



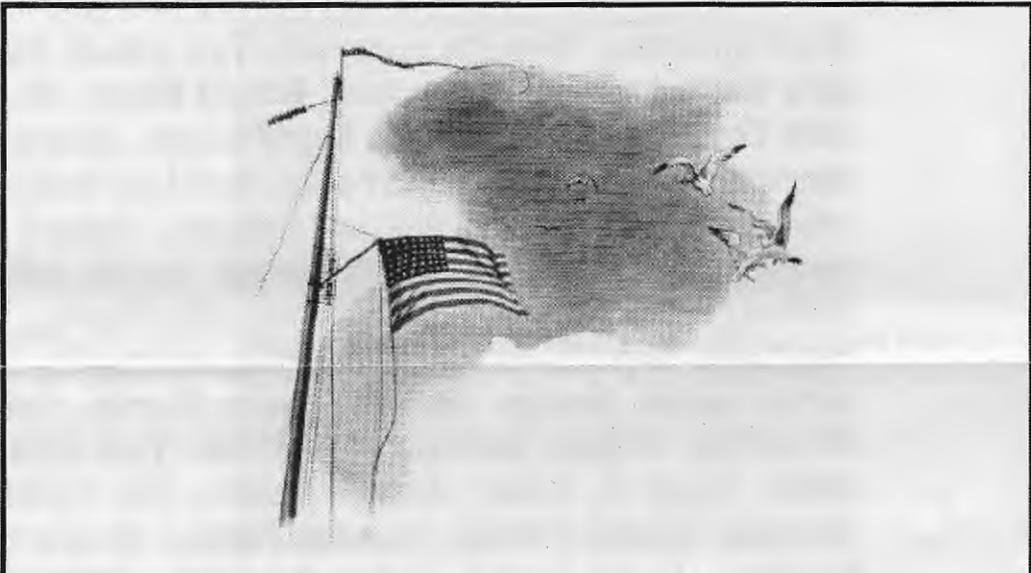
April 2007
Volume 13 - Issue 4



<http://perch-base.org>

**What's "Below Decks"
in the Midwatch**

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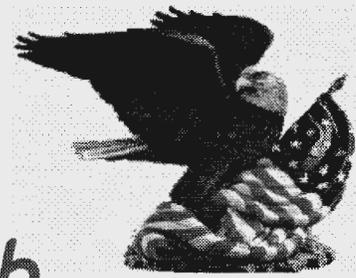


Lest We Forget Those Still On Patrol

APRIL ETERNAL PATROLS

USS Pickeral	SS177	April 3, 1943	74 men
USS Snook	SS279	April 8, 1945	84 men
USS Thresher	SSN593	April 10, 1963	129 men
USS Grenadier	SS210	April 22, 1943	4 men (as POW's)

The Perch Base USSVI is not able to totally support itself financially on the dues collected from its members. There has, to date, been no successful and ongoing plan since the base was formed to produce any other steady and effective source of income. Therefore, the Base has relied on additional donations from members. These supplemental donors are called the "Booster Club."



2007 Booster Club

David Anderson, Kenneth Anderson, Ted Asbell, Reynaldo Atos, Gary Bartlett, Kenneth Becker, Ronald Beyer, Bradley Butler, John Cash, Charles Chapman, Roger Cousin, George Crider, Jim Denzien, Harry Ellis, Joe Errante, Ray Lee Graybeal, Charles Greene, Billy Grieves, William Grissom, Robert Hanson, Ed Hawkins, Harry Heller, Glenn Herold, Lester Hillman, Gerald Holloway, Stephen Hough, Davy Jones, Mike Keating, Jack Kimball, Ron Kloch, Darrell Lambert, Robert Lancendorfer, Doug LaRock, Burtis Loftin, George Marions, Terry Martin, Bob May, Jack McCarthy, William McNay, Alan Miller, Paul Miller, Roger M. Miller, Roger R. Miller, Joseph Mullins, Jim Nelson, James F. Newman, Joseph Otreba, Nicholas Pappas, Wayne Pettes, Scott Prothero, Larry Rankin, Robie Robinson, Stanley Rud, Frank Rumbaugh, Mel Rycus, Raymond Schaeffer, Emil Schoonejans, Garry Shumann, Rick Simmons, Wayne Kirk Smith, Adrian Stuke, Jim Thomson, William Tippet, Phillip Wagner, Jim Wall, Forrest Watson, Jerry Yowell, John Zaichkin, Ronald Zomok, Al Landeck, David C. Jones, Walter Blomgren, Royce Pettit, James W. Newman, Ed Wolf, Tim Moore, George Long, Joe Bernard, Ray Samson, Tom Fooshee, Jim Edwards, Bob Nance, Milton Magart, John Welsh, George Woods, Donald Whitehead, Jerry Allston, Jack Messersmith, Dave Harnish, Chuck Emmett, Raymond Marshall, Robert Sungy, Ben Acosta, Ken Schonauer, David Carpenter, Denny Kerton, Thomas Moore, Stan Reinhold, Craig Olson



