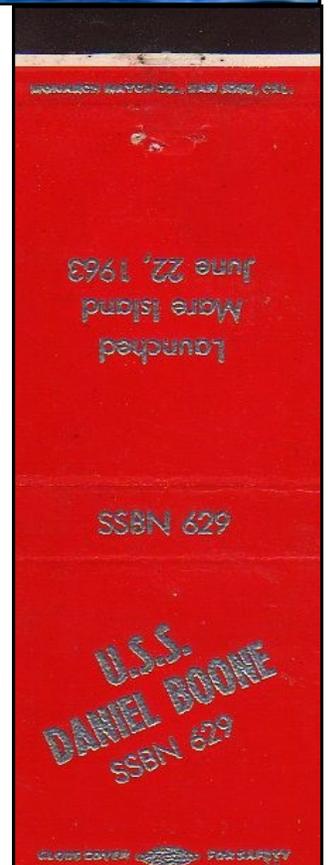
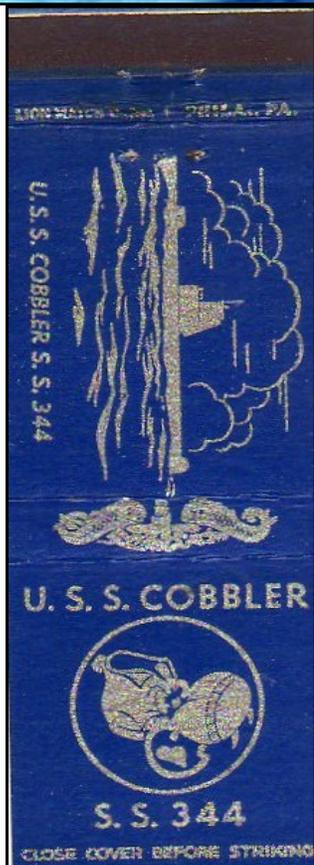
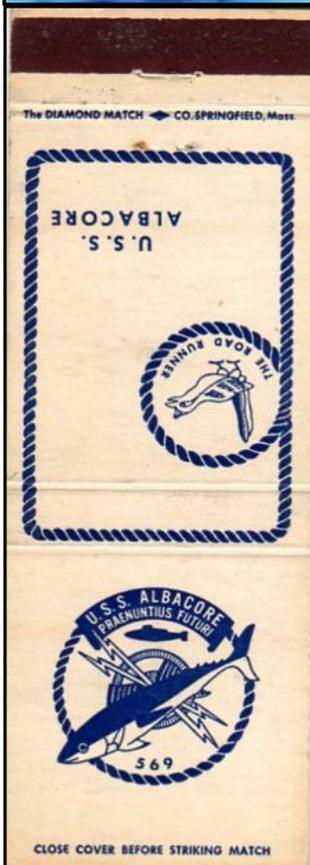




by
Mike Prero



At the dawn of the twentieth century, prominent American naval leaders recognized the submarine as a real threat to international surface forces and persuaded the Navy to acquire its first submarine in 1900. Inventors John Holland and Simon Lake competed their designs. Holland won the design competition and sold his newest model, Holland VI, to the Navy for \$150,000 on 11 April 1900. This 64-ton submarine, commissioned as USS Holland (SS-1), was equipped with an Otto-type gasoline engine for surface running and electric motors for submerged operations. Due to the volatility of gasoline, American submersible designs soon followed the French practice and adopted the diesel engine in 1909.

Early submarine classes such as E, H, K, L, M, N, O, and R, known as "pig boats" or "boats" because of their unusual hull shape and foul living conditions, ranged in displacement from 287 to 510 tons. The fastest "boats" achieved top surface speeds of 14 knots under diesel power. During World War I, U.S. submarines were divided into two groups according to mission. Boats of the N and O classes, as well as some of the E type, patrolled American coasts and harbors in a defensive role. Other submarines patrolled hostile European waters after 1917. Some K, L, O, and E class boats conducted offensive, open sea operations from the Azores and Bantry Bay in Ireland. They supported the Allied effort to maintain open sea lanes along the European coast and in the approaches to the British Isles.

The Navy Department's plans for future submarines reflected the prevailing thinking of the time. The submersible was viewed as a type of destroyer or torpedo boat that should operate with the battle fleet. Consequently, the first submarine designed by the Bureau of Construction and Repair and the Bureau of Steam Engineering produced the faster 15-knot, 800-ton, S class submarine in 1916. At virtually the same time, Electric Boat received a commission to design the three boats of the 20-knot T, or AA class (1,107 tons). On paper these characteristics, brought the U.S. Navy one step closer to the "fleet submarine," a submersible that could keep pace with surface ships of the battle fleet.

The success of the 1930's Salmon class inspired the development of the superb 1,500 ton Fleet Boat. Designed with food, fuel, and weapons sufficient for long range independent patrols, Fleet Boats enabled a shift in doctrine from coastal defense to open ocean attacks on enemy warships and convoys critical to enemy logistical sup-



U.S. submarines operated in Japanese-controlled waters from the beginning of World War II. Unfortunately, defective torpedoes, ineffective tactics, and inexperienced captains and crews hindered early submarine operations. Submariners solved these problems, and ultimately played a key role in stemming the tide of Japanese advancement. Employing the new, reliable Gato, Balao, and Tench class submarines, the Submarine Force began taking a mounting toll on Japan's merchant marine ships and warships. Deciphering encrypted Japanese communications, U.S. submariners intercepted and prosecuted Japanese ships in the vast Pacific. By late 1943, U.S. submariners, employing aggressive daytime submerged and night time surface attack tactics, were destroying large numbers of enemy ships throughout the Pacific and in Japanese controlled home waters.

