

THE SEA CHEST

JOURNAL OF THE PUGET SOUND MARITIME HISTORICAL SOCIETY | JUNE 2014 \$10



**WWII Navy
PT Boats** on
Puget Sound

**USS TURNER
JOY:** Bremerton
Memorial Ship

Vietnam
Boat Builder:
A. Nordtvedt

**Restoring
CG-8327:** The Cutter
and Her Stories

**Boeing
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ON THE COVER: An authentically computer-colored photo shows the 78-foot Higgins PT-646, as she passed at full speed in front of the iconic Puget Sound ferryboat KALAKALA, during WWII. Image courtesy of Frederick Gilmartin, a Navy crewman aboard the PT boat when the photo was taken near Bremerton in July, 1945. Colorization by Al Doggett, Al Doggett Studio, Seattle. Colorized image copyright © 2014 by Charles R. (Chuck) Fowler.

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A word from THE EDITOR

CHUCK FOWLER, GUEST EDITOR, THE SEA CHEST

WHEN RON BURKE OFFERED ME THE OPPORTUNITY TO TAKE OVER THE HELM of this issue of *The Sea Chest* as guest editor, I was greatly honored. The Puget Sound Maritime Historical Society's quarterly journal is a widely regarded publication in the maritime history world, and editing it is a singular privilege.

This special issue focuses on the military maritime history of Puget Sound and beyond. It is based on a pictorial history book that I co-authored with Dan Withers, *Patrol and Rescue Boats on Puget Sound*, published in 2011. Growing up during World War II (WWII) and the early 1950s, I was fascinated by the wartime actions of the fast Navy PT (patrol torpedo) boats, especially the story of Lt. (j.g.) John F. Kennedy, the skipper of PT-109. More than six decades later, I discovered and decided to chronicle the largely secret history of WWII PT boats in Puget Sound. This issue's lead article is the result of researching this hidden story, meeting and interviewing veterans who served aboard PTs during the war, and discovering rare photographs that bring their experiences alive.

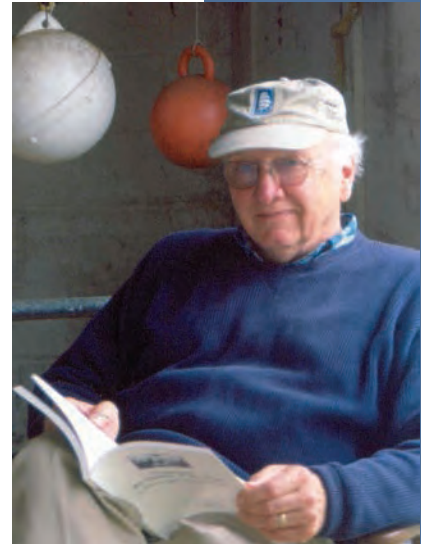
Naval and diplomatic historian Lisle Rose, a PSMHS member and volunteer library coordinator, follows with his article about the history of the Navy destroyer U.S.S. TURNER JOY. For more than two decades, the Seattle-built vessel has been an impressive Naval Memorial and museum ship on the Bremerton waterfront. Rose deftly relates the ship's proud, and also controversial history, both during her 23 year active duty career—including the Vietnam War—and in more recent times, as the only continuing, visitor-accessible Navy warship in Puget Sound.

Todd Warger's article about the late, legendary Bellingham boat builder Art Nordtvedt—not only highlights his innovative, “can-do” spirit—but also his savvy political acumen. He secured one of the largest Navy small boat contracts in Pacific Northwest history: to build the highly-regarded PBRs (Patrol Boat River) during the Vietnam War. However, Art never forgot to credit his boat builders, and those who crewed them in combat, for his success.

Former PSMHS board member and current webmaster Dan Withers, a Navy Vietnam War destroyer crewman, records his and his wife Roxane's experiences finding and returning Tacoma's WWII Coast Guard cutter, CG-83527, to the Sound. As a veteran himself, he focuses on the living history value of restoring and operating historic military vessels, and honoring those who served aboard them.

Finally, Harold “Hal” Turner recalls his personal memories as a naval architect, engineer, and manager with Boeing's military hydrofoil program. A WWII Army Air Force crash rescue boat crew veteran, his wartime interest in fast vessels ultimately led to a 22-year career at Boeing Marine Systems, working on some of the Navy's most cutting edge high-speed craft.

Editing this special military maritime issue has been an honor. The articles featured reveal the technological and also very human side of Puget Sound military maritime history. Two individuals deserve special mention for their “above and beyond” contributions: digital media wizard Dan Withers and researcher extraordinaire Bruce “Chip” Marshall. And to everyone who participated in so many ways, my sincere thanks.



World War II PT Boats in Puget Sound: The Hidden History

By Chuck Fowler



PT-27, an early 77-foot Elco design, was among four boats at Pearl Harbor during the infamous Japanese attack on December 7, 1941. The group was subsequently shipped to Seattle; then traveled 2,500 miles on their own bottoms to Alaska, arriving in August, 1942. The boats were sent to Adak Island in the Aleutians to help repel a feared Japanese attack on the island of Amchitka, but operational and weather conditions prevented them from seeing much combat action. Photo courtesy of Bob Ketchum and PT Boats, Inc.

FOR MANY YOUNG BOYS GROWING UP DURING WORLD WAR II, who later became maritime history enthusiasts, the wartime exploits of U.S. Navy Lieutenant (j.g.), PT boat commander—and later president—John F. Kennedy have become legendary.

Through the years, the tale of the nighttime ramming of the young officer's PT-109 in the Philippine Islands by a Japanese destroyer, and Kennedy's subsequent heroic rescue of his crew, have been chronicled in books, newspapers and magazines, films, television documentaries and countless other ways. However, because of tight security restrictions during the war, few people in the Pacific Northwest realized that the small,

fast and heavily-armed PT boats also operated in Puget Sound throughout the conflict. But now, by researching published, but largely ignored accounts, and uncovering crew members' personal memories and photographs, this largely hidden story can be told.

Historically, there were three waves of PT boat activity in Puget Sound during the war. The first took place in early 1942, when four boats stationed in Hawaii at the time the Japanese attacked Pearl Harbor, were shipped to Puget Sound enroute to combat service in Alaska. The second wave took place in 1943 and 1944, when two squadrons of PTs were again sent through the Sound and Bremerton, also on their way to and from



Top: PT-24 (left) and PT-27 are shown at a fish boat dock in Kodiak, Alaska, during their 1942 transit for service in the Aleutian Islands. Photo courtesy of Jerry Gilmartin.

Bottom-left: The aluminum builder's plaque of Elco PT-24 was given to Seattle resident Giff Jones by his uncle, WWII Lt. (j.g.) Grover (Ben) McClure, the skipper of the boat. Builder's plaque photo is by Dan Withers.

Bottom-right: The young Navy crewmen of PT-27 were obviously having fun in the fall of 1943, when they posed for this group photo aboard the boat in Seattle. Quartermaster 2nd class Bob Ketchum (first row left) was also a helmsman on the boat while in Puget Sound; and the late John Akin of Salem, Oregon, (far right, second up from bottom) was a Gunner's Mate, 1st Class. Photo courtesy of Bob Ketchum.

combat service in Alaska and the Aleutian Islands. The final wave occurred at the very end of the war in mid-1945, when 36 boats were transported by LSTs (Landing Ship Tanks) to Bremerton for delivery to Russia, as part of the U.S. Lend-Lease program, which provided armaments to allied nations.

According to *At Close Quarters*, by Captain Robert Bulkley, Jr., the seminal book on PT boats in WWII, when the Japanese began the war with their attack on Pearl Harbor on December 7, 1941, there were a total of 12 early-model 77-foot Elco boats in the harbor. They were lying at two separate moorages on the harbor across from Battleship Row.

Shortly after the attack, in January, 1942, eight of these boats were shipped west to Midway and the Philippine Islands in the central and south Pacific; and four—PTs 22, 24, 27 and 28—were transported east on freighters to Puget Sound. These latter boats were to be part of the U.S. Navy fleet sent to Alaska to repel a Japanese diversionary attack on the Aleutian Islands. This attack on U.S. Alaskan forward bases was designed to draw attention and assignment of forces away from major Japanese combat actions against key American territories, and other strategic lands in the South Pacific. However, after their initial operation, it was soon apparent that the high-powered, lightly-built wooden

PT boats were completely unsuited for the harsh Alaskan weather and sea conditions.

Originally designed by British naval architect Hubert Scott Paine in the mid-1930s, and subsequently built for Royal Navy patrol and Royal Air Force rescue boat service, the early 70-foot PT had been licensed by the U.S. Navy in June, 1939. A contract was issued to the Elco Boat Company in Bayonne, New Jersey, for the initial construction of 11 boats. Contracts were also given to Higgins Industries Inc. in New Orleans, Louisiana, and Huckins Yacht Company of Jacksonville, Florida, to build a few prototype PTs for testing.

PT Boat Construction Details

With Navy specifications, similar designs were produced by each company—with hulls from 72 to 81-feet long. All had wood-framed hulls, planked in a unique way with mahogany and fir veneer. Although commonly believed that PT boats were built of plywood as we know it today—thin sheets of veneer glued together under high pressure with their grain running in opposite directions—this was untrue.

Instead, on the production line, the framed wood hulls were turned over, deck side down and first planked diagonally with three-eighth inch thick, five-and-a-half inch



"I WISH TO HAVE NO CONNECTION WITH ANY SHIP THAT DOES NOT SAIL FAST; FOR I INTEND TO GO IN HARMS WAY" JOHN PAUL JONES 1778

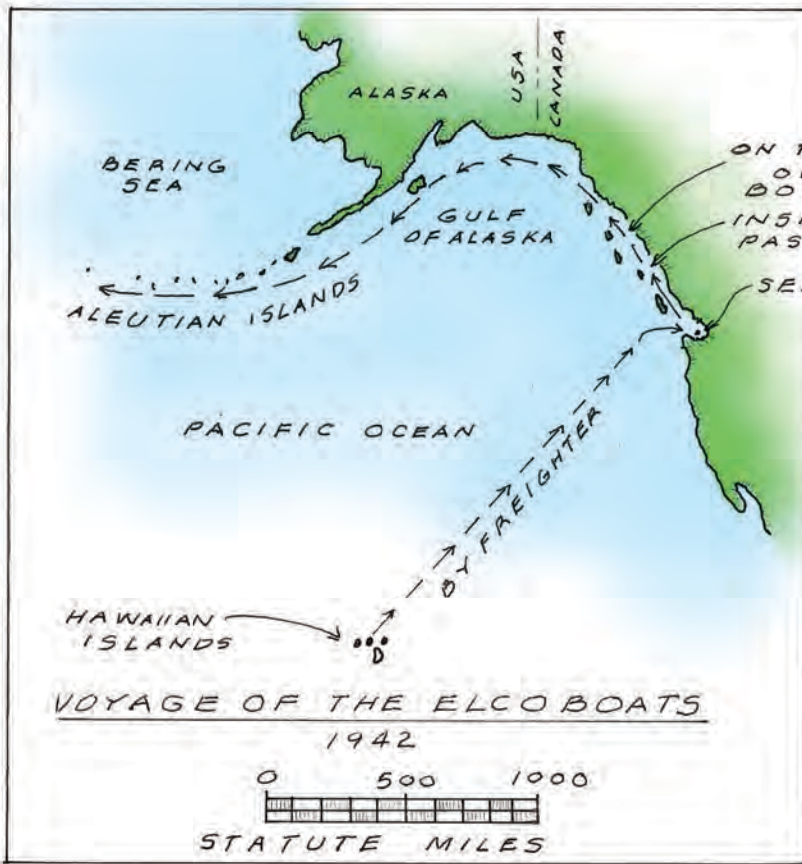


IN ADDITION TO THE HARSH WEATHER, THE BOATS WERE IN THE COMBAT ZONE AT ATTU & KISKA ISLANDS.

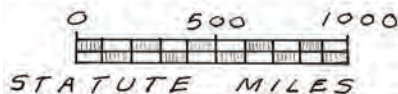
VOYAGE OF THE HIGGINS BOATS
1943

THE ELCO BOATS →

IN JANUARY 1942, P.T. 5 22, 24, 27 & 28 WERE SHIPPED FROM HAWAII TO PUGET SOUND ABOARD FREIGHTERS. THEY WERE DELIVERED TO PIERS 90 & 91 IN SEATTLE. THEN BEGAN A 2500 MILE VOYAGE THRU THE INSIDE PASSAGE TO THE ALEUTIAN ISLANDS.



VOYAGE OF THE ELCO BOATS
1942



THE HIGGINS BOATS

THEY WERE SHIPPED TO THE PUGET SOUND NAVY YARD IN FEB. & MARCH 1943. THE TRIP TO THE ALEUTIANS WAS MADE WITH STOPS AT THE CITIES OF VANCOUVER & PRINCE RUPEAT, B.C. KETCHIKAN, JUNEAU, YAKUTAT, KODIAK ISLAND & DUTCH HARBOR.



78 FOOT HIGGINS



77 FOOT ELCO

CRF / RRB 2014

wide mahogany strips. Then aviation-glued canvas was applied, and a second layer of six-inch to ten-inch wide mahogany planks added diagonally in the opposite direction. The total thickness of this layered hull skin was little more than an inch.

This construction method offered great strength and comparatively light weight, and produced a wooden composite hull with some capability to repel enemy fire. It also allowed the boats to be repaired in overseas combat zones that had limited maintenance facilities.

Another commonly held PT boat misconception is that they were equipped with Rolls-Royce Merlin V-12 aircraft engines, which were built under license by Packard, and which powered later model P-51 Mustang fighter planes. They were not.

The early Elco, Higgins and Huckins PT boats were powered by three Packard 4M-2500 V-12 marine engines of 1,200 horsepower each, and they burned 100 octane aviation gasoline. These sea-going engines weighed about 1,000 pounds more than the Merlin aircraft engines, and were linked to separate shafts and propellers. This power train arrangement allowed the about 48-ton displacement boats to achieve speeds of more than 40 knots with normal fuel and armament loads. The later boats, built toward the end of the war, had larger 1,500 horsepower, 5M-2500 engines.

Because the Navy was unsure of about which of the three initial PT boat designs to produce, a performance runoff competition, commonly referred to as the "Plywood Derby," was held in Florida. Elco and Higgins were then selected to be the two major producers of PT boats during the war, with Huckins manufacturing only a few boats used for patrol and training duties in non-combat zones. In all, Elco built a total of 320 boats, and Higgins 205 boats, before all production ended in the fall of 1945, after the end of WWII.

Early Elco PTs: From Hawaii to Alaska, 1942 - 1943

At the beginning of the war, following the Pearl Harbor attack, the four early 77-foot Elco PTs — shipped to Puget Sound from Hawaii — were sent as freighter deck cargo to Seattle's Piers 90 and 91. This was the first wave of PT boats to operate and transit through Puget Sound. They were off-loaded, outfitted, and began their 2,500-mile-long trip on their own bottoms up British Columbia's Inside Passage to Kodiak, Alaska, and the Aleutian Islands.

According to Bulkley, Alaskan operating conditions for the strong but relatively lightly-built PT boats were severe. "Aleutian weather, particularly toward the western part of the [island] chain, is the worst in the world," he wrote. "Nowhere else are the storms so numerous and so intense."

Bulkley continued that "the accompanying heavy seas, with strong currents running through the passes and channels, the jagged shorelines and submerged rock formations, [make] navigation extremely hazardous."

This view was echoed by the late Lt. (j.g.) Grover "Ben" McClure, the skipper of PT-24, who operated the boat for a year in both Alaska and also in Puget Sound during the war. He



A Higgins PT boat crashes through the waves off Attu Island during the brief occupation by the Japanese in 1943. The Alaskan “Williwaw” winds, heavy seas, driving rain, blizzards and fog made PT boat operations in the Aleutians an on-going challenge. Photo courtesy National Archives, 80G-53215.



PT-27 is shown undergoing major repair at the Olsen & Winge Marine Works in Ballard during the winter of 1943. The boat had suffered extensive damage in the Aleutian Islands as the result of accidents and operating in harsh weather conditions. Photo courtesy of MOHAI, No. 72.5503.73.

recalled that the unique “williwaw” wind squalls in the region would blow out of the mountains at a constant 60 to 80 knots, with gusts to 100. In later years, McClure became a successful businessman who was also the last president of “Peter Tare,” the association of PT boat officer veterans, which disbanded in 2007.

It was a constant battle to keep the PTs maintained, operating in the severe Aleutian conditions, with rain, snow, fog, wind and heavy, unpredictable seas. Of the four Elco boats that were sent to Alaska; two, PTs 22 and 28, were damaged so badly in accidents that they had to be abandoned. McClure’s PT-24 and PT-27 were sent back to the Olsen & Winge Marine Works in Seattle for major repair.

After arrival at the shipyard, the entire stern section of PT-24 was replaced; and PT-27 was also extensively restored before the boats went on sea trials in Puget Sound, and also on Lake Washington. Robert “Bob” Ketchum, a Quartermaster 2nd Class on PT- 27, remembers that the trials in the fall of

1943, and especially a practice torpedo drop, didn’t always go according to plan.

The crew didn’t have any instructions on the newly-installed roll off launching racks, he recalled. “I was at the wheel when the torpedo was dropped, and we were going more than 30 knots. When the torpedo hit the wake, it slid back into the side of the boat; its propellers chewing a hole in the hull,” Ketchum said. “That was the only time we dropped a torpedo in either the lake or the sound.”

