cobb of Nicholson, Pennsylvania. The Jenkins' have two children, Karen Sue and Mark.

THE STORY OF THE FIRST AND FINEST

USS LOS ANGELES (SSN 688), the fourth naval ship to be named after the City of Los Angeles, is the lead ship of her class. Designed as a follow-on to the STURGEON class submarines built during the 1960s, the Los Angeles class incorporated improved sound quieting and a larger propulsion plant than previous classes. She is capable of shooting MK 48 (advanced capability version) heavyweight torpedoes, Harpoon anti-ship missiles, and Tomahawk mines. Her many capabilities include anti-submarine warfare, anti-ship warfare, land attack (her missiles can hit on target 75 percent of the Earth's land surface), special forces delivery, reconnaissance, and carrier battle group support and escort. To safely operate the ship in any environment under routine and casualty conditions to support training for Los Angeles' wartime functions of undersea warfare, surface warfare, strike warfare, mining operations, and intelligence collection.

Launched on 6 April 1974 at Newport News Shipbuilding and Drydock Company in Newport News, Virginia, her sponsor was the Honorable Anne L. Armstrong, counsellor to the President. She was commissioned on 13 November 1976. On 27 May 1977, she hosted President Jimmy Carter for an at-sea demonstration of the capabilities of the nation's newest fast attack submarine.

LOS ANGELES made her first operational deployment to the Mediterranean Sea in 1977 and was awarded a Meritorious Unit Citation.

In 1978 she transferred to the Pacific Fleet and was assigned to Submarine Squadron SEVEN, homeported in Pearl Harbor, Hawaii. LOS ANGELES operated with distinction, conducting five Western Pacific, one Indian Ocean, and four Northern Pacific deployments. These operations, vital to national security, earned her three additional Meritorious Unit Citations. Additionally, she was awarded her squadron's annual Battle Efficiency "E" for excellence in combat readiness four times.

In July 1992, LOS ANGELES departed Pearl Harbor, Hawaii for a Change of Homeport to Mare Island Naval Shipyard, Vallejo, California. Arriving on 6 August, she commenced the first Engineered Refueling Overhaul of a Los Angeles class fast attack submarine. During the overhaul, she was outfitted with the latest state-of-the-art sonar and fire control systems, as well as the Navy's newest reactor core. These extensive upgrades make her one of the most advanced submarines in the submarine force.

LOS ANGELES returned to an operational status after the 31 month overhaul in March 1995. She was re-assigned to Pearl Harbor, Hawaii attached to Submarine Squadron ONE.

CAPABLE OF STEAMING OVER 600,000 MILES WITHOUT REFUELING, LOS ANGELES' ENDURANCE ALLOWS HER TO MAINTAIN A COVERT, FORWARD-DEPLOYED POSTURE FOR EXTENDED PERIODS.

USS LOS ANGELES (SSN 688)

Keel Laid.....8 JANUARY 1972
Launched .....6 APRIL 1974
Commissioned .....13 NOVEMBER 1976

SHIP'S CHARACTERISTICS

Length Overall .....360 feet
Maximum Beam ..... 33 feet
Surfaced Displacement .....6,100 tons
Submerged Displacement .....6,900 tons
Maximum Depth .....In excess of 800 feet
Maximum Speed .....In excess of 25 knots
Armament ..... Four 21-inch torpedo tubes
Power Source ..... S6G nuclear reactor
Ship's Complement.....14 Officers/127 Enlisted Men