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Sailing Orders



Next Regular Meeting
April 21, 2006,
American Legion Post #105
3534 W Calavar Rd.
Phoenix, AZ

"Salute to Veterans" Parade
April 21, 2007
Riverside, CA



Saturday, 7 April
The 107th
Anniversary of the founding
of the U.S. SUBMARINE
Force.



Base Past-Commander's Message

Dear Friends & Shipmates –

As you are aware, we held our Perch Base election at our last general membership meeting on 17 March 2007. The open officer positions ran unopposed except for Vice Commander and the two nominees for that position were Ben Acosta and Bob Gilmore. A vote by show of hands was taken for the Vice Commander position and the winner was Bob Gilmore. The Commander and Secretary/Treasurer were approved by acclamation. All officers are elected for one year except for Base Commander which is two years. The new elected positions are:

Stan Reinhold – Commander
Bob Gilmore – Vice Commander

The other elected positions and appointees who remain in place by acclamation include:

Jim Denzien – Secretary/Treasurer
Chuck Emmett – MidWatch Editor
Jim Nelson – Storekeeper
Ramon Samson – Membership/Webmaster
Howard Doyle – Chaplain
Jim Newman – Historian
Ben Acosta – Public Relations

I know you will all join me in congratulating Stan and Bob on their achievements and wish them well with their new positions of responsibility. I am confident that this new board will move Perch Base forward in a positive direction and will be an asset to our organization and the USSVI.

Over the next few months, we need to find a candidate to fill the Treasurer position and relieve Jim Denzien of that dual responsibility with his Secretarial position duties. Jim Edwards stepped up to the plate and volunteered to take over Bob Gilmore's responsibility as COB and continue as the Perch Base liaison with the American Legion Post 105. A motion to approve Jim's appointment will be made at the next board meeting on April 21. My hope is that one of you from the general membership will follow Jim's lead and volunteer for the Treasurer position. Your base needs your support.

In accordance with our Constitution and By Laws, Article XIV, Section 1, A., I will remain on the board as immediate past Base Commander. I will do whatever I can to support Perch Base and the USSVI as time and health permit. I firmly believe we can accomplish a great deal if we work together, as a team, in the pursuit of our mutual goals and objectives.

Tim Moore, Past Commander

IMPORTANT ANNOUNCEMENTS!

*** MIDWATCH NEWSLETTER ***

Article Submission Deadlines

The deadlines for the next three Midwatch newsletters are as follows:

<u>Publication</u>	<u>Deadline</u>
May 2007	Friday, May 4th
June 2007	Friday, June 1st
July 2007	Friday, July 6th

Please submit your articles by **the evening of the deadline dates** indicated to make sure your articles are included and to assure the timely publication and distribution of the Midwatch. Thank you.

Fraternally,

Chuck Emmett, Editor "MidWatch", Perch Base USSVI

A few Words from Our Now Past-Commander Tim Moore . . .



MY SINCERE GRATITUDE

I want to pass along my most sincere appreciation, thanks and gratitude to Ed Brooks and my other shipmates who most generously gave me a limited edition USS Seawolf SSN-575 pen & ink print. What an absolutely wonderful surprise. For those of you who were present at the meeting when the presentation was made, you know what a surprise it was for me and how pleased I was with this gift. For those of you who were not at the meeting, I was presented a limited edition print of the Seawolf that Ed Brooks located, had beautifully matted and framed, and was given to me as a gift as the departing Perch Base Commander. It was an honor to have served and again I want to thank Ed Brooks and my other shipmates who presented me with this absolutely wonderful gift.