During other post-repair sea trials, the late John Akin, also a PT-27 crewman, recalled that the boat made a couple of practice, no-launch torpedo “training runs” on Black Ball ferries that were operating between Seattle and Bremerton. Specifically, he remembered that when PT-27 began its run toward one side of the ferry, passengers would flock to the rail to watch the fast-approaching patrol boat, causing the ferry to list. Then, Akin said, after turning off their initial mock torpedo run, they would bring the speeding boat around the stern of the ferry to “attack” from the other side. This caused the surprised, but also intrigued, passengers to rush over to the opposite side, causing the ferry to roll in the opposite direction.

Shortly after these incidents, however, Akin said the crew of late teenage sailors, and their not- much-older junior officer commander, received a “cease and desist” order from 13th Naval District headquarters in Seattle, and the pseudo torpedo runs—and the training fun—stopped.

Following completion of sea trials, both PT-24 and P-27 were sent back to Hawaii in late 1943. During the remainder of the war, the tired, extensively-repaired old boats were used only for non-combat harbor and near-shore patrol duties, as well as training.

Higgins PTs to Alaska, 1943—1944

The second wave of PTs in Puget Sound began in February and March, 1943, when two squadrons of Higgins-designed boats, Squadrons (RONs) 13 and 16, were shipped and off-loaded from Navy Liberty cargo ships at Navy Yard Puget Sound. Like the 77-foot Elcos a year earlier, these 78-foot Higgins PTs were once again destined for Alaska, and again had to make the entire more than 2,000 mile voyage on their own bottoms. Port stops for refueling and supplies between Bremerton and the Aleutians were Vancouver and Prince Rupert, British Columbia; and Ketchikan, Juneau, Yakutat, Seward, Kodiak and Dutch Harbor, Alaska.

Because of their deep-vee stem design with less chine flare, and higher freeboard than either the 77-foot or later 80-foot Elco model such as Navy Lt. (j.g.) John F. Kennedy’s PT-109, the Higgins craft were known by their crews on deck as “wet boats.” “They tended to nose under the waves, drenching the crew,” according to Bulkley.

However, due to this design feature, they were more maneuverable and turned better than the Elcos. But in wartime, and later during PT boat veterans’ gatherings,

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Left: During the summer of 1943, a solitary sailor finds a quiet place—on his Aleutian Islands-based Higgins PT boat—to read a very welcome letter, probably from home stateside thousands of miles away. He is sitting on top of one of the boat’s four torpedo tubes. Photo courtesy of National Archives, No. 80G-43058.

Middle: Late model Higgins PTs, destined for Russia under the Lend Lease program, were sent to Bremerton as deck cargo on LSTs (Landing Ship Tanks). The Navy’s PT Ferrying Command was formed in March, 1945, to transfer the boats from the Higgins factory in New Orleans through the Panama Canal to Puget Sound, where they were turned over to the Russians. Photo courtesy PT Boats, Inc., national PT veterans association.

Right: Fred Gilmartin, a PT-646 radioman and gunner with PT Ferrying Command, shows his Squadron (RON) 43 boat insignia and plywood ditty box for personal belongings. Higgins plant workers crafted individual boxes for crew members, and presented them upon commissioning of each new boat off the production line. Photo by Chuck Fowler.

former crew members got into on-going friendly arguments about “their own” boats—and which was the best design, Elco or Higgins.

Just as with the earlier Elco PTs, the Higgins boats faced the same fates in the harsh Alaskan weather conditions. Throughout their service in Alaska and the Aleutians in 1943, and 1944, the Higgins PTs of RONs 13 and 16 had difficulty performing their patrol and related missions; often in freezing rain and snow, with constant high winds.

Being Retrofitted in Bremerton, 1944

Upon their return from the Aleutians to the Navy Yard in Bremerton in February, 1944, each of the squadrons’ boats’ four compressed air-fired torpedo launch tubes were replaced with simpler, more reliable roll-off racks. Also, the availability of the new Mark XIII torpedo, designed to be dropped by the Navy’s aircraft carrier-based Grumman Avenger bomber, improved the PT’s anti-ship target effectiveness

and accuracy. These modifications were completed at the Navy Yard before the boats were shipped to front-line combat duty in the Philippine Islands, New Guinea, and elsewhere in the South Pacific.

Ironically and sadly however, PT-77, one of the RON-13 Higgins boats, after being retrofitted, was mistakenly destroyed in the South Pacific by friendly fire from United States forces a year later; an incident which also cost the skipper’s life.

PT Ferrying Command Operations, 1945

In 1945, the third wave of PT boats that operated in Puget Sound was en-route neither to Alaska nor to the South Pacific, but rather to the Soviet Union. Toward the end of the war, when PTs were no longer needed for combat operations in the Pacific, Europe, or the Mediterranean; a total of 42 boats were turned over to Russia under the U.S. Lend-Lease armaments sharing program with our allied nations—

according to the Office of Navy History’s *An Administrative History of the PTs in World War II*. The majority, 36, were shipped to Bremerton for transfer to the Russians in Puget Sound, and ultimate delivery to Vladivostok.

In fact, although assigned originally and commissioned into Navy squadrons, some Elco and Higgins PTs that came off the production lines ended up being quickly decommissioned for transfer to the Soviet Union. The Higgins boat-equipped RON-43 had been commissioned by the Navy in December, 1944, but decommissioned in March, 1945. Its boats were transferred to a newly established Navy unit, the PT Ferrying Command.

The purpose of the Ferrying Command was, in the case of the Higgins boats, to take charge of the newly-manufactured PTs, run them through sea trials, and supervise their loading as deck cargo on LSTs in New Orleans. Ferrying Command officers and enlisted-rank crews then accompanied the series of PT shipments

west through the Caribbean Sea and the Panama Canal, up the Pacific Coast to San Pedro (Los Angeles), and finally to the Navy Yard Puget Sound.

One Ferrying Command crew member, Radioman 3rd Class and gunner Fred Gilmartin, Jr., from a coal mining town in Pennsylvania, later recalled his first sight of Puget Sound and its iconic mountain from aboard LST-1057 as she entered Admiralty Inlet at Port Townsend. "It was a very moving experience to see a speck on the horizon, which slowly became magnificent Mount Rainier, in such a beautiful part of the country."



Three of the four boats in Fred Gilmartin's PT Ferrying Command group are shown headed north from Bremerton through Agate Pass. They were on their way to be loaded aboard a Russian freighter at Indian Island, which would take them to Vladivostok under the wartime Lend Lease program. Photo courtesy of Fred Gilmartin.

Personal Covert Photos Taken

Although neither unauthorized civilians nor armed forces members were supposed to take photographs of military vessels or operations during WWII, Gilmartin and his fellow young sailors took many snapshots to document their PT boat adventures in the "far-off" Pacific Northwest. He said that they didn't intend to develop and print their photos until after the end of the war, which they believed would be soon. As a result, Gilmartin had some of the only known images, military or civilian, of PT boats in the Sound near the end of the war. (Note his photo on this page, as well as the photo on the front cover.)

However, one high-security activity that Gilmartin did not photograph took place at Lake Union Drydock Company (LUDD) in the heart of Seattle in July, 1945. During the loading by crane of his group of four boats aboard the LST in New Orleans, PT-646 accidentally swung into the dock, damaging her bow. As a result, before being turned over to the Russians, she was sent under her own power to LUDD for repair.

At the shipyard, "My shipmates and I had to stand guard on our boat around the clock" Gilmartin said, "for it was considered top secret."

A native of a rural mining town, Gilmartin was unfamiliar generally with boats and how they were built. However, he recalled vividly watching a shipwright skillfully replacing damaged

planks and rapidly caulking the seams. "I was thoroughly entranced watching an old [worker] caulking the deck of the fish boat tied up next to us," he said.

Once the damage repair was completed, Gilmartin and other crew members took additional photos of his PT-646 and the other three boats in his group running through Agate Pass in trail formation, on their way to the Indian Island area. There they were loaded aboard awaiting WWI-era Soviet freighters that would take the Lend-Lease PTs across the North Pacific to the Russian Far East.

"We secured the [PTs] under the direction of a female Russian boatswain, who was very tough-looking, wore high boots and tucked in trousers, and carried a 14-inch knife in her belt," Gilmartin said. "When we were finished to the Russians' satisfaction, we happily let them take the boats the rest of the way to Vladivostok."

After transfer of their boats, the crews returned to Piers 90 and 91 in Seattle. There they boarded the train that would eventually take them back east to Louisiana. Gilmartin's Ferry Command crew was scheduled to return to New Orleans to take on another ferrying assignment of four boats from the Higgins factory. But the war ended with Japan's official surrender on September 2, 1945, after two newly-developed atomic bombs

were dropped; one over Hiroshima and the other over Nagasaki, by separate Boeing B-29 heavy bombers.

The Restoration Story of PT-658 in the Pacific Northwest

Incredibly, however, one of the last four PT boats transported by the Ferrying Command, and which was moored at Bremerton when the war ended, PT-658, survived to more than 65 years later to become the only fully-restored, operating historic PT boat in the United States.

Following the war, PT-658 had been returned to California as a missile range chase boat at Naval Air Facility Point Mugu, near Port Hueneme. At the end of her active duty service, the boat was sold as surplus and to be restored as a personal yacht—a project which failed after a number of years.

Finally, the former PT-658 was discovered in 1993, beached and rotting away in California, by a group of PT boat veterans in the Portland, Oregon area. Purchased by the nonprofit "Save the PT Boat, Inc." (STPTB) organization, and with the cooperation of the Washington State National Guard marine transportation unit in Tacoma, the boat was shipped to the Navy and Marine Corps Reserve Center in Portland, in 1994, for restoration.



(Left) PT-658, in the Navy haze-gray paint scheme of her early restoration and operations period, is shown in 2007, running at 33 knots (38 miles per hour) on the Willamette River in Portland. Her owner, the nonprofit “Save the PT Boat, Inc.” has given rides to hundreds of WWII PT boat veterans and their families during her ten years of post-restoration operation. Photo from Classic Boat magazine, courtesy of Save the PT Boat, Inc.

(Right) When PT-658 arrived in Bremerton in late September, 1945, for turnover to the Russians under the “Lend Lease” program, she was painted in the camouflage colors seen above. Although the boat was equipped with older compressed-air-torpedo tubes requested by the Russians, she is shown here with newer Mark 13 torpedoes and roll-off racks fitted to all U.S. Navy boats after mid-1944. Photo by Wally Boerger, Save the PT Boat, Inc.

This began a challenging but very successful, two-decade-long process that restored and returned the PT to operating condition.

Many skeptics told the aging STPTB WWII veterans that, as former PT boat skippers—torpedo men, motor machinist mates (“Motor Macs”), gunners, and other crewmen—they were incapable of restoring a 78-foot, 48-ton, 40-knot capable wooden patrol boat. However, they and their younger volunteers proved the doubters wrong. After ten years of hard work, scrounging for parts, lumber and other materials, thousands of volunteer hours, and raising much needed funds, the fully restored PT-658 was returned to the water on the Willamette River in June, 2004.

After sea trials, and continual restoration and improvements through the years, STPTB volunteers, led by the late Navy Reserve Captain Harry Wiedmaier, have taken hundreds of PT boat veterans, their families and guests on commemorative PT “patrol” rides during the past decade. The boat has also participated proudly in the annual

Portland Rose Festival and many other civic and commemorative events.

The historical connection of PT-658 with Bremerton and Puget Sound during WWII make its story a fitting conclusion to three successive waves of Pacific Northwest PT boat history, from near the beginning of the war in 1942, to its end in 1945.

As the nation observed the 50th anniversary of President John F. Kennedy’s unfortunate assassination in November, 2013, his WWII exploits aboard PT-109 were among those recalled in many news media documentaries and other tributes. But the story of Navy PT boats operating in Puget Sound during this epic period of world conflict was little known. Researching, uncovering, and then chronicling this history has been both rewarding and fulfilling. Their story fills a topical void in the region’s naval heritage, and it also recognizes and honors those Navy crewmen whose military service helped make this hidden history. 🚩

Selected Bibliography

- Akin, John, Personal interview, Salem, Oregon, March 22, 2007.
- An Administrative History of the PTs in World War II*, Office of Naval History, Washington, D.C., February 15, 1946.
- Bulkley, Robert J. Jr, USNR (Ret.), *At Close Quarters: PT Boats in the United States Navy*, Naval History Division, Washington, D.C.: Government Printing Office, 1962.
- Chun, Victor, *American PT Boats in World War II: A Pictorial History*, Schiffer Publishing Co., Atglen, Pennsylvania, 1997.
- Friedman, Norman, *U.S. Small Combatants including PT Boats, Subchasers and the Brown Water Navy: An Illustrated Design History*, U.S. Naval Institute, Annapolis, Maryland, 1987.
- Gilmartin, Frederick Jr., Ed. D, Letters to Chuck Fowler, April 30 and December 30, 2011; and in-person interview, September 10, 2012, Sarasota, Florida.
- McClure, Grover Benjamin, Jr., Oral history Interview (video), February 25, 2000, New Canaan, Connecticut.
- Newberry, James M. (“Boats”) and staff, *Knights of the Sea*, P.T. Boats, Inc., Memphis, Tennessee, 1982.
- Polmar, Norman and Morison, Samuel Loring, *PT Boats at War: World War II to Vietnam*, MBI Publishing Co., Osceola, Wisconsin, 1999.



About the Author: Chuck Fowler

A Tacoma native, Chuck Fowler is the author of three Pacific Northwest maritime pictorial history books. He has also written many articles for other publications such as the Sea magazine and The Sea Chest. Fowler is a retired project planning and marketing consultant and he is a past president of PSMHS.



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As visitors approach the destroyer U.S.S. TURNER JOY, a Naval Memorial and Museum Ship on the Bremerton waterfront, they may not realize the significant role she played in the Vietnam War. Since she was opened to the public in mid-August, 1991, tens of thousands of people have toured the storied ship, which was in active Navy service from 1959 to 1982. Photo by Chuck Fowler.



U.S.S. TURNER JOY: Puget Sound's Naval Memorial and Museum Ship

By Lisle Rose

VISITORS' FIRST SIGHTING OF THE 1950s DESTROYER U.S.S. TURNER JOY (DD-951), at the Port of Bremerton's marina boardwalk, may be unaware that the Navy Memorial and Museum Ship, moored appropriately near the Puget Sound Naval Shipyard and Navy Museum, played a pivotal role in the United States involvement in the Vietnam War.

On the night of August 4, 1964, U.S.S. TURNER JOY, a seven-year-old, Seattle-built United States Navy destroyer, engaged in a furious naval action with North Vietnamese patrol torpedo boats in the Gulf of Tonkin off North Vietnam. Or did she?

By the summer of 1964, the United States had been militarily and politically engaged in supporting the Government of South Vietnam for over five years. The military coup against President Ngo Dinh Diem the previous November, had radically destabilized the political situation in Saigon. For the next seven months, South Vietnam was ruled by a series of rapidly revolving governments, few of which lasted more than six weeks. In this atmosphere of mounting chaos and steady gains within the South Vietnamese countryside by the North Vietnamese-supported Viet Cong guerrillas, the Pentagon and CIA developed the top secret "Operations

Plan (OPLAN) 34A,” under which a “covert series of U.S.-backed commando attacks and intelligence-gathering missions along the North Vietnamese coast” were to be “carried out by the South Vietnamese Navy.” The United States Navy was ordered to support OPLAN 34A through its own long-standing “Desoto program,” in which one or two destroyers further offshore in the Gulf of Tonkin conducted occasional reconnaissance and signals intelligence-gathering missions.

North Vietnam struck back, and on the afternoon of August 2, 1964, four torpedo boats rushed out into the international waters of the Gulf, finding and assaulting the lone Desoto-mission destroyer, U.S.S. MADDOX, which sank two of the attackers in the subsequent fight. Aircraft quickly summoned from the nearby aircraft carrier TICONDEROGA helped dispatch the last two.

Assigned to Assist Warship MADDOX

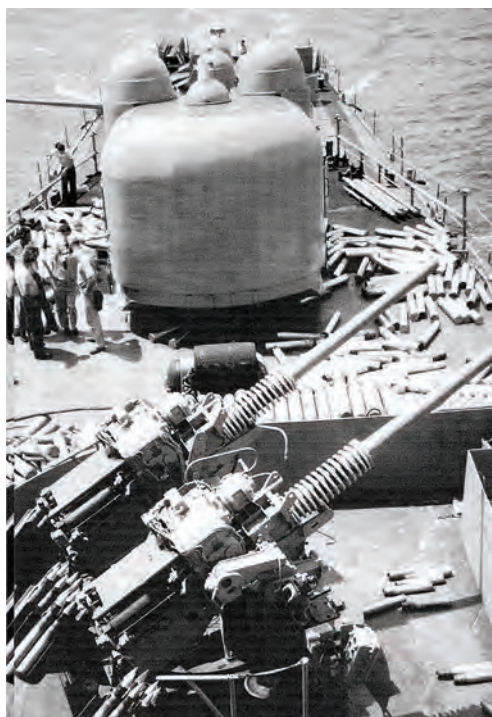
Promptly detached from her screening duties in the TICONDEROGA task group to support MADDOX, TURNER JOY, Comdr. Robert E. Barnhart commanding, reached her sister destroyer immediately after the attacks were repulsed, and remained on scene. At dusk two days later, amidst warnings of further possible North Vietnamese small boat attacks, deteriorating weather, and rising seas, TURNER JOY’s radar “picked up a number of what appeared

to be small, high-speed surface craft” approaching at long-range. A lone aircraft from TICONDEROGA piloted by Commander James Stockdale, later a vice admiral and U.S. vice presidential candidate, was promptly dispatched to the scene. “By nightfall, the unidentified radar echoes suggested that North Vietnamese small craft were converging upon the two American warships from west and south.”