COMMANDING OFFICERS

CDR J. E. CHRISTENSEN, USN ..... 13 NOV 76 - 21 OCT 77

CDR R. E. BEEDLE, USN ..... 21 OCT 77 - 17 FEB 81

CDR J. F. SHIPWAY, USN .....17 FEB 81 - 13 APR 85

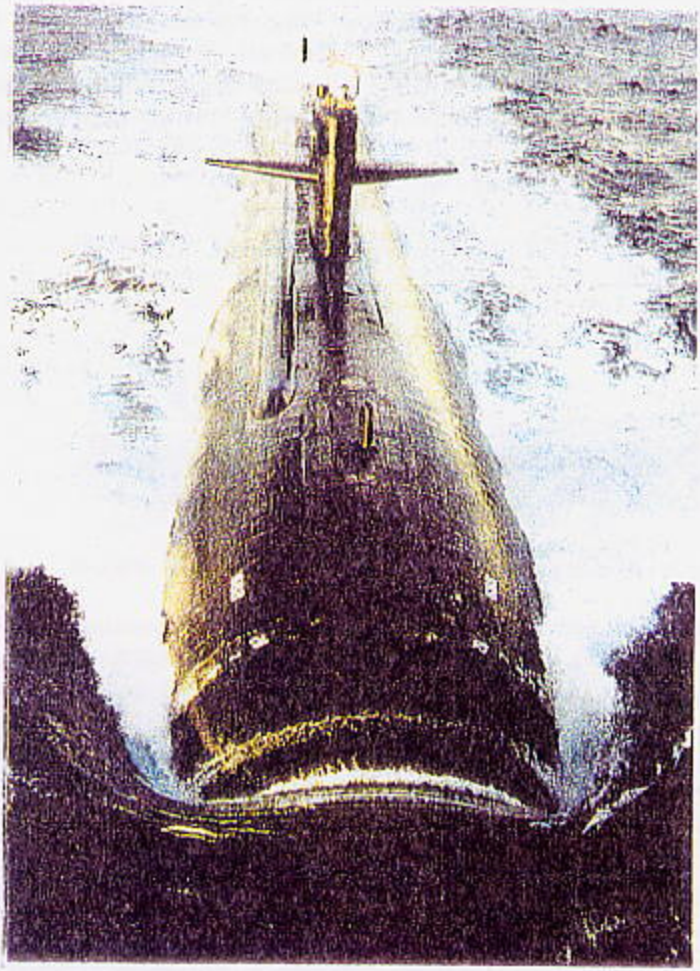
CDR D. I. STANLEY, USN ..... 13 APR 85 - 11 DEC 87

CDR J. K. ELDRIDGE, USN ..... 11 DEC 87 - 22 MAY 90

CDR M. S. MYERS, USN .....22 MAY 90 - 2 MAR 93

CDR J. S. BOULDEN, III, USN .....2 MAR 93 - 19 APR 96

CDR T. G. RUBENSTEIN, USN.....19 APR 96 - 11 DEC 98



EQUIPPED WITH THE MOST ADVANCED SONAR AND FIRE CONTROL SYSTEMS IN THE PACIFIC FLEET AND CAPABLE OF LAUNCHING MK 48 TORPEDOES, TOMAHAWK LAND-ATTACK MISSILES, AND MK 60 & 67 MINES, LOS ANGELES IS ONE OF THE MOST POTENT WARSHIPS IN THE U.S. ARSENAL.

DISTINGUISHED ANCESTRY OF THE LOS ANGELES

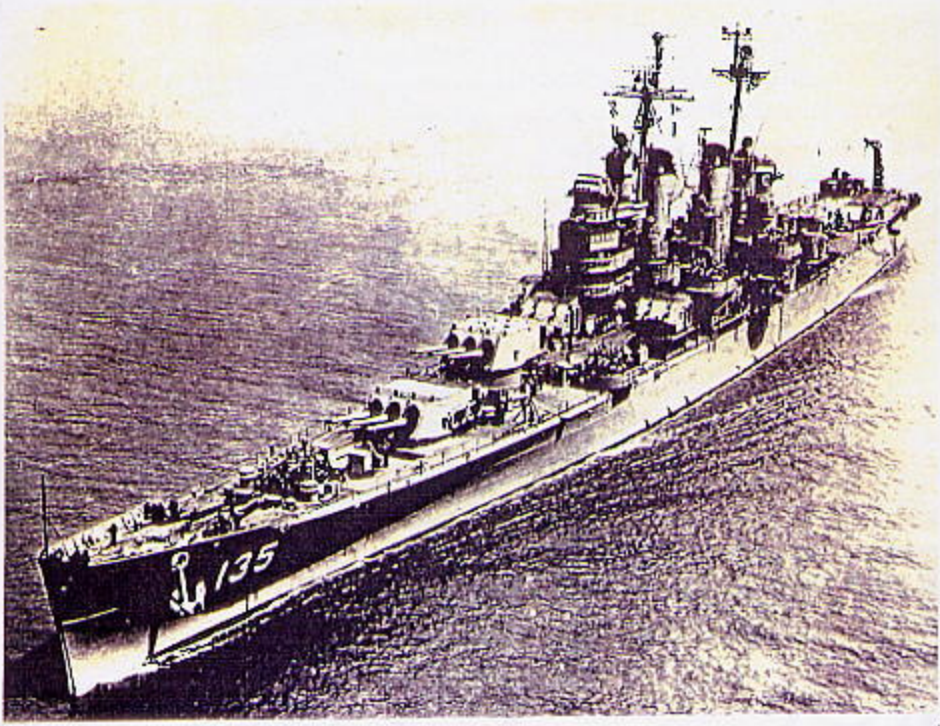
The first LOS ANGELES, a naval overseas tanker, was built by the Union Iron Works in San Francisco, California. The ship was launched in 1916 and built for the Union Oil Company. After commissioning on 9 August 1917, she operated along the Atlantic and Gulf coasts making numerous trans-Atlantic crossings carrying fuel oil to Brest, France, and Portsmouth and Davenport, England. In 1919, the end of World War I, she was decommissioned and returned to her former owners.