Tim Moore

Past Commander, Perch Base USSVI

Need a Name Tag?



Brass name tags are available again, Price is \$20.

Contact:

Jim Nelson, Ships Storekeeper

(623) 972-1044

sub489@cox.net

Perch Base "GOOD of the ORDER" Raffle

(Hand Crafted and Donated by James Dunn)

Tickets \$5.00 Each or 6 For \$25.00

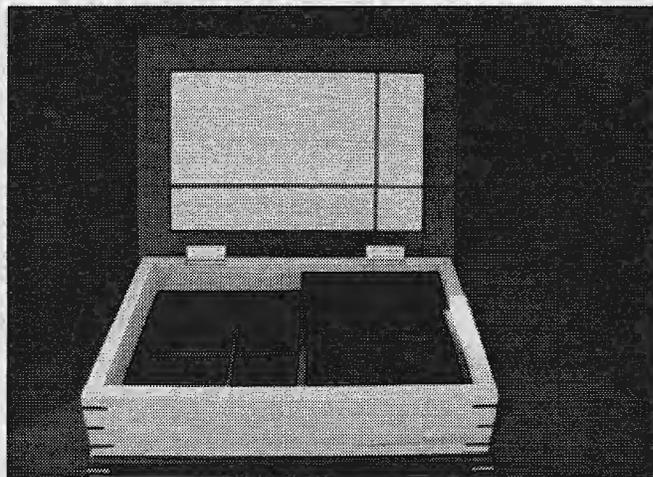
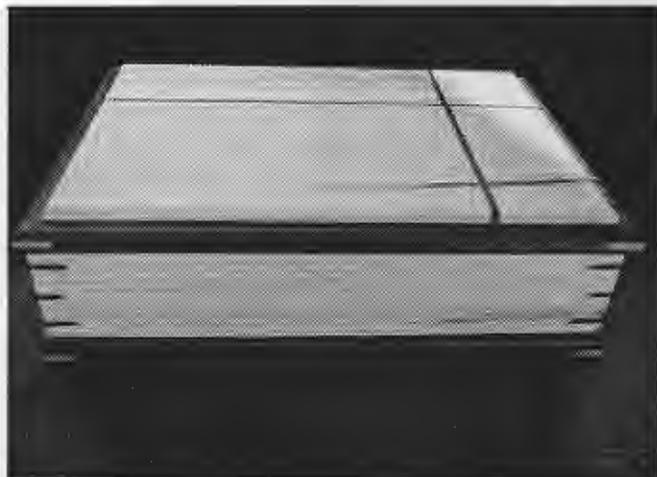
Make Check or Money Order out to

USSVI Perch Base

2027 South 85th Lane

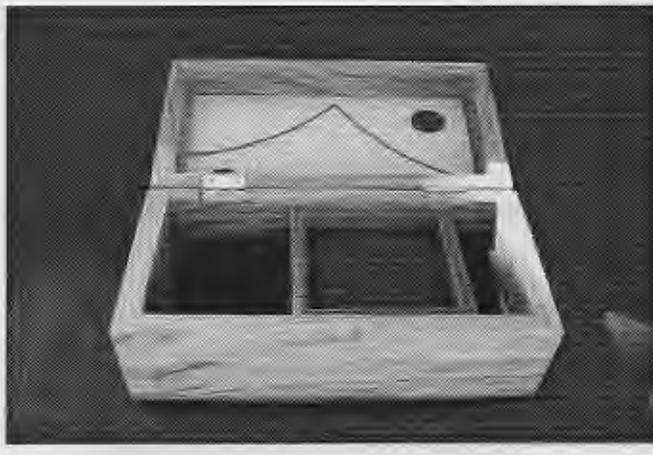
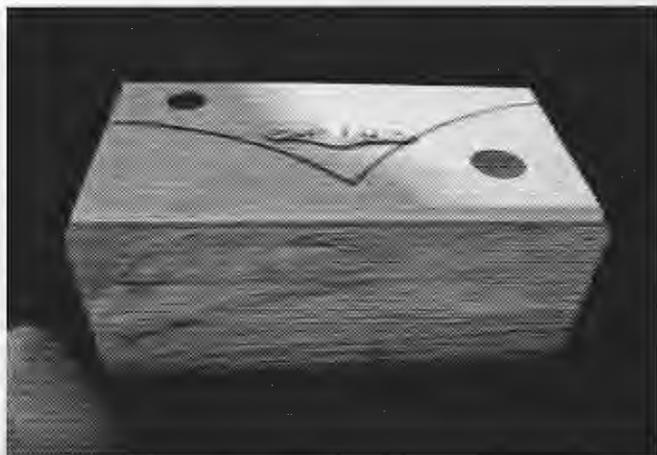
Tolleson, AZ 85353-8752