Both Destroyers Engaged in Further Battle

Though the bulk of the alleged subsequent torpedo attacks and small arms fire were supposedly directed at MADDOX, TURNER JOY reported sighting one or possibly two torpedo wakes as both ships began high-speed evasive maneuvers. For the next two-and-a-half hours, TURNER JOY and MADDOX together “fired at supposedly hostile craft,” though none were ever sighted visually.

As the night of wild, stormy weather passed, Captain John Herrick, commander of Destroyer Division 192 (DD-192), who was riding aboard MADDOX, began to wonder, along with the ship’s captain, Herbert L. Ogier, if the attacks were in fact phantoms created by bad weather, poor visibility, and crewmen at radar and sonar sets—understandably spooked by the readily observable North Vietnamese attacks two days before. Several sets on both ships were inoperable, and their main gun directors were “never able to lock on to any targets” because, as one operator aboard MADDOX surmised, “the



Left:: After firing, TURNER JOY’s stern-mounted 5-inch gun turret is surrounded by spent casings on the deck. In the foreground is a battery of 3-inch guns with shells loaded. Photo courtesy Bremerton Historic Ships Association.

Above: U.S.S. TURNER JOY is seen steaming “ahead full” on the gun-line off the coast of South Vietnam in April, 1968. In a six-month period during that year, the destroyer’s gunners fired more than 24,000 rounds of 5-inch and 3-inch ammunition. Photo courtesy of U.S. Navy, Naval Historical Center and Bremerton Historic Ships Association.



The bunting-decorated bow of U.S.S. TURNER JOY looms over two spectators at the Puget Sound Bridge & Dredging Co. shipyard in Seattle. Launched and christened in May, 1958, the destroyer was named for Navy Vice Admiral C. Turner Joy, who was the senior United Nations Delegate and presiding officer during the Korean War Armistice negotiations in 1951. Photo courtesy of Bremerton Historic Ships Association

radar was detecting the stormy sea's wave tops." In his aircraft overhead, Commander Stockdale saw no sign of enemy small craft in the stormy dark seas below. He, Herrick, and Ogier passed their concerns up the chain of command. In Washington D.C., a series of meetings and phone calls resulted in the conclusion that in view of the first obvious attacks two days before, the second set of North Vietnamese assaults against two American warships in international waters must also have occurred.

President Johnson Takes Action

Eager to stem the political hemorrhaging in Saigon, and mounting defeats in the South Vietnamese countryside, President Johnson used the second attack as a pretext for arguing that North Vietnam had practically declared war on the United States in the Tonkin Gulf and adjacent South Vietnam (though no war was ever formally declared by either side). He quickly wrung from Congress a Declaration that authorized the chief executive to "take all necessary measures to repel any armed attack against the forces of the United States and to prevent further aggression." This blank check, which TURNER JOY and MADDOX practically if inadvertently wrote, sent the United States into its long and bloody venture in Southeast Asia.¹ Decades later, proud crewmembers and supporters would claim that TURNER JOY was the only ship to have fired both the first and last shots of that "Ten Thousand Day War."

Perhaps she did. In May of 1965, when Commander Robert McClinton relieved Barnhart, he spent much of the four-day-overlap period closely questioning his immediate predecessor and TURNER JOY's bridge and combat information center (CIC) people about what happened. All told their new skipper that despite the skeptics, they firmly believed there had been North Vietnamese torpedo boats out in the murk and the storm that August 4 night, which had fired torpedoes at the two American warships. Years later, McClinton encountered Captain Andy Kerr—a judge-advocate-general representative on the staff of Commander, Seventh Fleet at the time of the Gulf of Tonkin incident—who said that he had closely interviewed the bridge and CIC people of both destroyers within a few days of the incident, and that they had relayed the same conviction to him.²

Part of the American Cold War Fleet

Before, during and after Vietnam, TURNER JOY was an integral and honored part of an American Cold War fleet called upon to perform a multitude of tasks, along with mostly aging vessels from World War II. Like all of her type, she was a relatively small, but fast, general-purpose warship capable of fulfilling a variety of combat roles.

The last of eighteen FORREST SHERMAN-class destroyers, the vessel was built in Seattle by the Puget Sound Bridge and Dredging Company. Her keel was laid on September 30, 1957, and she was commissioned 22 months later on August 3, 1959. Four-hundred-eighteen-foot long, with a beam of forty-five feet, "TJ" as her 320-man crew affectionately called her, displaced just over four-thousand tons fully loaded. Her four Foster Wheeler 1,200 psi boilers provided steam to two General Electric turbines, whose 70,000-horsepower drove her through the water at a maximum speed of just over 32 knots. As built, TURNER JOY was armed with three 5-inch 54-caliber guns, and four 3-inch 50-caliber guns for surface action and anti-aircraft protection; plus "hedgehogs," depth charges, and special torpedoes for anti-detection radars, sonar, and fire-control systems. Her electronics suite enabled her to perform intelligence-gathering missions, and to more safely conduct battle force screening

activities; in all, a formidable naval weapons platform and system.

Named for Admiral Charles TURNER JOY, who climaxed a distinguished naval career as Commander Pacific Fleet, and Chief United Nations negotiator, during the Korean War—DD-951 was a typically hard-working ship. Home-ported throughout her career at Long Beach, she made no less than a dozen deployments to “WestPac” (Western Pacific) in the twenty-two years following May, 1960. In both war and peace she performed the multitude of roles for which she was designed, and then some. Prior to the 1965 escalation of the Vietnam War, typical WestPac deployments with the Seventh Fleet lasted six to seven months, followed by a year to eighteen months in-yard overhaul and upgrade status. This was followed by intensive refresher training and fleet exercise activities in Southern California and Hawaiian waters before undertaking another WestPac tour.

Serving as a “Grey Diplomat”

Both the training and the tours were grueling and unrelenting. In addition to the major responsibility for anti-aircraft and anti-submarine warfare, the ship’s company had to be proficient in battle force screening, plane guard work, independent radar picket duty, underway refueling and replenishment—and, after 1965, shore bombardment. TJ’s intelligence team had to be “up-to-the mark.”

One important activity for which there could be little formal training was as a “grey diplomat.” America’s Cold War Navy on all seas and oceans represented the United States and its values in every foreign port visited. During her career, TURNER JOY called at a number of major Asian and South Pacific port cities including Auckland, Sydney, Brisbane, and Melbourne (in 1967 to represent the U.S. in twenty-fifth anniversary celebrations of the Battle of the Coral Sea)—besides Kaohsiung, Hong Kong, Sasebo, Yokosuka, Pusan,



A North Vietnamese P-4 torpedo boat, of the type involved in the Gulf of Tonkin incidents of early August, 1964, is shown underway. The boats, capable of speeds up to 55 miles-per-hour, were equipped with twin 14.7 mm heavy machine guns and two torpedoes. Photo courtesy Bremerton Historic Ships Association.

and Bangkok. Before and following the Vietnam War, she also participated in several international naval exercises with allies in Asian waters.³

But war and training for war was her chief business. Throughout the early 1960s, TURNER JOY supported anti-submarine exercises off Japan; and on one occasion was pressed into patrol duty in the Taiwan Straits, during one of the periodic crises with Chinese Communists over the offshore islands of Quemoy and Matsu. In 1965, the ship inaugurated the Navy’s day and night gunfire support missions along the southern and eastern South Vietnamese coasts, as U.S. Army and Marine Corps units joined South Vietnamese forces to engage the Viet Cong in ever-greater numbers and intensity.

Comdr. McClinton inherited an exceptionally motivated and competent crew with a “vibrant attitude above and beyond” what might be expected. These values were pressed into service on September 25, when TJ, while providing round-the-clock “call fire” support, suffered a hang-fire or misfired shell in the after 5-inch gun mount. McClinton immediately instituted standard operating procedure; clearing the mount and waiting seventy minutes before asking three gunner’s mates to go back into the mount and back the shell out. Tragically, it ignited as they worked, “shredding” the three sailors, and the mount itself, and blowing down

the weapon’s department head, the “gun boss,” and two other sailors standing on the fantail nearby. Moments later, crewmen heard a cry in the water off the starboard bow, and McClinton sent a swimmer into the water who got the gun boss aboard. A helicopter hovered briefly overhead soon after, to take the wounded to the nearest shore-side hospital; and then TJ raced back to Subic Bay for repairs. The destroyer was back at sea within a week, screening for the ubiquitous TICONDEROGA.⁴

“Sea Dragon” Operations

From 1965 to 1973, TURNER JOY expanded her at-sea and combat time at the expense of shipyard repairs and upgrades; spending at least part of each year in Vietnamese waters where she earned no less than nine battle stars. While occasionally screening carrier task forces, the ship more often than not found herself part of the “Sea Dragon” inshore “gun-line” interdiction campaign; moving “hither and yon” along the Vietnamese coast, engaging in day and night long-range shore bombardment—to destroy enemy logistics and infrastructure, troop formations, and weapons concentrations.⁵ During her 1966/67 deployment, TJ fired over 9,000 rounds of 5-inch and 3-inch ordnance at targets along both South and North Vietnamese coasts. At one point during her Sea Dragon operations, the ship suffered minor topside and below



A bronze statue of a ship worker presenting a ship model to a young boy—and a ship's propeller was placed on the Bremerton Boardwalk to commemorate the 100th anniversary of the Puget Sound Naval Shipyard in 1991. The propeller blades frame the superstructure of U.S.S. TURNER JOY, seen in the background at upper left, moored at the north end of the boardwalk. Photo by Chuck Fowler.

decks damage while exchanging gunfire with a North Vietnamese shore battery. “In the six months of Gulf of Tonkin operations during 1968, TURNER JOY expended nearly 24,000 rounds of 5-inch and 3-inch gun ammunition during some 200 assigned missions, accomplishing a variety of tasks in both South and North Vietnam.”⁶

Time to be Overhauled and “Re-Gunned”

During her 1972 overhaul, the destroyer was “re-gunned.” While she parted with her 3-inch batteries and torpedo tubes, she was armed with the first new 5-inch/54 Mod 10 rapid-fire mounts in the Pacific Fleet. Her crew size was slightly reduced as a result of these changes to roughly 290 men. Returning to the war zone, TURNER JOY helped finish the war she had started. During the final month, the ship fired over ten-thousand rounds from her new 5-inch guns in support of combined U.S./South Vietnamese military efforts around the old Demilitarized Zone; while continuing her Sea Dragon operations against targets and shore

batteries in southern North Vietnam. “TURNER JOY fired the last naval gunfire against opposing forces as the ceasefire began on January 27, 1973.”⁷

Continuing to Serve

Always and on every occasion, the military culture of demanded excellence clamped down on ship and crew with a rigidity that never relaxed. Like every unit in a task force or group, TURNER JOY was under relentless scrutiny. Conduct had to be consistently “outstanding” and “4.0.” Exercises and maneuvers had to be “superior.” Commanding-and-senior officers and enlisted people endured stress and tension that never relaxed until periodic shore leaves in Yokosuka, Subic Bay, or elsewhere provided a variety of much needed, if temporary, diversions.

With war's end, the operational pace set by Cold War policy and objectives barely slackened. In 1974 and 1975, TURNER JOY deployed twice to the Western Pacific, where she expanded her operational range from the Sea of Japan, down into Australia's Tasman Sea—and out into the Indian Ocean and

Persian Gulf for temporary additional duty with the Third Fleet. At one point, she engaged in combined training operations with the Pakistani Navy.

Repair/Reserve Status

Nearly two decades of shooting, hasty repairs to light damage, intense steaming, and high speed operations; without time for sufficient overhaul had their effect on the destroyer TURNER JOY. In 1976, she failed her power plant evaluation and spent most of two years in repair status. Moreover, a new generation of more capable SPRUANCE-class destroyers was beginning to join the fleet, effectively displacing the eighteen FORREST SHERMAN-class ships on the Navy register. Following her 1982 deployment, the Navy announced that TURNER JOY and all her sisters would be retired, concluding that further upgrades and repairs to the ships would not be cost-effective. On November 27, of that year, TURNER JOY was formally de-commissioned

An Important New Role for TURNER JOY

For over five years, the destroyer languished in reserve status at the Puget Sound Naval Shipyard until a new role abruptly beckoned. A group of Bremerton business leaders, retired Navy officers, and local boosters seized upon the idea of placing a naval memorial and museum ship adjacent to the Bremerton ferry dock and near the Bremerton Navy Museum—now replaced by the Puget Sound Navy Museum. The ship would be both a celebration of the Washington State centennial, and a way to help revitalize the downtown waterfront. A project-marketing brochure explained, “By complementing each other, the Bremerton Naval Memorial ship project and the Bremerton Naval Museum could be cross-marketed with other related attractions in the area, especially the new Naval Undersea Museum at Keyport.” TURNER JOY perfectly fit the desire for a “contemporary but

historic naval ship” of proper size to become a floating museum, yet not so large as to impede traffic in and out of Sinclair Inlet.⁸

After more than twenty years, the TURNER JOY complex with its shore-side interpretive exhibits, gift shop, and nearly unprecedented visitor access of onboard spaces and weapon systems, remains the only major warship in the Pacific Northwest regularly open for public tours.

By synergistic circumstance, in 1991, Navy Rear Admiral McClinton—then retired and living in Sequim, Washington—was asked to join the board of the Bremerton Historic Ships Association (BHSA). The BHSA had been formed as a nonprofit organization to help raise funds for TURNER JOY’s restoration and return to duty as an historic Navy ship. As the ship’s fourth commander, McClinton was recruited by board members and consultants to be a credible project leader. He effectively and successfully urged potential donors to contribute their “time, talent and treasure” to the major restoration project.

In all, more than \$ 400,000 was raised from individuals, businesses, state and local governments, and foundations to place the Seattle-built and PSNS-maintained destroyer on the Bremerton waterfront as an appropriate naval memorial and museum ship.

Today, U.S.S. TURNER JOY continues to remind visitors, and local residents alike, of the vital military roles played by Navy vessels worldwide in both war and peace. 🚩



About the Author: Lisle Rose

While serving in the U.S. Navy, Lisle Rose first came to the Puget Sound area in 1955, and returned permanently in 1989. A retired U.S. State Department official, he is the author of a dozen books, including the three-volume naval history, *Power at Sea*. Rose currently serves as the secretary of PSMHS.

Endnotes

1 Pat Paterson, “The Truth About Tonkin,” *Naval History*, 22, no. 1 (February 2008), pp. 52-59. Quotes on pp. 52, 55, 56. For the Turner Joy’s role see USS TURNER JOY (DD-951) Reunion Group, “History,” <http://www.ussturnerjoy.com/tjhistory.aspx>.

2 Telephone Interview with Rear Admiral Robert McClinton, USN (ret.) July 14, 2013.

3 “NavSource Naval History Destroyer Photo Index DD 951 USS TURNER JOY,” <http://www.navsource.org/archives/05/951>; USS TURNER JOY (DD 951), “Ship’s History” and “WestPac Cruise, 1982” cruise book <http://navysite.de/dd/dd951.htm>.

4 McClinton interview.

5 Ibid.

6 “More TURNER JOY History as Forwarded by VADM Edward S. Briggs,” USS TURNER JOY (DD 951) Reunion Group “History 2,” <http://www.ussturnerjoy.com/tjhistorymore.a>.

7 Ibid

8 Bremerton Historic Ships Association, “Preserving and Renewing Our Naval Heritage: The Bremerton Memorial Ship Project” (Bremerton, WA: n.d.), unpaginated.



Top: Laid up in 1983 at the Puget Sound Naval Shipyard’s Inactive Ships Maintenance Facility, the destroyer TURNER JOY, DD 951, would spend more than seven years as part of the Pacific Reserve (“mothball”) Fleet. In 1991, she was acquired on loan from the Navy by the nonprofit Bremerton Historic Ships Association to serve as a memorial and museum ship on the downtown waterfront. Photo courtesy of Bremerton Historic Ships Association.

Bottom: This aerial view of the downtown Bremerton waterfront shows U.S.S. TURNER JOY, at far right, serving as both a breakwater for the Port of Bremerton downtown marina and also an appropriate naval memorial and museum ship. A waterfront boardwalk and plaza connects the ship with the Puget Sound Naval Shipyard and Navy Museum (top), the Washington State ferry terminal, a hotel and restaurant complex and condo residences. Both photos courtesy of the Bremerton Historical Ships Association.



A United Boat Builders 31-foot Navy PBR (Patrol Boat River) completes a 180 degree, hairpin turn on Bellingham Bay during sea trials in 1966. The company built about 250 of the fast, maneuverable patrol boats for the Navy and Army during the Vietnam War. Photo courtesy Don Rubeneck.

Vietnam War River Patrol Boat Innovator: Art Nordtvedt and the PBRs

By Todd Warger

WHEN THEN 35-YEAR-OLD Arthur “Art” Nordtvedt established United Boat Builders, Inc. in Bellingham in late 1957, he developed a “Tri-Legged System” to diversify his product line and help insure the success of his fledgling company. This approach guaranteed year-around production of his fiberglass boats of up to 48-feet, and employment of a minimum workforce of 400. The Tri-Legged System was based on producing three separate lines of boats: pleasure craft, commercial designs, and military variations.