USS LOS ANGELES TANKER

The second LOS ANGELES (ZR-3), an air ship, was commissioned on 25 November 1924. The ship was built by the Zeppelin Airship Company at Friedrichshafen, Germany, for the United States Navy and was christened by Mrs. Coolidge, wife of President Calvin Coolidge. LOS ANGELES served for more than seven years as an aerial laboratory and testing platform for the development of coordinated naval air and sea tactics. She conducted the first mid-air docking of a fixed wing fighter by an airship. The second LOS ANGELES was decommissioned on 30 June 1932.

LOS ANGELES (ZR-3)

The third LOS ANGELES (CA-135), a heavy cruiser, was commissioned on 22 July 1945. She was financed by war bonds purchased by the citizens of Los Angeles. She operated in the Seventh Fleet off the China coast and in the Western Pacific from January 1946 until January 1947. She was deactivated on 9 April 1948. LOS ANGELES was recommissioned in January 1951 and deployed to the Far East during the Korean conflict. As the Flag Ship for RADM Arleigh E. Burke, Commander, Cruiser Division FIVE, she provided gunfire support at KoNiji, Wonsan, and other coastal areas. From 1953 to 1963 LOS ANGELES made six deployments to the Far East, and participated in the Quemoy-Matsu operation of 1956. She was overhauled twice by Mare Island Naval Shipyard (Interestingly, USS LOS ANGELES (SSN 688) was overhauled in the same drydock thirty years later). On 15 November 1963, USS LOS ANGELES (CA 135) was decommissioned.



USS LOS ANGELES (CA-135)

NUCLEAR PROPULSION PLANT

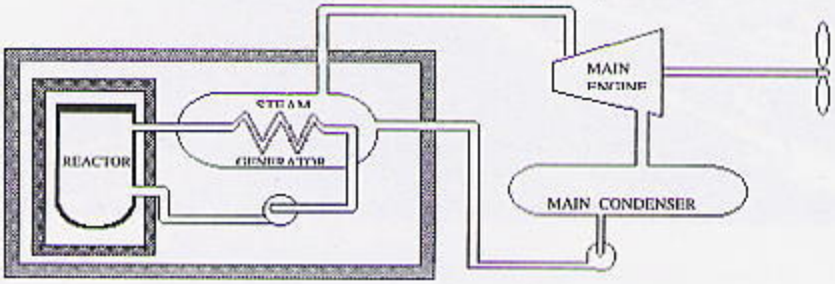
The propulsion plant of the *Los Angeles* is based on use of a nuclear reactor to provide heat. The heat comes from the fissioning of the nuclear fuel contained within the reactor.

The nuclear propulsion plant on *Los Angeles* uses a pressurized water reactor design with two basic systems, primary and secondary. The primary system circulates ordinary water and consists of the reactor, piping loops, pumps, and steam generators. The water in the primary system is maintained under pressure to prevent boiling. This water is pumped through the steam generators and back into the reactor for reheating.