You will receive your tickets in return mail.



The **Ladies Jewel box** is approximately 13" long x 12" wide x 4" deep with sliding tray.

The main section is made of "Birds Eye Maple", which is extremely hard to get and usually comes from the East Coast. The trim is from "Wenge", a West African wood, only imported to large-port cities. This wood originated in either Portland or Seattle. The inlay is of "Padouk" which comes from the Andaman Islands midway between India and Malaya. All of the woods are scarce and very expensive.



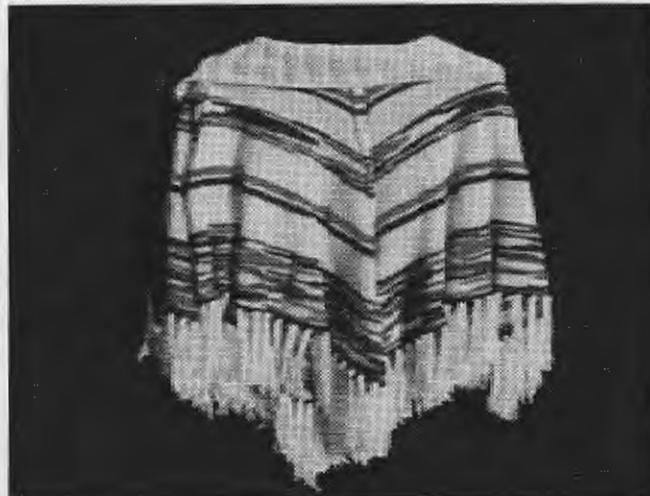
The **Gentleman's Jewel box** is approximately 12" long x 7" wide x 4-1/2" deep with sliding tray.

The main section is of "Black Limba" from West Africa. The top is made of "Yellow Heart", which comes from the Congo. The wing inlay is of "Padouk" and the plugs are of Wenge".

Perch Base Subvettes Raffle

The Ladies of the Perch Base in Arizona lost Kay E. Harnish to cancer last year. Kay was a founding member and a plank owner of the Subvettes of the Perch Base. Our sadness gave way to the vision of the Kay E. Harnish Scholarship Fund. What better way to honor the woman who was instrumental in starting the Subvettes of the Perch Base?

In order to get this project off the ground, we are having a raffle of a handmade **afghan** and **poncho** shown below.



We need your support in this wonderful endeavor to commemorate one of our own. Please help us by purchasing raffle tickets as soon as possible.

Ticket prices are: \$5.00 each or
 6 tickets for \$25.00

Please make your check payable to:

Subvettes of Perch Base
Kay Harnish Scholarship Fund on the memo line
Mail to: P.O. Box 815
Peoria, AZ 85380-0815

You will receive your tickets in return mail.

Drawing will be announced at a later time in the Perch Base Midwatch and on our web site. You will receive your tickets in return mail.



March Meeting Minutes

The regular monthly meeting of the Arizona Submarine Veterans, Perch Base was convened at American Legion Post #105, Phoenix, AZ at 1301 hours, 17 March 2007. Tim Moore, Base Commander, called the meeting to order.

The membership was led in a prayer of invocation by Chaplain Howard Doyle followed by the Pledge of Allegiance led by Stan Reinhold and a standard ceremonial opening. A moment of silence was observed for shipmates on eternal patrol and the tolling ceremony for boats lost in March was conducted.

New members and guests at the meeting included Gerry Darnell and Matt Hayball.

According to the sailing list, there were thirty-five members, ladies and guests present.

Minutes from the February 2007 regular meeting as published in the Midwatch were approved as written.