But it was one particular military variant, the Vietnam

War era 31-foot Patrol Boat River (PBR)¹ for the U.S. Navy that elevated United to national boat builder prominence and financial success. By the end of production in 1968, the company had built about 250 of the widely-known, highly-regarded small patrol boats for use in Vietnam.

Before founding United, Nordtvedt was general manager at Bellingham Shipyards. After overseeing the construction of 48 wooden minesweepers up to 180-

¹ PBR: The acronym for the U.S. Navy designation of a rigid-hulled patrol boat used in Vietnam, called “Patrol Boat, River” or “Patrol Boat Riverine.”



Left: Through his working knowledge, innovation and savvy, the late Art Nordtvedt built his Bellingham-based company into a recreational and military boat building leader. Respected by both his United Boat Builders (UBB) employees and the military crews who drove his boats in South Vietnam, he epitomized the best of qualities of a hands-on company executive. Photo by Linda Wright Photography.

Middle: This aerial view of the UBB manufacturing plant in Fairhaven shows the main building where PBRs, Uniflite pleasure craft, and commercial boats were built. The company expanded to this Bellingham waterfront site in early 1959. Photo courtesy of Todd Warger.

Right: More than 15 newly-built PBRs are lined up outside the UBB plant on the Fairhaven waterfront in south Bellingham. The boats are ready for final outfitting and testing before delivery to the Navy. Photo courtesy Todd Warger.

feet, and more than 480 LCVPs (Landing Craft Vehicle Personnel) for the U.S. Navy in 1955-1956, he had accumulated a solid record of military boat building experience. Things moved fast for Nordtvedt at United, and the company became well-known and respected within the Pacific Northwest boat building industry.

When interviewed by a *Bellingham Herald* reporter at the beginning of United operations in 1957, Nordtvedt said of his production team: “We’re just a young bunch of guys banded together, doing the thing we love and enjoy—boat building. I can assure you of this, we have the ability, desire and know-how to succeed.” And succeed they did.

By January 1959, United had outgrown its location and moved the facility onto the Fairhaven waterfront in south Bellingham. This manufacturing facility included nine acres and a 100,000 square-foot building. United continued its rapid growth with its line of recreational fiberglass boats of various sizes up to 48-feet.

Once full production was underway at the new location, the company first sought and won a series of commercial-craft contracts. United commercial-production boats included all craft not targeted for military or pleasure craft

use. Its vessels were widely used for charter operators, and operations on the Alaskan North Slope oil fields. Other examples of commercial craft included law enforcement and harbor patrol boats, fishing charters and fishing boats, custom boats, and water taxis.

As these production lines started turning out boats, Nordtvedt was able to concentrate on military contracts; turning United into the major supplier of fiberglass boats and small craft for the U.S. Navy. Ultimately, the company would produce more than 1,500 Navy vessels.

Again, United outgrew itself. In 1966, two additional 24,000 square-foot buildings were constructed to meet business demands. The company was now recognized as a leading boat builder not only regionally but throughout the nation. Therefore, it was not surprising that Nordtvedt would eventually land the most important naval contract on which United would ever bid.

The Need for a Riverine Warfare Watercraft

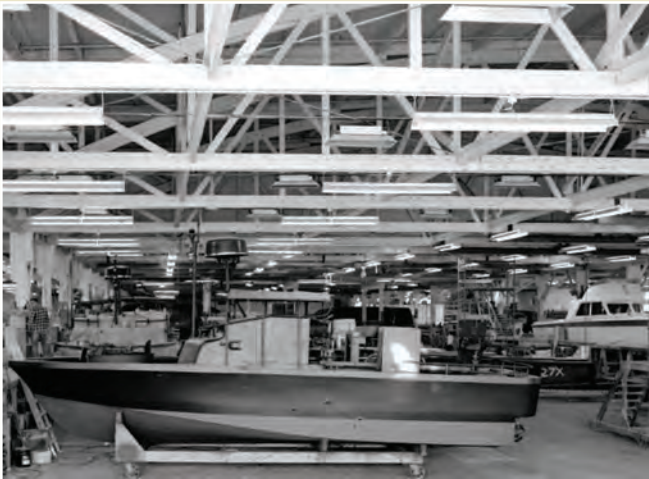
In early 1962, the Research Analysis Corporation² (RAND Corporation)

completed a study on growing North Vietnam Army Viet Cong activities in the waterways of South Vietnam. The research highlighted Viet Cong ambush tactics and their effectiveness against present combating countermeasures. It was becoming obvious that those navigational transportation routes were used to supply weapons to guerrilla forces conducting paramilitary attacks against the Army of the Republic of Vietnam (ARVN) forces in South Vietnam. At this time the United States was providing military assistance to its allied nation in Southeast Asia.

The most critical areas of concern were the rivers and canal systems of the Mekong River Delta region.³ This was South Vietnam’s main economic artery for the transportation of food, goods and commercial trade. Further reports emphasized the critical importance of the Mekong waterways, and warned that Viet Cong forces had nearly overrun its length and estuaries, with an added threat of becoming a potential North Vietnam Army incursion route. In 1962, U.S. and ARVN forces had only a small, inferior, and mixed river force to defend the waterways, including ancient converted landing craft. Many of these

² As part of the April, 1962, Symposium of Counterinsurgency, sponsored by the Rand Corporation’s Washington office.

³ The Mekong region was known as “The 9 Dragons” for its nine tributaries.



Top-left: Two powerful Washington State political leaders, Senator Henry M. "Scoop" Jackson (middle), and 2nd District Representative Lloyd Meeds (right), watch Nordtvedt demonstrate a 50 caliber machine gun in 1966 aboard a UBB-built PBR. Both longtime congressmen were strong backers of the PBR contract award to the Bellingham boat building company. Photo courtesy Whatcom Museum.

Top-right: Two United Boat Builders workers assemble the main bulkhead bow-to-stern stiffening section to a PBR hull. Efficient construction methods allowed each PBR to be built in eight days. Courtesy Tim Southerland, Sea Cure.

Middle: Two boats of Art Nordtvedt's "Tri-Legged System" to diversify his UBB production and market are shown here. The 31-foot recreational cruiser, at left, was a mainstay of the early product line and sales; and modified and re-engineered, it became the highly successful PBR (Patrol Boat River) widely-deployed during the Vietnam War. Photo courtesy Todd Warger..

Left: A nearly completed PBR, left, is pictured alongside a UBB pleasure craft on adjacent production lines at the Fairhaven plant in south Bellingham. The manufacturing facility had waterside access, allowing PBRs to undergo sea trials immediately after installation of engines, water-jet pumps, and final fitting out. Photo courtesy Don Rubeneck.

vessels were leftovers from the French-Indochina War in the 1950s. They were slow, awkward in maneuvering, drew too much water, and out-gunned. They were also “sitting duck” targets against small and heavy arms fire, B-40 rockets, and rocket-propelled grenade (RPG) attacks.

Two years later, a Vietnam Delta Infiltration Study Group concluded that Viet Cong forces had started to use the Delta region as a major trafficking zone, unhindered by resistance. The need to reverse the situation was imperative if the war were to be won. U.S. Navy Commander Jack Endacott (See footnote 4) theorized that the control of inland and coastal waters would be vital to suppressing an insurgency and warned of the need to develop a capable, deployable riverine warfare force, complete with specialized doctrine, training, weapons and craft.⁴

In January 1965, the Weapons Planning Group of the Naval Ordnance Station at China Lake released a report entitled “Revolutionary Warfare on Inland Waterways: An Exploratory Analysis.”⁵ The report suggested a new breed of riverine warfare craft for use in a hostile jungle environment of river combat. The Mekong Delta was a labyrinth, which included thousands of miles of waterways and canals with narrow and shallow estuaries. Vegetation was extremely thick. The rivers were full of obstacles with stumps, weeds, trees, shallow silt, and various sorts of water debris. And then, there was the enemy—hidden within fortified, camouflaged bunkers. They

possessed countless places to lie in ambush with heavy weapons and could deploy water-mines.

After reviewing the report, the Ordnance Department, of the Unconventional Warfare Office, created a circular of requirements for a 28-to-35-foot, shallow-draft hull of either aluminum or fiberglass construction. A weed-hindering propulsion system or water-jet propulsion was deemed mandatory. Speed and maneuverability were essential. Urgency was a top priority, and the report suggested the use of perspective “military craft under development or commercial boats adapted for military use.”⁶ There was no time to design and build a craft from scratch.

A month later, the Naval Advisory Group of the Military Assistance Command Vietnam, established the criteria for a riverine, inshore patrol boat in a study titled “Naval Craft Requirements in a Counter-Insurgency Environment.”⁷ With that, the ball was rolling for the eventual production of a new form of combat riverine craft for the escalating Vietnam conflict.

Willis Slane of the Hatteras Yacht Company & PBR Contract Controversy

For decades, there has been lingering debate regarding the Hatteras Yacht Company’s direct involvement in the development of a river-patrol craft, and the Navy’s contracting process for such a craft. Little has been documented of the involvement of Willis Slane, the president of Hatteras Yacht Company of North Carolina, in the development of riverine warfare during the Vietnam War; except that he did offer a prototype craft of his own design.

In 1965, Slane, founder of the Hatteras Company, accompanied by his naval architect, Jack Hargrave, were invited to a meeting in Washington D.C., with other boat manufacturers. A Navy

captain from the Ordnance Department was said to be making a desperate plea to acquire a shallow-draft craft within the 30-foot range that could run at speeds up to 30-knots. They were looking for an existing hull, which could be adapted for operation on the murky, shallow rivers of Southeast Asia.

Hargrave was said to have turned to Slane during the meeting and indicated that with a pair of water-jet pumps, they could meet those specifications with their current 28-foot sporting-boat hull. According to Hargrave years later,⁸ Slane stood up and said, “Excuse me captain, I have just put into production a very fast, broad-beamed hull, 28-feet long, that might do the job.” After gaining the group’s attention, Slane continued, “If we could drive her with water-jet pumps, we wouldn’t have to contend with shafts, propellers, and rudders. That would allow us high-speed operation in very shallow water.”⁹

The captain asked, “When could we [the Navy] expect a formal proposal from Hatteras?” Slane responded, “Proposal, hell! I haven’t got time for that paperwork stuff. I’ll build the damn boat and then you can come down next week and ride in it.”

Returning to his High Point, North Carolina office, Slane took two 28-foot production hulls that hadn’t received their engines—and had his crew equip them with Indiana Gear Works water-jet drives. Needing a powerful power plant, Slane bought a set of supercharged diesel Daytona engines to be installed. A week later, he had a prototype in the water, running at 30.5-knots with a 165-mile range. He was ready to show off his prototype design to the Navy, and took one of the boats to Washington D.C. for a demonstration.

4 For more details regarding these studies see the thesis presented to the Faculty of the U.S. Army Command and General Staff College titled: “The Rise and Fall of the Brown Water Navy: Changes in US Navy Riverine Warfare Capabilities from the Vietnam War to Operation Iraqi Freedom.” by Jason B. Scheffer, LCDR, USN, 1994.

5 The origin of this report could very well explain how the Ordnance Department, under the auspices of the Unconventional Warfare Office, were the first to take charge for a combat river craft, rather than the Bureau of Ships’ small boat division. (The bureau would change the following year to BuShip and later NAVSEA.)

6 Ibid.

7 Ibid.

8 The origins of previous research typically goes back to an article in *Yachting* by Boughton Cobb, Jr., titled “River Boat Patrol for Vietnam,” and the recollections of Hatteras’ naval architect Jack Hargrave, Sarah Phillips and Fred Joest. See: Cutler, Thomas J., Lt. Cmdr., *Brown Water, Black Berets*, USN: US Naval Institute Press, 1988, for the best source regarding this history.

9 Ibid, Cutler.



This restored and fully-operational PBR—owned, operated, and exhibited by the Northwest Chapter of Gamewardens, an affiliate of the Vietnam Veterans of America—escorts the Navy frigate U.S.S. FORD to her moorage at Naval Station Everett, in 2008. (The frigate FORD was named for a young Navy PBR machine gunner who was killed in action in Vietnam, and posthumously awarded the Navy Cross for his bravery in combat.) Photo courtesy Gamewardens of Vietnam, Northwest Chapter.

As Tommy Henshaw, a longtime Slane employee at Hatteras recalled, “I was working in Morehead City, and he [Slane] brought one [of the prototypes] down to Spooners Creek, and I had a chance to ride on it when he was driving. He tested that boat to the limit,” Henshaw said. “It was fast [and] would turn and stop on a dime.”¹⁰

Art Nordtvedt of United Boat Builders Becomes Involved

While Slane was developing his prototype, word of his negotiations with the Navy reached United’s Art Nordtvedt, some 3,000-miles

¹⁰ “The Making of an Empire: Hatteras Celebrated 40 Years of Building the Finest Cruising and Sportfishing Yachts in the World,” Hatteras World, Roy Attaway, Fall, 1999.

Also found at www.hatterasowners.com/hatterasstory.htm

away in Bellingham. “I had heard through [informal] channels in the industry that Slane was dealing with the [Navy] Ordnance Department to develop a river patrol boat for use in Vietnam,” said Nordtvedt. “I wondered why the Bureau of Ships’ small boat division wasn’t involved at the procurement level, and where the circular requirements and contracts had originated from.” He continued, “I had known [Fred] Joest who worked at the bureau; he was in San Diego at the time and so [I] called to inquire what he knew about this. In the end, [I found out that] the Ordnance Department shouldn’t have been involved.”¹¹

¹¹ All quotes from Art Nordtvedt came from a series of interviews which took place at his Bellingham home in 2006, by the author and David Lowrance.

Nordtvedt noted that Joest¹² headed the small boat division from his Washington D.C., office with four project engineers. “They oversaw the Navy’s procurement of 5,000 craft up to 85-feet in length, and were responsible for the purchase, bids, designing, construction, maintenance and repair.”

Subsequently Joest got a call from Nordtvedt requesting information about bids going out to other boat builders on the project, and asking why the Navy Ordnance Department

¹² Upon joining the U.S. Navy Bureau of Ships (Now NAVSEA) in 1964, Fred Joest became Project Engineer for Boat Acquisition and Maintenance. Since 1967, he has served as Deputy Director, Amphibious (now Amphibious and Auxiliary) Ships Logistics Division, Naval Sea Systems Command; Washington D.C.

Note: Mr. Joest was the 1971 recipient of the Navy Civilian Meritorious Service Award.

was spearheading this effort. Mystified, Joest said he'd look into the matter.

"Someone at the Unconventional Warfare Office talked with the people at Hatteras about a quick prototype to sell [to] the Navy," Joest reported back to Nordtvedt. In thinking back about this situation, Joest commented: "Why they went to Willis Slane I have no idea; this was not proper procedure. I called Art and told him that no, this contract has to go out to bid and that [everyone] needed a fair chance to bid, build and deliver." At the time, Joest promised that he would get a project-bid circular out on the street as fast as possible.

Joest also recalled: "There was a great need for a large quantity of riverboats by the Unconventional Warfare Office. They were asking for 120 boats with a three-month turnaround after awarded. I was given a photograph of Slane's boat, and a

single sheet of specifications that the [Navy] Ordnance Department had written up. I needed those specs in making a circular of requirements, which bonded bidders to a mandated speed—with a full armament load, a range, detail builder's plans, materials, bid price and method of construction. You let the [boat building] industry respond to that. We knew responses would be few, by not allowing a company time to build a mold, but using an existing hull. We gave them only a week to respond."

Meanwhile, back in Bellingham, Nordtvedt did his own research and made contacts regarding what Slane had been up to. Nordtvedt discovered that he had had a few weeks' advance notice over other competitors before the circular was published. In addition, he found out that the Navy needed 120 River Patrol Boats (PBRs), and



In the mid-1980s, Vietnam War-era PBRs, Swiftboats, and other Navy combat craft and their crews were involved in "Exercise Northern Hawk." Simulated combat operations were carried out in the Indian Island and Whidbey Island areas. Photo courtesy U.S. Navy Special Boat Unit 11.

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they wanted them fast. The Ordnance Department circular requirements outlined everything the Navy wanted—including weight capacity, speed, and configurations for armament—including .50 and .30 caliber gun turrets fore and aft. They were simple requirements he thought, and boat builders eventually would have to submit their own designs. While the Bureau of Ships was getting things straightened out, Nordtvedt decided to do some testing of his own.

Continuing with his recollections, Nordtvedt said: “I knew Hatteras was attempting to use their 28-foot hull. So, I started with the requirements that the Ordnance Department had given to them. I drew my outline on a drawing board in two days, and did a lot of experiments on our 31-foot fiberglass sports-cruiser hull. I had to

Under the tightly-drawn contract, each overdue boat would cost the company a \$500 per-day penalty.

make some changes to the bottom of the hull to accommodate for weight, and made the beam six-inches wider to 10-feet, 7-inches. The new hull was an improvement over the 31-footer and that design was passed on to the pleasure boat. The boat was soon in the water as we began checking speed and handling characteristics.