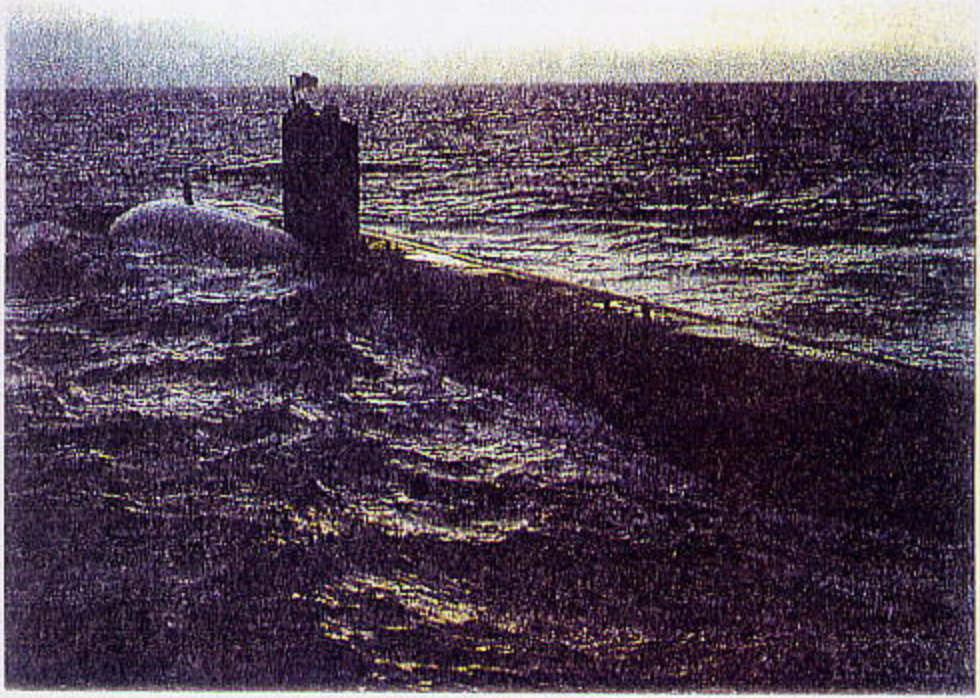
In the steam generators, the heat from the primary system is transferred to the secondary system to create steam. The primary and secondary systems are separated and the water between the two does not intermix.

In the secondary system the steam flows from the steam generators to turbine generators to provide electricity and to the main turbines to provide propulsion. After passing through the turbines, the steam is condensed to water and returned to the steam generators by the main feed pumps. Both the primary and secondary systems are closed with the water recirculated and reused.

There is no step in this system that 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.



USS LOS ANGELES (SSN 688)



GENERAL REMARKS

SECURITY: Our submarine, of necessity, has aboard many highly classified pieces of equipment. Many of her operating characteristics are classified. We request that when you leave the ship, you keep in mind the dangers involved in discussing the classified aspects of the ship.

WARNING SIGNS: Please observe all warning signs. Consult members of the ship's crew for assistance in any matter. Do not operate any equipment, flip any switch, turn any valve, or enter any posted area without permission. Observe posted precautions and procedures in all operations.

EMERGENCIES: Should any emergency situation arise, alarms will be sounded and word will be passed. You are requested to STAND FAST, BUT CLEAR, of all passageways and operating areas. Do not obstruct ladders, hatches, or watertight doors. The member of the ship's company in charge of the compartment will explain the situation as soon as he is able. Please follow his instructions without hesitation.

INJURY OR ILLNESS: You are requested to report all injuries, however minor, to the Medical Department for treatment. A corpsman is available for medical advice at all times. Sea sickness medication is available from the Medical Department Representative. If you are susceptible to motion sickness, you should take medication prior to getting underway.

As your host, the officers and men of the LOS ANGELES hope your visit will be informative, interesting, and enjoyable. Your suggestions for improving this or future visits are greatly appreciated.

"Anytime,
Anywhere,
Always Ready,
Always There."

The insignia of the U.S. Navy Submarine Service is a Submarine with bow planes extended to the diving position, flanked by two dolphins. Dolphins, the traditional attendants to Poseidon, the Greek god of the sea and patron deity of sailors, are symbolic of speed, grace, endurance, and a calm sea.