At the end of the war, U.S. submarines had scored the most complete victory in the war. Comprising just 1.6 percent of the U.S. Navy, U.S. submarines sank 30 percent of the Japanese Imperial Navy including eight aircraft carriers, one battleship, and eleven cruisers. More importantly, the Submarine Force sank 2,400 merchant ships totaling 4.9 million tons. Having destroyed 60 percent of the Japanese merchant marine, the Submarine Force imposed a veritable stranglehold on Japan, choking off its economy. In the final months of the war, American submarines had difficulty finding targets because there were virtually no enemy ships left to sink. The SILENT VICTORY was complete.

The SILENT VICTORY came with a heavy price, though. During World War II, the U.S. Submarine Force suffered the highest loss rate of the U.S. armed forces. Of the 16,000 U.S. men serving in submarines during the war, 375 officer, 3,131 enlisted men, and 52 submarines were lost.

Diesel-powered submarines played a critical role during WWII. But the allied victory in the Atlantic indicated that submarines designed mainly for surface operations had limited future effectiveness. Two issues confronted designers - greater underwater speed and endurance. Speed was addressed with the "teardrop" hull design. First implemented on the experimental USS Albacore (SS-569), it enabled unprecedented submerged speeds. The advent of nuclear power solved the undersea endurance problem, and truly revolutionized submarine design and naval warfare. In 1954, the Navy launched USS Nautilus (SSN-571), the world's first nuclear-powered submarine. USS Skipjack (SSN-585) was the first submarine to combine the endurance of nuclear propulsion and the high-speed teardrop hull design. Every American submarine built since 1958 incorporates these features.

Throughout the Cold War, the Submarine Force played a vital role, checking the Soviets in two ways. First, U.S. ballistic missile submarines deterred nuclear war by maintaining a survivable retaliatory strike capability. Second, U.S. attack submarines monitored the rapidly expanding Soviet Navy while conducting intelligence, surveillance, and reconnaissance missions.

During the Cold War, U.S. attack submarines monitored Soviet naval development and ocean naval operations in the Mediterranean, Atlantic, and Pacific. U.S. SSNs obtained vital information on Soviet naval capabilities and weaknesses. Two recently declassified missions showcase Submarine Force capabilities. *USS Guardfish* (SSN-612) silently tracked a Soviet cruise missile submarine which was following U.S. aircraft carriers off Vietnam in the 1970's - ready to protect our ships should the SSGN launch her missiles. In 1978, in the Atlantic, *USS Batfish* (SSN-681) tracked a Soviet ballistic missile submarine (SSBN) sailing off the East Coast of the U.S.- learning Soviet SSBN patrol areas and operating patterns and providing early indications of any potential surprise attack on the U.S.

As the Cold War progressed, the Soviet Navy expanded substantially in size and capability, which was much larger than the U.S. Submarine Force. By the 1980's, Soviet submarines had narrowed, but not eliminated, the submarine technology gap. The U.S. Navy counted on the superiority of its submarines in the event of hostilities.

The end of the Cold War has been marked by a surge of regional conflicts, which has driven the Submarine Force to greatly expand its mission focus while still serving as our nation's greatest deterrence to global nuclear war. U.S. military force level reductions have placed an increased premium on timely and accurate intelligence on potential trouble spots. Submariners, utilizing skills honed during the Cold War, contribute substantially to this mission requirement by conducting Intelligence, Surveillance, and Reconnaissance (ISR) missions. Subma-

rines are superb intelligence collection assets because of their stealth and ability to remain on station for long periods of time. Because submarines get close to the action, they can capture signals or observe events that are too elusive or enveloped in background noise for satellites to detect.

The intelligence gained by submarines enable us to understand an adversary's military capabilities, allows U.S. policy makers to anticipate hostilities, and aids diplomatic efforts. Due to the large number of post Cold War hot spots, the number of submarine ISR missions has doubled since 1989—despite SSN force reductions of almost 50 percent!

U.S. submarines also provide America's decision makers with powerful offensive capabilities, should U.S. military force be required. U.S. submarines operate autonomously in the world's coastal regions where the submarines' ability to conduct land attack, covert special operations, mine warfare, and antisubmarine warfare remains a key component of our Navy's capability to operate Forward... From the Sea. For example, submarines have become increasingly important to the U.S. Navy's land attack precision strike capability. Since we first launched Tomahawks during Operation Desert Storm, the contribution to the overall Tomahawk strike effort has increased as a percentage.

During Operation Allied Force in Kosovo, submarines fired nearly 25 percent of Tomahawks launched against Serbian targets. New technologies such as unmanned undersea vehicles (UUVs), being developed for reconnaissance and mine warfare missions, hold the potential to vastly improve a submarine's mission capability. New communications capabilities mated with submarine-launched unmanned aerial vehicles (UAVs) could result in U.S. submarines independently detecting and destroying targets far inland. Stealthy mini-sub, like the Advanced SEAL Delivery System (ASDS) will launch from SSNs and take Special Forces teams hundreds of miles to their landing sites. [<http://www.navy.mil/navydata/cno/n87/history.html>]

[John Holland, inventor of the first U.S. Navy submarine Holland VI, stands topside on his creation on October 12, 1900.]