“Hatteras went with Indiana Gear Works for their water-jet pumps, but I didn’t find them powerful enough. They were also experimenting with Daytona diesel engines, and again, I wanted a better power plant. I started tests on the water jet propulsion units by Berkeley and Jacuzzi Brothers. I used gas engines to see if I could get the speed up with the load-carrying capacity requirements. The speed specification was 25-knots, fully loaded—not to mention carrying 160-gallons of fuel. As for weight, I could guarantee 13,500 lbs., but the Navy added a certain amount of

displacement for combat weight. We eventually had a 16,500-pound vessel that took into account ammunition, guns and crew. It took some work to get this thing running properly and to carry the weight. I did all this preliminary work to be on solid ground; otherwise, United would have lost the bid, and the contract. I was ready.”

United Won the PBR Contract Over Other Boat Builders

Based on their commercial hulls, several well-known boat builders submitted plans and bids for the PBR contract. In addition to United Boat Builders from Washington, those that participated were Hatteras Yacht Company in North Carolina, Bertram Yacht Company and Boston Whaler in Florida, Chris-Craft in Michigan, and Bay Shipbuilding in Wisconsin.

Fred Joest remembered the bid evaluation process: “We evaluated those bids quickly when the proposals came in, and I had a team ready to go as it was a top priority. We picked the best proposals that technically could do the job. Then we looked at the price proposals. We knew right off it would have to be someone with a hull that could be modified for the application. We looked at the bids to see who could provide the best performance requirements, and where others would fall short. When we saw the United package, we said, ‘This is where we want to go.’ United won the low bid at \$75,000 per boat.”

It is doubtful whether the Hatteras Yacht Company was ever in the running for the contract. Their river patrol boat prototype design may have been impressive on its test run, but the North Carolina boat builder had no previous history with the Navy; and as a result,

it would have been risky to award a contract for such a priority program. In addition, the company’s assembly line was not geared toward the rapid construction of 120 river patrol boats within a three-month period.

What Willis Slane’s intentions were after developing his prototype, or if he would have contested the contract decision, we’ll never know. He died of a heart attack on November 7, 1965, shortly after the test run of his prototype—and before the official award of the contract. He was just forty-four years old.

The Patrol River Boat, MARK I Version

In late November 1965, United Boat Builders was awarded the highly valued PBR contract. The company organized for production in Bellingham, tooling three additional 31-foot hull and deck molds. The order began on January 1, 1966, and United had until April 1 to deliver 120 PBRs. Under the tightly-drawn contract, each overdue boat would cost the company a \$500 per-day penalty.

The United design was an olive-drab, fiberglass 31-foot river patrol craft¹³ based on the company’s Uniflite sport-cruiser design. The military variant had a turret up forward for a twin .50-caliber machine gun in a rotating tub, and a fixed .30-caliber machine gun on the stern¹⁴. The boat’s helm station featured a windscreen with a soft canvas top. The coxswain station was on the portside with two FM radios and control panel. A Raytheon radar was mounted atop the helm station. The coxswain station and gun-mounts had ceramic-armor plating that could stop small arms fire.

Installed tightly under the deck were two GM 220-hp 6V53N diesel engines with no gearbox, since there was no reverse, nor propeller. Instead, it had a flexible shaft with a U-gate and water nozzles that were powered

13 Patrol River Boat, PBR MK.I

14 Later changed to an additional .50-caliber machine gun.

by Jacuzzi 14 YJ water-jet pumps. The pumps were mounted with the intake at the bottom of the boat, which then ran up through the boat and out an opening in the stern. The water would be sucked up through the line and passed through an impeller that would accelerate the water flow, shooting it out of the stern at high thrust. The water nozzles also controlled the steering. When the U-gate was lowered to cover the water nozzles, the water jet was rerouted 180-degees, stopping the boat within two boat lengths and turning the boat around "on a dime." This gave the PBR exceptional maneuverability.

The contract included government equipment, furnished by the Navy Supervisor of Shipbuilding in Seattle, to outfit each boat. Small arms, hand-radios, machetes—and even a Polaroid camera, prized at the time, were included in an accompanying assembled materials package.

The first ten boats were delivered to the Navy in mid-January, 1966.

The contract included building the boat, running it for an hour to meet naval requirements, loading the boat on a truck, strapping it down, and delivering it to Pier 91 in Seattle. They were then shipped to Naval Operations Training Center, Mare Island, where the first crews would train to operate them. Subsequent boats were shipped to Vietnam to meet their trained crews when they arrived. The 120th boat was delivered on April 5, 1966, and the Navy forgave the four-day delay penalty. Also, an amendment was added to the original contract to produce another forty boats.

With his production procurement experience, the Navy's Fred Joest was now the contract administrator. "It was exciting to see something come to fruition so quickly," he said. "The team was very dedicated, not just in fulfilling the contract, but also in doing the job right."

However, the first boats didn't quite meet the performance require-

ments, and United wasn't impressed with their ability to carry the combat load at 25-knots.

"So, we went on a weight witch-hunt," Joest recalled. "We went through the boats piece by piece." The bow-mounting ring for the .50-caliber machine gun was originally steel and it was remanufactured in aluminum. Any weight savings that didn't affect the structural integrity were altered until Nordtvedt and Joest were happy with the results.

"One morning I walked into Art's office," Joest remembered, "and he was lying on the floor, underneath a model of the bottom of the boat. He was studying water flow, wanting to get more water through the [water-jet] pump—I got a chuckle out of that."

The fact that Nordtvedt got down on the floor to work out a design problem was one of the successes of United, whose corporate dedication reached from top management down to the employee production-line level.



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The fact that Nordtvedt got down on the floor to work out a design problem was one of the successes of United, whose corporate dedication reached from top management down to the employee production-line level.

The Patrol River Boat, MARK II Version

Even though the Navy operated the first version of PBRs with much success on the Mekong River Delta, they soon placed orders from United for a modified version known as PBR MARK II (MK.II). By January, 1968, 160 of the new model boats were delivered, with a total of more than 300 constructed by the end of the program.

“The MK.II version was simply what we optimized from the first boats,” Joest said. “It was my designers that came up with the plans and specs for the MK.II as we saw the need for more boats. The changes were designed to improve boat performance, which meant an increase in payload, but still maintaining 25-knots.

“Art’s original MK.I boat had a ‘deep-vee’ design, which was commonly used in rougher coastal waters. And, we were operating in riverine waters so we didn’t need the amount of ‘dead-rise’ that was in those first boats. And, when you flattened the dead-rise out, you can enhance its weight bearing capacity.”

The new PBR variant was 32-feet long and its beam was increased to 11-feet, 5-inches. This increased its weight carrying capability over a broader area.

Joest also noted: “It’s a balance between reducing the deep-vee and increasing the beam with the existing horsepower. If we could have had another 100-horsepower, we would have been delighted. It would have made all sorts of difference.”

Another change was aluminum gunwales to resist wear when docking and boarding vessels.

The patrol river boat MK.II added several hundred pounds of capacity-enabling additional armament; most

commonly two M60 machine guns on the port and starboard sides, and a 40-millimeter grenade launcher. Some boats maximized their firepower by adding a 20-millimeter cannon forward, or placing an 81-millimeter mortar toward the stern.

PBR Operations and Modifications in Vietnam

Once in Vietnam, Navy and Army PBR crews constantly made boat modifications, trying to gain more performance. They added armaments, protective shielding, and tweaked their engines for more power. Each modification, of course, carried its own problems. Added firepower and shielding, reduced speed; reducing speed made the boats vulnerable to rockets and ambush. The faster boats forfeited both firepower and shielding.

Most crews discovered that their greatest weapon was speed and maneuverability exiting the combat zone. “Hot-dogging” it out of harm’s way; then hitting back was the key to survival. The hull’s fiberglass varied in thickness up to a half-inch, so unless a Rocket-propelled Grenade (RPG) or small arms fire hit the engines or something equally solid, most projectiles would pass straight through the hull, and detonate after exiting. With floatation built within the boats, they were nearly impossible to sink.

On December 18th, 1965, the river patrol force of Task Force 116 had been established to carry out “Operation Game Warden.” The operation was the U.S. Navy’s interdiction of the Viet Cong from using the Mekong Delta, and its region, to channel arms and supplies to South Vietnam. New naval bases were established as part of these operations.

The first eleven PBRs of Operation Game Warden’s river patrol force had arrived from the United boat builders on March 21th, 1966, at Nha Be—followed by nine more a week later. Newly-arrived crews were trained and indoctrinated in the Vung Tau area, where numerous boat modifications were made and experiments performed. The first of eight permanent Game Warden Naval support bases was established at Cat Lo. The Operation had entered its initial stages as the first PBRs became operational. For the next six years, the fast, maneuverable United small boats would contest enemy movement; winning many battles, and virtually suppressing Viet Cong activities on the Mekong Delta.

When asked what he remembered most about these PBR operations, an author and former Navy Machinist Mate 3rd Class Ralph Christopher,¹⁵ who as a crewman went on hundreds of patrols, said it wasn’t so much the combat action or the newfound brotherhood of the crew, but rather the boat. “I always thought the most impressive thing about the boat,” he said, “was the U-shaped gate over the water jets. It allowed the boat captain to come to a sudden stop, and turn 180 degrees at full speed in its own backwash; quickly changing directions in one length, and to a dead stop in three lengths. The boat captain had to yell out ‘Turn!’—or our crew men went over the side.”

¹⁵ Ralph Christopher is the author of four books on the riverine war in Vietnam. He served with great pride on a PBR and has provided the author with volumes of materials about the conflict on the Mekong—much of which I have used in this article.

Overall Fred Joest remembers that: “There was a need. And we busted our butts to fulfill it with success. And the men in the field beat back the enemy because of that.”

Although Nordtvedt traveled to South Vietnam to see and experience his United PBRs in action, the close connection between Art and the crews who served on them became even closer after the end of the war in April, 1975.

Nordtvedt still continued his involvement in boat building after United Boat Builders was sold in 1968, and its name changed to “Uniflite,” which had been the name of its recreational boat line. He was an active marine designer and construction consultant for more than four decades—also working with Ocean Alexander Yachts of Taiwan, his sons and son-in-law at Nordic Yachts and NorthStar Yachts—and pursuing other community projects in the Bellingham area.

Arthur Nordtvedt was 91 years old when he passed away on October 1, 2013. And with each passing year after leaving United, he had been thanked by countless Navy and Army PBR veterans. He received hundreds of letters of gratitude and was honored during many veterans’ reunions—the last one in Bellingham shortly before his death.

In return however, Nordtvedt always refused to take singular credit for the boats he designed and built. Adamant, each time he was thanked, he would say, “It’s my crew you want to thank, not me.” This truly heartfelt sentiment reached back to Nordtvedt’s first newspaper interview in 1957, when his company opened: “We’re just a young bunch of guys banded together, doing the thing we love and enjoy—boatbuilding.” 🚤



As UBB president, Nordtvedt is shown with models of both a UBB recreational cruiser and a PBR. Guided by his diversified recreational, commercial, and military boat production strategy, the company earned \$ 11.5 million in 1966. Photo by Todd Warger.



About the Author: Todd A. Warger

As an historian on staff at the Whatcom Museum in Bellingham, Todd Warger is often a contributor to their Journal, the publication of the Whatcom County Historical Society; plus he is the co-author of the book *Mount Baker*. He knew and worked closely with Art Nordtvedt, chronicling his life as a shipwright, boat builder, company owner and manager. Warger received the 2009 Washington State Historical Society’s David Douglas Award for his documentary film, “Shipyard,” and he also produced “The Mountain Runners.”

Bibliography

- “Art Nordtvedt, Uniflite Founder, dies at 91,” *Bellingham Herald*, October 3, 2013.
- Christopher, Ralph, *Duty Honor Sacrifice: Brown Water Sailors and Army River Raiders*, Author House, 2007.
- Christopher, Ralph, *River Rats*, Author House, 2005.
- Cutler, Thomas J. Lt. Cmdr., USN, *Brown Water, Black Berets: Coastal and Riverine Warfare in Vietnam*, U.S. Naval Institute Press, 1988.
- Wynn, Goldsmith, *Papa Bravo Romeo: U.S. Navy Patrol Boats at War in Vietnam*, The Ballantine Publishing Group, 2001.
- Sheppard, Don. *Riverine: A Brown-Water Sailor in the Delta*, 1967, Simon & Schuster Inc., 1992.

Studies/Reports:

- Research Analysis Corporation Report, by Commander Jack Endacot, USN, “Symposium of Counterinsurgency,” sponsored by Rand Corporation, Washington Office, April 1962.
- Vietnam Delta Infiltration Study Group thesis presented to the Faculty of the U.S. Army Command and General Staff College titled: *The Rise and Fall of the Brown Water Navy: Changes in US Navy Riverine Warfare Capabilities from the Vietnam War to Operation Iraqi Freedom*, by Jason B. Scheffer, LCDR, USN, 1994.
- The Weapons Planning Group of the Naval Ordnance Station at China Lake Report: “Revolutionary Warfare on Inland Waterways: An Exploratory Analysis,” January 1965.

RESTORING CG-83527: The Cutter and Her Stories

By Dan L. Withers



Seen lying quietly, but ready to respond CG-83527 is, at the Municipal Dock in Tacoma in the late 1940s. The cutter served the city, the surrounding area, and south Puget Sound from 1945 to 1962. She and her crews participated in hundreds of rescues and other emergencies, performed boating safety inspections, navigation aids monitoring, and other additional duties during her 17 years of active Coast Guard service. Photo courtesy of Tacoma Public Library.

SEA STORIES, TOLD BY THOSE WHO SERVED ABOARD HISTORIC VESSELS restored and preserved for public exhibit or as floating museums, have special significance in maritime history. However, those ships or boats with military heritages have particularly close personal connections with those who crewed them, during both war and peacetime service. Such is the case with the WWII-era Coast Guard cutter, CG-83527.

Based in Tacoma and serving central and south Puget Sound from 1945 to 1962, the 83-foot wooden patrol boat was decommissioned, sold as federal government surplus in 1964, and taken to northern California. For 40 years, before her 2003 re-discovery on the Sacramento River delta at Rio Vista, California, her Coast Guard stories were lost and forgotten.

As proud Puget Sound residents, it was then that my wife Roxane and I found the venerable cutter and her hidden history, and decided to purchase, restore and return her to her original Pacific Northwest active-duty waters. But in the process we discovered an even more important result—hearing the sea stories recalled by former crewmen of CG-83527 and also her sister 83-foot cutters, and recreating some of their amazing living history experiences.

One of these inspiring experiences was reuniting a survivor of the 1956 crash of a Northwest Orient Airlines Boeing Stratocruiser into Puget Sound with a crew member aboard CG-83527 who helped rescue him.

Through an incredible historical coincidence, another situation brought together a former WWII 83-foot Coast Guard sailor and his skipper with their actual cutter, CG-

83366, that both served on during the D-Day invasion at Normandy in June, 1944.

Its experiences and stories like these that have inspired me, and with Roxane's support, to restore our WWII-era Coast Guard cutter once based in Tacoma, CG-83527. While many maritime history articles describe the technical nature of the design and operation of a family of vessels, here we recall very personal events that occurred aboard this regionally historic Coast Guard cutter. It covers the lives of the people who served aboard during her active service, as well as those who have worked to save her as a military public exhibit and education vessel.

Personally, this need to preserve military history and "mess around" with boats must have been in my genes. My family lived on a farm near Salem, Oregon, and my mother had boxes of scrapbooks she had created from WWII, Korea and Vietnam—with magazine and newspaper articles about Oregon and Willamette Valley servicemen.

As kids, my sister and I were always playing in something resembling a boat. But I had another strong maritime influence too. My grandfather and dad had both served in the U.S. Navy and I have photos of myself in a kid's version of the blue Navy jumper. So it seems I was destined to follow in their footsteps.

In September, 1963, after I graduated from high school, I enlisted in the Navy in Portland, and after "Boot Camp" training went to U.S.S. ESTES, AGC-12, an Amphibious Force flag ship. I then transferred to Electronics Technician Class A School for one year, and was assigned subsequently to U.S.S. STODDARD, DD-566, a WWII Fletcher-class destroyer. Before long, we were underway for combat duty in Vietnam.

I first became interested in patrol boats in 1965, when I saw what we thought were WWII-type PT boats going out and into Da Nang harbor in South Vietnam. We were told that they were Central Intelligence Agency-operated "spook" boats; intelligence support craft headed for North Vietnam—carrying U.S. Navy and South Vietnamese Special Forces commandos. They were fast and beautifully-designed, and I can still hear the distinctive whine of their engines' turbochargers when they throttled up for that night's mission. I would later learn that they were called PTF's, or "Patrol Torpedo Fast" boats, and powered by twin 3,100 hp British Napier Deltic diesel engines.

After returning from Vietnam at the end of my three year Navy enlistment, I was soon a freshman at Oregon Technical Institute, the state's polytechnic engineering college located in Klamath Falls. I graduated in 1970 with a Bachelor's degree in electrical engineering and a minor in mechanical engineering, with financial help from the federal GI Bill.

I had kept my interest in fast power boats during my college and early career years. First, I owned a series of gradually larger, more powerful and faster race boats—beginning with an eight-foot homemade plywood outboard and ending with a 27-foot offshore racer.



The restored and fully flag-dressed CG-83527 makes her way along Ruston Way in 2005, as part of the "Tacoma Tall Ships" event. As a participant in the more than 30-vessel "Parade of Sail," the 83-foot wooden cutter was making a nostalgic return appearance in her long-time homeport, which she served beginning in 1945 at the end of WWII. Photo courtesy of Combatant Craft of America.



Dan and Roxane Withers, shown with CG-83527 in Rio Vista, California, in 2004; shortly after the former Coast Guard cutter was acquired by the nonprofit "Combatant Craft of America." This was the beginning of a several-year-long restoration process, which ended with her more than 1,000 mile return voyage to Puget Sound. Photo by Chuck Fowler.

During my initial working years I had engineering and management jobs with leading-edge technology companies, including the early engineering of one of the Puget Sound cellular systems. Also, following marriage, Roxane and I started a computer maintenance and software support business that provided the resources to buy into several more technology start-ups in Seattle.

By 2000, the Internet was becoming a research tool for the general public, but I couldn't find any information about the speedy, stealthy PTFs that I had seen in Vietnam. However, a grant from the National Science Foundation for an engineering project that I was working on provided some tools to create websites. This allowed me to create a website that featured information and photos about my then-virtually-unknown Navy patrol boat. Soon emails were arriving from PTF veterans and others who sent photos and stories about



Top to bottom:

Dan aboard USS STODDARD, DD-566—in the South China Sea off the coast of South Vietnam—during the war. The WWII-era destroyer, built at Todd Seattle-Tacoma Shipbuilding in Seattle, was launched in November, 1943; and participated in the Aleutian Islands campaign against the Japanese in 1944, and early 1945. Photo courtesy of Dan Withers.

In this official photo, the vessel CG-83527 is shown standing off Dash Point, north of Tacoma. With Maury Island in the background, the cutter was a familiar sight; in from Commencement Bay to Olympia, more than 30 miles south. Photo courtesy of the Coast Guard Historian's Office, Washington, D.C.

With both a father and grandfather who were Navy veterans, at an early age Dan was already destined to join the sea service. Photo courtesy of Dan Withers.



these boats. Now I was hooked. This expanded into chronicling the history of other smaller military patrol boats, and the www.warboats.org website was growing with additional historical photos and veteran's stories.

Coincidental Connection: Finding Tacoma's Coast Guard Cutter

My interest in WWII PT boats continued and I discovered that the Vosper-designed PT-695, renamed PT-JOE after the war, had been a yacht in Newport Beach, California; and was now in the collection of the non-profit American Patrol Boats Museum in Rio Vista. I thought that I might be interested in buying her to finish the boat's restoration. But after a visit to the museum, I determined that this was a project beyond my capability and also specific interest.

However, during the on-site visit, I noticed a wooden 83-foot Coast Guard cutter, CG-83527, tied up to the PT boat. She looked to be in quite respectable condition, and she was available to another non-profit organization at a very reasonable price.

This purchase required Roxane's agreement and, because she also likes boats and boating, she was willing to help me with this major project. She took on yeoman tasks, including paint and glue scraping, bilge oil hauling, and exterior and interior painting. She and a friend also drove back and forth between Puget Sound and the San Francisco Bay Area delivering needed initial restoration materials.

The Coast Guard 83-footers were wood-hulled craft, designed by Walter J. McInnis who was hired in December, 1940, to develop the plans for the cutter class. The design was completed in March, 1941, and the first 40 of a total of 230 cutters were built under contract with Wheeler Shipyard, Inc. of Brooklyn, New York.

For Wheeler, the transition from civilian to military boat building was relatively easy, as the round-bilged 83-footer wasn't much different from the sport fishing boat they had designed and produced. Their Coast Guard boat, with its narrow, single-planked hull, 16-foot beam and straight keel; ending in a skeg that protected the running gear and rudder, were all familiar. But the engines were much different. They were twin Sterling Viking II TCG 8 gasoline engines manufactured in Buffalo, New York, and each inline 8-cylinder power plant produced 600 hp. This gave the cutter a cruising speed of 10-knots with a maximum of 15 for emergency response.

From 1941 to 1945, the versatile cutters were used for WWII antisubmarine patrol, coastal convoy escort, and search and rescue on the United States Atlantic Coast. Sixty of the earlier boats were shipped to Great Britain and became USCG Rescue Flotilla No. 1, based at Poole, England. The Flotilla deployed offshore during the June 6, 1944, D-Day invasion at Normandy, France in two 30-boat rescue groups. Their crews rescued more than 1,500 soldiers and sailors during these operations. Thirty of these boats were then returned

to the United States for stateside duty during the rest of the war. They were re-distributed around the nation to Coast Guard stations, and many were shipped to California, and some sent to the Pacific Northwest. Six of these 83-footers served in Puget Sound: one each in Port Angeles, Friday Harbor, Bellingham, and Tacoma; and two in Port Townsend. Incredibly, after decommissioning in the early 1960s, one of the former D-Day rescue boats sent to California, ended up in Seattle.

I kept thinking about the cutter CG-83527 and her Tacoma and Puget Sound history. In late 2003, I returned to Rio Vista to visit the cutter with some knowledgeable friends and we inspected the boat from stem to stern. While reading one of the forward engine room placards, I discovered a Coast Guard vessel Engineering Department document that read, "Engineering Room Safety Documents for the CG-83527, Tacoma, Washington." I immediately called my friend and fellow Puget Sound Maritime Historical Society member Chuck Fowler, a Tacoma native, to tell him about this hometown connection.

The surviving engine room notice led us to many other historical materials, including the federal surplus auction brochure, and the Coast Guard documents confirming her 1964 sale in Seattle to her first owner, Vernon Wilkie. He took possession of the boat in Seattle and took her down the Pacific Coast to Oakland - Alameda, California. She was renamed *FIRST LOVE*, and was moored as a live-aboard summer home until 1998. After Wilkie's death, the boat was donated to the non-profit American Patrol Boats Museum in Rio Vista, which acquired surplus military boats for Sea Scout education program use.

A survey of CG-83527 was completed and a deal made, transferring ownership to a certified Internal Revenue Service certified section 501 (c) 3 non-profit we had established, "Combatant Craft of America;" and through a website I had created, cg83527.org, the word got out to veterans. A Coast Guard 83-foot Sailors Association representative contacted me and said they were having an annual reunion during the summer of 2003 in Port Townsend. Soon I was in contact with many of the crew members who served aboard Puget Sound-based 83-footers, including CG-83527, and they were very interested in the restoration of the boat and the return voyage.

The first work party to get the cutter ready to come back up the coast to the Sound took place in August, 2003. Other work continued in September, November and December 2003, as well as February 2004. Finally in May, 2004, our early restoration work at Rio Vista was completed and we moved the boat to Bay Ship and Marine in Richmond in the San Francisco Bay area, where we hauled her and did

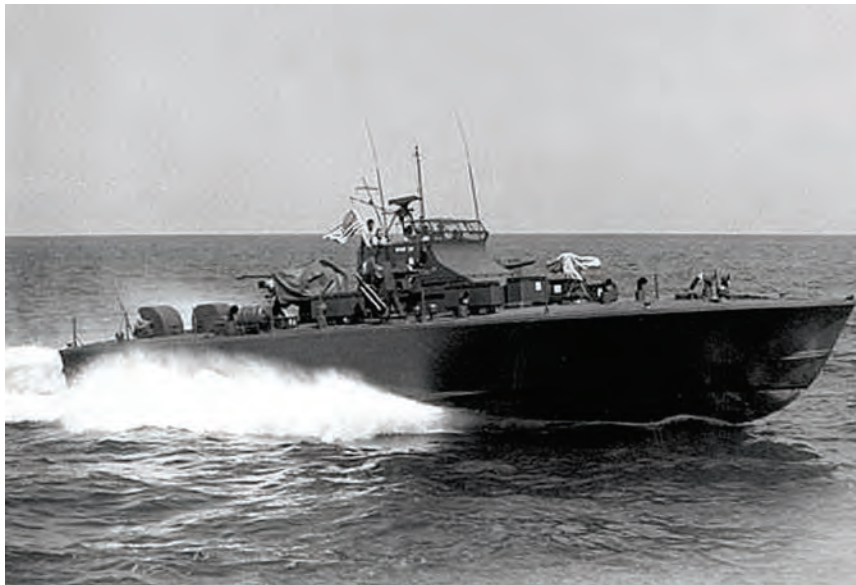


an underwater survey. The survey revealed that some repairs we needed and they were completed. Two props and the port prop shaft were replaced. The bottom was scraped, caulked, and new bottom paint applied. We then put together a crew of local Sea Scouts and made several hours of test runs in the Richmond channel and San Francisco Bay.

The Voyage Home: Port-to-Port and Tacoma Homecoming

We started the final preparation for the trip North in early July, 2004. Mid-month we departed "Sugar Dock" in Richmond and passed under the Golden Gate Bridge at dawn, following the fishing fleet out into the Pacific. Our crew members were Royal Journey from Port Ludlow, and Wendell "Wink" Weber from Forest Grove, Oregon, who was at the time the president of the 83-Footer Sailors Association of Coast Guard veterans. Also, Roxane shadowed us in a shore-side support vehicle, driving about two thirds of our more than 1,000 mile return voyage to Puget Sound.

Our travels north included stops at Bodega Bay, as well as Fort Bragg, California—where we were guests at the Coast Guard Noyo River Station. This stop included a public



While in Vietnam in 1966, and 1967, Dan became enamored with the powerful 80-foot PT boat of the era, the Patrol Boat Fast (PTF). Seeing and hearing them go out on night patrols from Da Nang Harbor, the PTFs sparked his on-going interest in small combatant craft. Photo courtesy of Combatant Craft of America.

open house and special tours, with many former and active-duty Coast Guard guests, including 11th District commander, Rear Admiral Kevin Eldridge. At this stop we also picked up retired Chief Boatswain's Mate (BMC) Selby Drew, a former 83-foot skipper during the 1950s, who shared many great tales about life aboard the venerable boats.

After leaving Fort Bragg, we visited Crescent City, moved on to Coos Bay—and then Newport, Oregon, where we were guests of Coast Guard Station Yaquina Bay. There we met legendary Coast Guard BMC Tom McAdams, who was also the final active-duty skipper of CG-83527. McAdams provided us with many photographs, taken in and around Tacoma and Gig Harbor, when he was her skipper in the early 1960s.

The next leg of our homebound voyage was the long reach from Newport to Westport, Washington, where we spent a month making needed engine repairs. In early August, we were underway again on flat seas to “turn the corner” into the Strait of Juan de Fuca—and we arrived at Neah Bay.

Our next port call was at Coast Guard Station Port Angeles, where

we were guests—and many Coasties came aboard to see “how it used to be” aboard a WWII-era wooden patrol boat. During the trip to Port Angeles we made arrangements to exhibit the cutter at the Port Townsend “Wooden Boat Festival.” Next, we left for our home at Port Ludlow, where we would finally arrive at our homeport—and tied up for a week to rest.

The next weekend we departed for Tacoma, and a public exhibit, during their annual “Maritime Fest.” Upon arrival, we celebrated the final leg of our 1,070 mile trip to the city where CG-83527 had spent 17 years of her active-duty working life.

Humanizing History: Reconnecting Cutters with WWII Crewmen

One of the first guests aboard the hometown cutter after arriving back in Tacoma was Ed Young, from Puyallup, once one of her Coast Guard crew members. For years after his active-duty service he had wondered what had become of “his boat.” Then one day he picked up a copy of the Tacoma News Tribune, and saw that she was going to be tied up and on exhibit about a half-

mile from where he had served aboard her, while based at the old Municipal Dock building.

Among his memories, Ed Young recalled that he had carved his name in the bottom of the crew table in the galley. Some of us “old-timers” were all too “physically challenged” to look under there to see, but Ed’s granddaughter crawled under and excitedly exclaimed that his signature was there. She made a pencil rubbing of the personally “historic” carving.

In early October, the CCA held an “Old Crew Rendezvous” at the Harbor Master restaurant in Port Ludlow. Attending were her one-time skipper, Chief Petty Officer (CPO) Jake Annas of Sequim, Myron “Tike” Hillman of Port Ludlow, and Ed Young, all of whom had served together aboard the cutter CG-83527 in 1955 and 1956. They each told their share of “whopper” sea stories. In addition, Dick Craig of Shoreline, showed his Coast Guard veteran crew colleagues how his boat, CG-83464, which was stationed in Port Townsend, differed from CG-83527.

A special guest at the occasion was Al Kearn of Sequim, who had survived the Northwest Orient Airlines crash into the Sound in 1956. “Tike” Hillman had been on board the cutter CG-83527 at the time, and assisted with the rescue effort. Both survivor and rescuer had a great reunion, as well as sharing their own perspectives of the accident. Kearn brought photocopies of the April 2, 1956, issue of the *Seattle Times* which had extensive news coverage of the crash. He and other survivors had been taken from the crash site by the Tacoma-based cutter to a downtown dock, where they were driven by ambulance to a hospital.

As part of our CCA educational outreach mission, we continued to publicly exhibit the cutter throughout the Puget Sound region. These visits uncovered additional, and sometimes amazing experiences involving 83-foot Coast Guard cutters.

For example, we learned about

the history and restoration of the former CG-83366 from Dave Coghill, a Puget Sound wooden-boat shipwright from Vashon Island. He had recently completed a restoration project on the boat for Ray Holland, a retired Boeing worker from West Seattle. Holland's father had purchased the cutter 40 years earlier at a federal government auction in Alameda, California; then brought her up the coast to Puget Sound, and converted her to a family yacht, which he named TIBURON. Later, his son Ray became her owner, and he had her moored at the Lake Union Dry Dock in Seattle. While restoring the boat, the shipwright Coghill and his son had done some research, and discovered that the former CG-83366 had also been known as CG-11, and was one of the 60 Wheeler-built 83-footers that made up Coast Guard Rescue Flotilla 1 (RESFLO-1) during the D-Day invasion at Normandy. Among the more than 1,500 soldiers and sailors saved during the invasion and afterward, the cutter CG-11 was credited with saving more than 40 of them.

Adding some amazing living history to the boat's past, we soon discovered a surviving former crewman for CG-11 at Normandy, 84-year-old Signalman 3rd Class Wilfred "Bud" Eberhart. This incredible discovery inspired us to create a "D-Day Celebration" at the Lake Union Park Historic Ships Wharf on June 6, 2005. The event was to honor all Coast Guard sailors who had served aboard the 83-footers on June 6, 1944, and reunited Eberhart with his old wartime cutter. Eberhart of Mitchell, Illinois, and his family traveled to Seattle so he could see, board and stand at the helm of "his" patrol boat once again—after more than six decades.

When the celebration anniversary day finally arrived, Eberhart was put aboard CG-83527, which was moored on the Ship Canal at the Seattle Maritime Academy. Meanwhile, the unpowered TIBURON (aka CG-83366 and CG-11) had been towed from Lake

Union Dry Dock to Lake Union Park with the cooperation of Mark Freeman and Freemont Tugboat Co. As CG-83527 approached the Historic Ships Wharf, Eberhart was overwhelmed to be reunited with his former D-Day Coast Guard rescue cutter. When we were secure at the dock he crossed over to CG-11; kneeled down and kissed her hull, and thanked her for getting him home from his wartime combat experiences. Later, a public celebration was held on the wharf, and Eberhart spoke about his time aboard and his appreciation for making this occasion possible.

Also on that day, to show the 60-year span of patrol boat history, the 13th CG District brought in the newest of its 87-foot Marine Protector Class patrol boats, U.S.C.G. TERRAPIN, stationed at Bellingham. And by absolute historical coincidence, the last three digits of TERRAPIN's number, CG-87366, matched those of her 1940s to 1960s active-duty predecessor, CG-83366. During this event, Eberhart was also able to spend time aboard TERRAPIN, sharing sea stories across the generations with the newer cutter's Coast Guard

crew of young men and women.

Through subsequent research at the National Archives in Washington, D.C. and on-line searches, we discovered that Eberhart was not the sole surviving crew member of CG-11. WWII Coast Guard veteran and former Lt. (j.g.) Arthur Lehne, the boat's skipper during the D-Day invasion, was also alive. A retired Chicago Public Schools administrator, the then 85-year-old, was living in Arlington Heights, Illinois.

With this new discovery, we developed a similar CCA-sponsored event a year later on Armed Forces Day in May, 2007, when we reunited both Lehne and Eberhart with their D-Day Coast Guard cutter. Capt Earl McAuliffe, USCG (Ret.), a Bellevue resident and LCVI (Landing Craft Vessel Infantry) skipper during D-Day at Normandy was also honored; and Retired Coast Guard District 13 Commander Rear Admiral John Lockwood, presented commemorative medals to each of the three WWII combat crew veterans.

After a subsequent fall at his home in southern Illinois, "Bud" Eberhart passed away less than two years later.



The tired, virtually abandoned CG-83527, is shown at the American Patrol Boats Museum dock in Rio Vista in April, 2004—when on-site restoration began. Behind the WWII-era patrol boat is the former Coast Guard buoy tender FIR, once based in Seattle; and the focus of an extensive civic restoration effort which unfortunately failed. Photo by Chuck Fowler.



Prior to her 2004 return voyage to Puget Sound, the cutter CG-83527 was hauled out for inspection, hull repair, and painting at Bay Ship and Marine in Richmond, north of San Francisco. Preparations and sea trials were completed in June, and the trip up the coast began. Photo by Dan Withers.



Left: Dan and his Air Force veteran friend Royal Journey are seen doing maintenance on one of CG-83527's twin General Motors 671 diesel engines. Originally powered by two 600-horsepower Sterling Viking gas engines, almost all of the cutters were re-equipped with less fuel-hungry diesels after they were decommissioned and sold in the commercial market. Photo by Marc Bracken.



Right: As part of the on-going CG-83527 restoration process, Roxane Withers repainted historically authentic numbers on the cutter when she arrived in Port Ludlow in mid-August, 2004. The historic Coast Guard patrol boat was on exhibit subsequently at the Port Townsend Wooden Boat Festival. Photo by Dan Withers.

However, we were greatly honored to hear and tell his D-Day story before the end of his life.

Another particularly significant highlight of CG-83527's recent history was the 2008 "Coast Guard Heritage Fleet" parade. This event featured the cutter as the primary historic escort vessel for USCG Barque EAGLE, known as "America's Tall Ship," when it visited Seattle briefly enroute to the "Tall Ships Tacoma" event in the summer of 2008. It was a moving experience to see the majestic square-rigger followed by the historic fleet of retired and current Coast Guard vessels parading across Elliott Bay, and greeted by the Seattle fireboat LESCHI, with a full water-spray tribute. Also, a part of the parade was the Vietnam-era, 82-foot former POINT DIVIDE, WPB-82337—renamed MARITIME INSTRUCTOR—and

owned and operated by the Seattle Maritime Institute; and the former 65-foot Coast Guard buoy tender BLUEBERRY, CG-66832, now a working and cruising tug owned by Coast Guard veteran Mark Freeman of the Fremont Boat Company in Seattle. The 110-foot CG cutter ORCAS, WPB-1324, from Coos Bay, Oregon, EAGLE's active-duty escort cutter while traveling in the Pacific Northwest, was also part of the parade.

Conclusion: The Value of Preserving Military Maritime History

Historic military vessel restoration is exciting, fulfilling work. Through the years we have had some great volunteers that share our interest and commitment. Some of them have been veterans that served on 83-footers and on CG-83527



Left: Al Kearl, left, and Myron “Tike” Hillman were both involved in the NOA airliner crash in 1956; Kearl as a passenger, and Hillman, as a crew member aboard CG-83527, who helped rescue him. They were reunited during a stopover in Port Ludlow by the 83-foot cutter, on her return voyage to Puget Sound almost 50 years later. Photo by Chuck Fowler.

Right: In 2005, the late Wilfred “Bud” Eberhart, a WWII Coast Guard Signalman 3rd class, stood proudly in front of the very patrol boat he was aboard during the historic invasion at Normandy, France on June 6, 1944. Through research, CCA was able to bring together this combat crew veteran with “his” 83-footer (AKA: CG-83366, CG-11, and TIBURON), during a CCA-sponsored D-Day commemoration ceremony at Lake Union Park. Photo by Chuck Fowler.

specifically. We have had some help from the Junior Navy Reserve Officers Training Corps students from Issaquah School District, who had a chance to be part of the preservation of a WWII-era military vessel—and proudly, in full uniform, got to cruise with the Coast Guard veteran “old timers.”

The operation of any historic vessel, especially former military vessels, presents huge engineering challenges; such as figuring how modern materials should be used to restore the original wooden hull, decks and superstructure. Also, the conversion to diesel engines was a major safety factor, because it was not practical to risk a fire by using the original WWII gasoline engines. Insurance companies don’t want to hear the words “gasoline engines” when considering coverage; yet the costs of insurance and moorage for the cutter CG-83527 are still “big ticket” expenses each year.

Hosting the various military commemoration programs, honoring veterans for many years, has been a great experience—especially because almost the vast majority of the boat’s history took place in Puget Sound.

Some days, after a particularly tough CG-83527 restoration project, it seems like an impossible effort. But as the saying goes, “many hands make light work.” So we just take our massive task one step at a time. Overall, for the past ten years, it has definitely been worth the time, talent and treasure that have been put into the project.

The rewards are often unseen and difficult for others to comprehend. However, sometimes just watching a Coast Guard veteran who served aboard CG-83527, or another 83-footer, sit on his old bunk, hearing him tell his “own sea stories,” and adding them to this fascinating history is reward enough. 🚩



About the Author: Dan Withers

A retired wireless communication executive, Dan Withers is also a Navy destroyer veteran of the Vietnam War. He is founder and president of Combatant Craft of America, a nonprofit group dedicated to preserving warboat history and patrol boats—including the restoration of the Coast Guard cutter CG-83527.

Selected Bibliography

Burke, Ronald and Constance, “Airborne Shipwreck,” *The Sea Chest*, 44:3, March 2011.

Fowler, Chuck, “Homeward Bound: More Than a Boat -- this Cutter is a Lifesaver,” *Sea magazine*, May, 2005

Fowler, Chuck, Withers, Dan and Combatant Craft of America. *Patrol and Rescue Boats on Puget Sound*, Arcadia Publishing Co., Charleston, South Carolina, 2011.

Scheina, Robert L., *U.S. Coast Guard Cutters & Craft of World War II*, Naval Institute Press, Annapolis, Maryland, 1982.

Scheina, Robert L., *U.S. Coast Guard Cutters & Craft: 1946—1990*, Naval Institute Press, Annapolis, Maryland, 1990.

“The Ex-Coast Guard Cutter CG-83527 Restoration Site,” Combatant Craft of America, <http://www.cg83537.org>.

“USCG 83 Foot Sailors and Their Cutters,” USCG Sailors Association, <http://uscg83footers.org>.

“U.S. Coast Guard Cutters and Craft Index,” Cutter Photo Galleries (83300—83529), (History, Specifications and Images), U.S. Coast Guard Historian’s Office, Washington, D.C., <http://uscg.mil/webcutters/83FtHistories.pdf>.



The Boeing Patrol Hydrofoil Missile U.S.S. TAURUS (PHM-3) takes a high-speed turn on her underwater foils during sea trials in 1977, on Elliott Bay, in Seattle. At 132-feet long, this PEGASUS-Class hydrofoil—and her five sister military patrol vessels—were the largest built by the Boeing Marine Systems division. Photo courtesy The Boeing Company.

Boeing's Other Flying Boats: Military Hydrofoil Memories

By Harold E. Turner

Introduction

Widely-known for its iconic and successful commercial airliners and military bombers, the Boeing Airplane Company had a maritime beginning when established in 1916. The first Boeing aircraft built and flown was the B & W Model 1, a biplane fitted with wooden floats. Other early models, operating from the Boeing manufacturing plant hangar on Lake Union, also had boat-shaped pontoons. They were crafted by George Pocock, renowned for his race-winning rowing shells for the University of Washington and many other collegiate crews.

Also, to keep his company going financially while he attempted to develop new aircraft sales following WWI, William E. Boeing's enterprise also produced a line of wooden boats during the early 1920s. Called "Sea Sleds," the 28-foot, 40-knot-capable boats had flat, inverted vee-shaped hulls, and were rumored to have been purchased and operated by rum runners during the Prohibition era.

From 1938 to 1941, Boeing again returned to some maritime-related aircraft production. The beautifully-designed, four-engine Model 314 Clipper seaplane was produced for Pan American World Airways and other airlines. It became a well-known, elegant passenger and cargo-carrying mainstay on international routes throughout the Atlantic and Pacific, before WWII halted commercial operations.

After Boeing's production success during WWII, it dominated the passenger jetliner age with the 707 and its variants through the early 1970s, before again facing economic tough times. The company's Apollo program work was winding down, and so were its related contract; the Super Sonic Transport (SST) project was cancelled; commercial aircraft sales were foundering—and Boeing was trying to diversify its business once again. Applying its aircraft design expertise, it had begun initial research and testing to build a military hydrofoil in 1959. This effort ramped up during the 1960s, to produce a series of military and commercial hydrofoils. These high-technology watercraft "flew" above the sea, with water flowing over submerged foils, instead of air flowing over wings.

Powered by gas turbine engines widely used in aircraft, and propelled initially by conventional bladed propellers—and later water-jets—the Boeing hydrofoils were an innovative marine application; which ultimately, for operational and economic reasons, were not fully adopted by either government-military or commercial organizations. However, the basic technology proved successful during a total of 23 years of design, development, testing, and operation under a wide range of conditions—including military patrol and combat assignments.

Harold "Hal" Turner, a naval architect and engineer, who retired from Boeing Marine Systems in 1982, was an active participant in these cutting-edge developments and helped make this hydrofoil history. This is his story.

- Chuck Fowler



My Early Years

In 1946, after crewing three years on U.S. Army Air Force crash rescue boats (CRB) in Alaska and the Aleutian Islands during WWII, I decided to become a naval architect. During my active duty I became enamored with the performance and capability of the fast 85-foot CRBs, designed by California naval architect Dair Long, who also had experience working on PT (patrol torpedo) boat plans. Starting at the University of Washington, I transferred to the University of Michigan and was graduated in February, 1951, with a Bachelor of Science degree in Naval Architecture and Marine Engineering.

In Seattle, the well-known naval architecture and engineering firm W.C. Nickum & Sons hired me right out of college. I started as a draftsman, was promoted to Principal Naval Architect and obtained my professional license. After nine years, I resigned and transferred to Boeing in 1960. Business in the marine industry had slowed and I saw an interesting opportunity to advance my career.

Boeing Marine Systems

Boeing had formed the Marine Systems organization under the Aerospace Division to pursue work from the U.S. Navy Advanced Marine Systems unit. Their interests included submerged as well as high-speed surface craft such as hydrofoils. Our group was later reorganized as the separate Boeing Marine Systems Division, which was

Left: The sleek design of the 85-foot Army Air Force crash boat P-512, on which Harold "Hal" Turner was a crew member during WWII, inspired him to pursue a college degree in naval architecture and marine engineering. After returning to Seattle in 1951, Turner first worked for the naval architecture firm of W.C. Nickum & Sons, before beginning a 22-year career with Boeing Marine Systems. Photo courtesy Hal Turner.

Right: The 38-foot long Boeing Hydrodynamic Test System (HTS), nicknamed "AQUA-JET," was a hydrofoil research hydroplane; powered by a J-33 pure jet engine producing 4,000 pounds of thrust. Shown on Lake Washington in 1962, with a "pickle fork" design, which allowed testing of model underwater foils at speeds of more than 100 miles per hour. Photo courtesy of Ray Richards.

in competition for federal government contracts with the Grumman Aircraft Co. Within the Pentagon, then Captain and later Admiral and Chief of Naval Operations, Elmo Zumwalt, was pushing these efforts because he believed that they had a place in the U.S. Navy.

Marine Systems concentrated on hydrofoil capability and related technology. Early research, beginning in 1959, included a "pickle fork" bow-design hydroplane powered by a pure jet engine. Called the Hydrodynamic Test System (HTS), and nicknamed "Aqua-Jet," this craft gathered information on model foils (underwater wing systems) and antisubmarine warfare concepts.

Early studies determined that water-jet propulsion would be superior to propeller drive in terms of reliability



Left: Boeing's "LITTLE SQUIRT" was a 20-foot long hydrofoil research craft built in 1962. It tested automatic control systems and was the first hydrofoil to demonstrate the use of water-jet propulsion. Photo courtesy The Boeing Company.



Right: Boeing's FRESH 1 (Foil Research Supercavitating Hydrofoil) was another hydrofoil test platform. A 96-foot craft of high-deadrise catamaran design, it was powered by a turbofan pure jet engine, and was the first hydrofoil to achieve a foil-borne speed of more than 80 knots. Photo courtesy of The Boeing Company.

and simplicity. Fully submerged foils would provide a smooth platform unaffected by waves; however they required a vehicle stabilizing system. "Roll-pitch-yaw" control was adapted from Boeing's Bomarc missile system, using vertical gyroscopes (gyros). An acoustic height sensor system was selected for height/foil depth below the waterline control. Gyros and accelerometers were fed into a "black box" control unit. In 1962, these features were incorporated into a small 20-foot-long, water-jet-propelled test craft named "Little Squirt," which reached speeds of about 50-knots, or 58 miles-per-hour.

PCH-1/ HIGH POINT

When I arrived at Boeing in 1960, the company had a contract with the Navy to build a Bureau of Ships (BuShips) designed hydrofoil designated PCH-1 (Patrol Craft Hydrofoil) and named "HIGH POINT." This project was fully-staffed and managed, so I was not personally involved—but engaged in various other company technology studies at this time.

PCH-1 had vertically retracted "canard" or forward-placed foils. The vessel was powered by two Rolls-Royce Proteus 4,500-hp gas turbine engines driving twin conventional submerged propellers. The welded aluminum hull was built under subcontract by J. M. Martinac Shipbuilding in Tacoma. Boeing built the foils, wheelhouse superstructure, propulsion, and control systems; and did outfitting and assembly. Testing was conducted in Puget Sound in Seattle, and east of Vashon and Maury Islands; then the vessel was delivered to the Navy Yard at Bremerton, from where she operated. This was the first Boeing military hydrofoil.

"FRESH 1" (Foil Research Hydrofoil)

FRESH 1, an acronym for "Foil Research, Experimental, Supercavitating Hydrofoil," was the first Boeing hydrofoil

project I worked on directly. In 1961, I was assigned to a team to develop a proposal in response to a Navy request for proposals to design and build a high-speed hydrofoil testing vehicle. Our proposed design featured two parallel 56-foot long welded aluminum hulls, separated by two steel trusses, which supported a control and instrumentation cabin mounted between them. This "cockpit" structure housed the pilot, co-pilot and instrumentation engineer.

The propulsion for high-speed dash testing was a Pratt & Whitney JT3-D turbofan jet engine, mounted above and behind the cabin. This was the same engine that powered Boeing's well-known 707 jetliner and its B-52 Stratofortress bomber, and it provided 18,000 pounds of static thrust. Hull-borne, very low-speed maneuvering power was provided by two 75-hp outboard motors; each mounted on the hull pontoons. The contract was awarded to Boeing and the test hydrofoil was assembled in the "Developmental Center" off East Marginal Way, near today's Museum of Flight. I was appointed lead engineer and continued as liaison engineer during the construction and test operations.

The hulls were out-sourced to J.M. Martinac Shipbuilding in Tacoma. A basic set of three strut-foils were provided for initial testing. These were base-ventilated (blunt trailing edge) for high speed performance. The foils and the rest of the craft were built and assembled by Boeing.

Test operations were conducted in Puget Sound off Vashon and Maury Islands, southwest of Seattle, under the surveillance and support of the U.S. Coast Guard and a Boeing "chase" boat. Initial sea trials with the Boeing foils in various configurations were carried out, and a top speed of 84-knots, or 96.6 miles-per-hour, was achieved.

The Grumman Aircraft Engineering Corporation of



Left: Shown in her U.S. Coast Guard paint scheme in Puget Sound, in 1975, at the beginning of her evaluation by the sea service; the hydrofoil HIGH POINT (PCH-1) was designed by Boeing and built by J.M. Martinac Shipbuilding of Tacoma. This 116-foot hydrofoil, capable of speeds of more than 50 knots, was built under Navy contract, placed in service in 1963, and was the company's first military hydrofoil. Photo courtesy Coast Guard Museum Northwest.



Right: The 71-foot long TUCUMCARI ((PGH-2), Boeing's design for a Navy hydrofoil gunboat, was powered by gas-turbine engines driving twin high-velocity water-jets. Tested in Puget Sound at speeds exceeding 50 knots, the heavily-armed "TUC" as she was nicknamed, was equipped with a 40 mm cannon, four .50 caliber machine guns, and an 81 mm mortar. Photo courtesy The Boeing Company.

New York also built and supplied a set of foils to be tested. During one of the test runs with these foils at high speed, the rear foil rudder ventilated, and the craft went out of control and capsized. The three crew members—pilot, co-pilot and test engineer—escaped the accident unharmed. The craft was examined and found structurally sound, but the jet engine was destroyed. Upon recovery, the instrumentation equipment was immediately removed and flushed with alcohol. The jet engine was replaced; then FRESH 1 was refurbished and delivered to the Puget Sound Naval Shipyard.

PGH—2/ U.S.S. TUCUMCARI

In 1965, the Navy requested proposals from both Boeing and Grumman for a hydrofoil gunboat. Boeing submitted a design for a 55-ton, 71-foot long, gas turbine water-jet-propelled canard foil configuration. This layout had two separate foils spread aft at the stern and one foil centered near the stem or bow. Grumman's proposal was similar in size, with airplane foil and conventional propeller "Z"-drive configuration.

Construction contracts for both designs were awarded to determine the most suitable prototype for future boats. The Grumman hydrofoil was designated PGH-1 FLAGSTAFF, and the Boeing boat PGH-2 TUCUMCARI.

I was promoted to management and was one of two design group supervisors working for the chief engineer on the TUCUMCARI project. My group had responsibility for all the structure, technical, and outfitting; while the other group had propulsion, mechanical and systems. The project was located at the "Old Ford Plant" off East Marginal Way.

The hydrofoil's hull was all welded of 5456 aluminum, and the superstructure was riveted 60611-T6 aluminum. The double-suction, double-scroll centrifugal water-jet pump

was designed and manufactured to specifications by Byron-Jackson Pump Co. in Los Angeles, California.

The structure and foils were welded with 17-4 precipitation-hardened stainless steel. Heat treating was done by Lindberg Heat Treating; also in Los Angeles. The two aft foils had anhedral (outward tips angled down) design, to prevent tip broaching above the water surface in banked coordinated turns.

Following her launching in July, 1967, "TUC" as she was nicknamed, went through initial sea trials during which she demonstrated continued 50-knot speed capability and proved highly maneuverable. The gunboat carried one 40-mm cannon, four .50 caliber machine guns, and one 81-mm mortar. She was the first weapon-equipped military hydrofoil.

Martinn Mandles had worked as a student engineer and co-pilot for Boeing's HTS and FRESH-1 hydrofoil test projects from 1961 until April, 1963; had completed his engineering degree in August, 1964, at Stanford University; and been commissioned in the Navy and served a two year duty tour in Vietnam. In September, 1967, he became TUCUMCARI's first naval officer-in-charge, commanding a crew of twelve enlisted men. Mandles and his crew took her through operational evaluations, first in Seattle and Puget Sound where she was delivered to the Navy in March, 1968; and then at the Navy Amphibious Base in Coronado, adjacent to San Diego, California.

Following these extensive tests, the Navy deployed TUCUMCARI to South Vietnam in the fall of 1969, for a year of operational evaluation including coastal patrol duty.

During this same period, Grumman's FLAGSTAFF was also undergoing operational testing in South Vietnam.

Ultimately, this parallel combat zone evaluation in South Vietnam, and later separate tests of the two hydrofoils, proved that TUCUMCARI's performance was superior and she was accepted as a prototype for potential follow-on boats.

In 1972, TUCUMCARI was sent to Europe on an LST (Landing Ship Tank) "mothership" for operational demonstrations for the North Atlantic Treaty Organization nations—from the Baltic to the Mediterranean Seas.

She spent time in La Spezia, Italy, where at the time I was working on an Italian version of TUCUMCARI for their Navy. During the Navy hydrofoil's stay, I had the privilege of attending the change-of-command ceremony where the Lt. Richard Stedd, USNR, turned over command to his executive officer, Lt. Edward Bond, USN.

After achieving 1,000 hours of foil-borne operation—a major achievement—Boeing asked me to host a celebration party for the crew. I was assisted by an employee of Boeing International from Rome, and needless-to-say a good time was had by all.

During her deployment in Europe, including to Brest, France, I had other contracts to supervise—including repairs to the bow doors which were damaged during heavy weather down the Atlantic Coast. Also, I was sent to Brindisi, Italy, on the lower east coast and the Adriatic Sea, where I supervised welding repair to a crack on the cast aluminum propulsion pump.

TUCUMCARI then continued her operational evaluation stateside on the Atlantic Coast—based at Woods Hole, Massachusetts, in Chesapeake Bay; and then on drug interdiction patrol duties in the Caribbean Sea. But unfortunately, in November, 1972, she ran aground on a reef in Puerto Rico during simulated amphibious combat operations training. TUCUMCARI was seriously damaged, repairs were too costly to return her to service, and she was finally scrapped in 1973.

ALINAVI/ Italian "Swordfish"- Class Hydrofoil

The Italian Navy had shown strong interest in military hydrofoils. Boeing Marine Systems had responded with proposals until the PGH-2 piqued their interest. In 1969, they requested a proposal for a variant of the hydrofoil TUCUMCARI. The requirements included:

- One 76 mm Oto Melara rapid-fire cannon turret
- Two S.S. OTOMAT missiles
- Combat Information Center and fire control systems

A small group of Italian engineers was formed in Rome to prepare the proposal. They configured the boat and provided all the requirements. At Boeing I headed the proposal's design modifications, which included:

- Widening the hull
- Strengthening the foredeck to accommodate the turret
- Modifying the foils with added dihedral to the outboard wings to prevent "squatting" in banked turns
- Revising the water inlets

- Preparing proposal performance specifications
- Developing a weight analysis
- Identification of a retractable, steerable outdrive instead of the PGH-2 water-jet, to meet long-range transit requirements

This work required extensive liaison with the Italians and several trips to Rome, but finally the proposal was accepted.

Boeing formed a subsidiary company to produce the hydrofoil in Italy, ALINAVI, which in Italian means "winged boats." It was owned 80 percent by Boeing and 20 percent by Italian interests.

Engineering and management functions were developed in Italy, and the production facility selected was OTO Melara, an armament and military vehicle plant in La Spezia—a naval harbor on the Italian Riviera. The Italian production manager and chief engineer were retired naval officers, Col. Francisco Cao and Col. Fabrizzio Antanucci.

I was selected to be the project technical and advisory consultant, and was accompanied by a hydraulics engineer to assist on the extensive electro-hydraulics and other systems.

The hydrofoil plans, modified from the hydrofoil PGH-2, were used directly for fabrication; but all other plans had to be redrawn and produced in metrics. The U.S. TUCUMCARI plans and documents were reproduced and provided for design guidance.

The first propulsion pump was produced by Byron Jackson who had built the PGH-2 pumps, and the remainder was produced in Italy. Boeing provided the "black box" control system package for all of the Italian boats.

In early fall of 1972, after two years, I returned to Boeing to take the chief engineer position on the company's commercial "Jetfoil" hydrofoil. However, at Boeing, I also continued to coordinate with the ALINAVI project until the P-420 "SPARVIERO" was delivered in 1974. ALINAVI was awarded a six boat follow-on construction contract. Boeing opted out of the project and the contract was assumed by Cantievi Navali, a naval shipyard in La Spezia, operating under license from Boeing.

In summary, the Italian "Swordfish"-class boats were a formidable naval weapon system for their size.

"Jetfoil" Commercial Passenger Hydrofoil

During my tenure in Italy, Boeing had developed a preliminary design for a commercial hydrofoil, and was under contract with Pacific Sea Transport (PST) in Hawaii to produce four boats. Initially there were many problems to be solved:

- Coast Guard and American Bureau of Shipping (ABS) plan submittals for review and approval.
- Design weight reduction; boat overweight as initially designed.
- Engine changed from Lycoming 3,500-hp gas turbines to Allison 501 with 5,000-hp gas turbines, which required specification changes for new gearboxes and

water-jet-propulsion pumps, to be purchased from outside suppliers.

- Staffing a new design department with the most experienced personnel committed to working with the concurrent Patrol Hydrofoil Missile (PHM) program.
- Performance improvements required.

The water-jet-propulsion pumps were contracted to Rocketdyne in the Los Angeles area for “state of the art” axial flow-type development which was superior to centrifugal pumps. This developed into a long on-going effort to achieve optimum performance.

The resulting Model 920-100 Jetfoil displaced about 110 tons and accommodated up to 250 passengers for inland waters. After an extensive test period, the first boat was delivered from the plant in Renton in 1975. However, operation in Hawaii inter-island service proved to be unsatisfactory because of severe sea conditions. As a result, the four PST boats were purchased by the Far East Hydrofoil Company of Hong Kong for operation between that city and Macao.

Follow-on development produced an improved Model 920-115 in 1978. This modification displaced about 115 tons.

Boeing produced more than 20 Jetfoils before the company sold the design and production rights to Kawasaki Heavy Industries Company of Japan. With continued maintenance, many have remained in service after almost 40 years of operation.

Patrol Hydrofoil Missile/ U.S.S. PEGASUS

During my time in Italy, Boeing was asked to submit a contract proposal to the Navy for six larger versions of the PGH-2 TUCUMCARI prototype hydrofoil, the new Patrol Hydrofoil Missile (PHM). The contract for the fast attack PHM hydrofoil was awarded in September, 1972. I was privileged to attend the contract award celebration at Boeing upon return from my P-420 “SPARVIERO” assignment in Italy.

Because I was totally involved with the commercial Jetfoil program at the time, which was separated from the PHM project at the Renton plant, I had little knowledge of it. However, at 132-feet long and displacing 241-tons, the hydrofoil U.S.S. PEGASUS was much larger than PGH-2 TUCUMCARI which I knew inside and out. Also, she was armed with an Oto Melara 76 mm cannon turret, eight Harpoon 5.5 anti-ship missiles, and .62 caliber machine gun turrets.

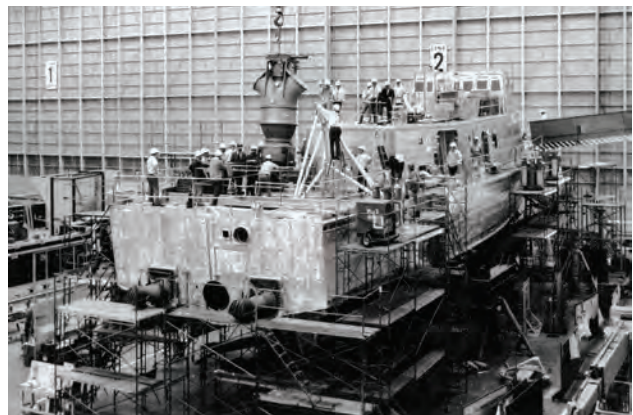
The six boats were completed, commissioned, and assigned by the Navy to the Caribbean Sea, where they conducted patrol and drug interdiction duties. Although they did not have combat duties in this region, I personally believe they would have been useful in the Middle East during the Persian Gulf War and off Somalia on anti-pirate patrol.

AGEH-1/ U.S.S. PLAINVIEW

AGEH-1, U.S.S. PLAINVIEW, was the largest hydrofoil ever built in the United States. Designed by Grumman in airplane foil arrangement, she was 220-feet long, displaced 315



Passing in front of a traditionally designed, much slower cruise ship, a high-speed Boeing commercial Jetfoil is shown ferrying passengers in Chinese or Japanese waters. First launched in the mid-1970s, Jetfoils were licensed and built in both nations; and when continually maintained, many have remained in operation for more than 40 years. Photo courtesy of Hal Turner.



Boeing's first Patrol Hydrofoil Missile (PHM-1), U.S.S. PEGASUS, is shown under construction in the early 1970s on the production line at the Renton plant. The hydrofoil's main water-jet pump, driven by an 18,000 horsepower General Electric gas turbine engine, is being lowered into the hull. Photo courtesy of Hal Turner



U.S.S. PLAINVIEW (AGEH-1), (left) and HIGH POINT (PGH-1) are shown flying above Puget Sound on their foils during evaluation runs in July, 1978. The 220-foot PLAINVIEW, the Navy's largest hydrofoil, was built by Lockheed Shipbuilding and Construction Company of Seattle, and commissioned in March, 1969. Photo courtesy of Navy History and Heritage Command, Photographic Section.



A military variant of the Boeing 929 commercial Jetfoil, HMS SPEEDY, was built for Britain's Royal Navy and went into service in June, 1980. The 90-foot, 50 knot capable hydrofoil was used as a fisheries patrol vessel off the Shetland Islands in the North Sea. Photo courtesy of Hal Turner.

tons, and featured propeller Z-drive propulsion on the two forward foils. Powered by two General Electric LM-1500 gas turbine engines driving two super-cavitating propellers, she achieved foil-borne speeds of over 50-knots. PLAINVIEW was built by Lockheed Shipbuilding and Construction Co., the successor to the widely-known Puget Sound Bridge and Dredging Co., and operated out of the Puget Sound Navy Shipyard in Bremerton. .

In 1974, after leaving the Boeing Jetfoil program and moving to the sustaining Engineering Department, I was assigned to prepare a bid for the refurbishment of PLAINVIEW's two main foil struts, and the contained Z-drive and associated systems. These had sustained sea water flooding that required extensive repair. Todd Shipyard had the prime contract for the total ship refurbishment, but outsourced the foil/ strut propulsion portion. Boeing was awarded the subcontract and I managed the project to completion in 1976. The Navy's Superintendent of Ships (SupShips) office in Seattle provided detailed specifications and drawings, as well as on-site inspection, and completed item sign-offs. Todd took delivery and reinstalled the foils, but shortly after acceptance, one of PLAINVIEW's propulsion pods again flooded with sea water.

The SupShips office decided to abandon further work and AGEH-1 was sold to civilian owners as surplus. The hull ended up on the beach—first at Astoria, Oregon, and was later moved to just east of Megler on the Washington State side of the Columbia River, where it remains today.

Research and Development Activity


After my work on PLAINVIEW, I was assigned to Boeing Marine Systems research and development and headed a small group to identify and research improvements to the Jetfoil. We also developed and promoted variant configurations of the passenger hydrofoil. Once improvements were accepted, they were turned over to the Engineering Department for implementation.

Jetfoil variants included designs for offshore oil rig crew transfer, fishery patrol, and military missile/ gunboats. One variant produced was the Model 929-320 fishing patrol vessel, H.M.S. SPEEDY. She was acquired by the British Royal Navy to patrol off the Shetland Islands in the North Sea. Boeing delivered an operating hydrofoil platform and the Royal Navy completed the boat, which was in fact a military boat and had weaponry.

Sales of the Jetfoil variant for offshore oil rig crew transfer were pursued extensively, particularly for North Sea and Caribbean Sea operations, but they did not materialize. In addition, I, along with our Marine Systems director of marketing, made a missile-equipped gunboat sales presentation to the Egyptian Navy—but to no avail.

One major Jetfoil safety improvement was the initiation of Boeing subcontractor outsource development of a 42-person, U.S. Coast Guard-approved life raft, to replace the 25-person "Elliot" inflatable version. This allowed 250 passengers capacity in offshore operation mode; up from the 150 due to unmanageable deployment of the required number of 25-person rafts. The 42-person rafts have been adopted for many passenger vessels. Although aircraft carry their own version of a 42-person raft, these were not suitable or approved by the Coast Guard for marine vessels.

Finally, in 1982, after 22 years with Boeing, I decided to take early retirement from the company. At the national level, following the retirement of Admiral Zumwalt as Chief of Naval Operations, the U.S. Navy lost interest in hydrofoils and no further Navy development or construction contracts were awarded. With the end of the military hydrofoil work, and reduced interest in the commercial Jetfoil, eventually Boeing Marine Systems went out of business as a separate company division.

Summing up my more than two-decade-long career working on the hydrofoil program at Boeing, I look back on a very satisfying and rewarding experience which involved many challenges and opportunities. Above all, I recall and thank the vast number of people who formed the large wheel of the endeavor of which I was one cog. And finally, I still believe that the submerged foil, water-jet-propelled vessels may have an important place in future operations of our Navy and Coast Guard. 



Two Boeing commercial passenger Jetfoils flank a company Navy Patrol Hydrofoil Missile (PHM) during a joint test run west of Seattle in the late 1970s. Both hydrofoils were built on adjoining production lines at the company's Renton plant. Photo courtesy of Hal Turner.



Left: During training aboard his crash rescue boat in the Aleutian Islands, in 1944, a young Army Air Force Technical Sergeant, Hal Turner, mans twin .50 caliber machine guns. The rescue boats supporting air and sea operations, in the Alaska combat zone, were armed to fend off any enemy attacks during the abortive Japanese invasions of the Aleutians. Photo courtesy Hal Turner.



**About the Author:
Harold Turner**

After becoming a WWII Army Air Force crash boat veteran, Hal Turner received his degree and professional license as a naval architect and marine engineer. He retired after a 22-year career with Boeing Marine Systems, during which he worked on the company's major research, commercial and military hydrofoils.

A WORD FROM THE PRESIDENT

From the Quarterdeck...

John Hough, PSMHS President



AT THE SOCIETY'S ANNUAL AWARDS DINNER on May 7 we recognized two people who have contributed greatly to our Society, but also to the preservation of maritime history in the Pacific Northwest.

The core of our Society is a number of hardworking volunteers. We annually recognize one of our volunteers who has done exceptional work over the year. This year, Dick Vanderpool was named Volunteer of the Year. Dick was recognized for his countless hours of work serving as a docent in the McCurdy Family Maritime Gallery at the MOHAI Museum, especially working with the children who flock to the Maritime Gallery for free First Thursday activities. In the past, Dick also manned our small, now closed, museum at Chandler's Cove; was on the Society's board and served as the membership secretary. Our Society could not survive without the dedicated work of Dick and our other hardworking volunteers.

Second, Chuck Fowler, longtime PSMHS board member and past president, was awarded the Society's Medal of Merit. He was recognized not only for his many years of service to the Society, but for his contributions to preserving and promoting our region's maritime heritage. This award follows Chuck's selection by the Washington State Historical Society to receive its highest award: the Robert Gray Medal. The award recognizes Chuck's long-time, distinguished contributions to our region's maritime history. Chuck will be honored at the State Historical Society's annual meeting on Saturday, June 21, at the Washington State History Museum in Tacoma.

A Tacoma native, Chuck has distinguished himself in many state and local history leadership roles since returning from college and the military 40 years ago. As the Robert Gray Award recognizes, he has been particularly effective at building partnerships among maritime heritage organizations, and mentoring others to achieve their goals. Among other things, Chuck has organized two major Tall Ship events and was a founding member of the Pacific Northwest Maritime Heritage Caucus. He is also the author of numerous articles for *The Sea Chest* and other publications, and of three books on Puget Sound maritime history. Last year Chuck received the Tacoma Historical Society's Murray Morgan Award for preserving and communicating local history.

Chuck's receipt of the Robert Gray Award recognizes the historical importance of maritime commerce in the development of the Puget Sound region.



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Top: A solitary Navy Higgins PT (patrol torpedo) boat moves slow ahead in icy blue Alaskan waters off Attu Island during WWII. The scenic mountain and sea image was taken in the Aleutians in June, 1943, by a member of the Navy photo documentation unit headed by widely-known photographer Edward Steichen. Photo courtesy of National Archives, No. 80-G-K-8143.

Bottom left: Another striking WWII color photo taken in Massacre Bay on Attu Island, shows a motor launch passing behind a crew muster on the foredeck of one of four RON-13 PT boats. Photo courtesy of National Archives, No. G-K-16165.

Bottom right: Three Higgins PTs of RON-13, raft alongside the seaplane tender U.S.S. GILLIS, in Casco Cove, Massacre Bay on Attu Island in June, 1943. The Navy PBY Catalina flying boat astern of GILLIS is being refueled for another Aleutian patrol mission. Photo courtesy National Archives, Navy Steichen Photographic Unit, No. 80-G-K 9454.