Treasurer Jim Denzien reported the Base's financial status as of the first day of March 2007. A motion was made and seconded to accept the Treasurer's report as read. The motion carried by unanimous voice vote.

Reports of Officers and Committee Chairmen

Vice Commander – Stan Reinhold had no report.

Chief of the Boat – Bob Gilmore reported on the status of the work on the Legion facilities.

Chaplain – Howard Doyle reported on the status of shipmate Ed Hawkins. He also reported on his attendance at a Phoenix Society function. No news on the installation of the USS Phoenix sail.

Membership Chairman – Ramon Samson reported that we had to drop four members for non-payment of dues.

Newsletter Editor – Chuck Emmett reported we now have two ads for the newsletter. We need more!

Ship's Storekeeper – Jim Nelson had no report.

Old Business

The Western Region conference will be on April 9-13 in Laughlin NV. The conference will be held in conjunction with the Caucus for the WWII Submarine Vets. Registration forms and agendas were made available to the membership.

There will be a "Salute to Veterans" parade on April 21st in Riverside CA. All hands are invited. We will be taking our float to participate. Tucson Base will be bringing their float also.

We have an 18' wing tank, acquired from Peoria High School. Tim Moore and Dave Harnish picked it up and took it to the Live Steamers Railroad Park. This tank will be the foundation for our new float. We should look at having it finished by Memorial Day 2008. Howard Doyle and Jim Denzien are heading the Committee for the new float.

We still need to make plans for the annual picnic. Last year's picnic was in March and the earliest this year would be May. We need to select potential dates to coordinate this event with either White Mountain or Gudgeon Base. No action taken.

New Business

Base Commander Tim Moore suggested that we have an annual meeting with representatives from all Arizona bases. He suggested that Jim Dunn, Western District 1 Commander chair the meeting with Western Region Commander Dave Harnish. The host base could shift from year to year.

Good of the Order

Base members with medical issues were mentioned: Shipmates Ed Hawkins, Howard Doyle and Jim Edwards.

Please remember the raffle being conducted by the Subvettes.

Be sure to invite your wives or girlfriends to participate with us and the Subvettes.

MEESE, PLC
DAVID P. MEESE, JR., CPA, PLC
Certified Public Accountants

Taxation

- Individuals and Related Businesses
- Estates and Trusts
- Corporations, Partnerships, and LLCs
- Employee Plans and Exempt Organizations

Accounting

System Design • Business Startup
Accounting Services • Financial Statements

Consulting

- Income and Estate Tax Planning
- Deferred Compensation Planning
- Management and Operations Analysis

1646 North Litchfield Road (623) 935-1008
Suite 200 • Goodyear, AZ 85338 FAX (623) 935-1008

We need to confirm a guest speaker for next month. Les Parsons was unable to be at this meeting due to a last minute medical issue. We wish him well.

A "Thank You" letter from Marissa Poppell was read. Marissa was the recipient of our scholarship last year.

Base Commander Tim Moore reported on the gathering with the CO of the USS Helena and members of the crew. The event had been sponsored by the Phoenix Commission with members of the Phoenix Society participating.

Base Elections

There are four positions up for election: Base Commander, Vice Commander, Secretary, and Treasurer. The previously existing candidates are: Stan Reinhold for Base Commander; Ben Acosta for Vice Commander; Jim Denzien for both Secretary and Treasurer. The floor was opened for any additional nominations; Bob Gilmore was nominated and seconded for the position of Vice Commander. There being no additional nominations, a motion and second closed the nominations. A show of hands for the one position with multiple nominees was conducted and candidate Bob Gilmore was elected Vice Commander. The other two candidates were elected by acclamation.

Results: Base Commander: Stan Reinhold (two years)

Vice Commander: Bob Gilmore (one year)

Secretary/Treasurer: Jim Denzien (one year)

50/50 Drawing

The 50/50 drawing was held and the winner was Jim Nelson.

Adjournment

All the outstanding business having been concluded, it was moved and seconded that the meeting be adjourned. The motion carried by voice vote.

Chaplain Howard Doyle offered the closing prayer and the meeting was adjourned at 1352.

Jim Denzien, Secretary/Treasurer, Perch Base, USSVI

From Beyond the Wardroom *Perch Base SubVettes*

I am Mary Denzien, recently elected President of SubVettes of Perch Base. Nancy Nelson is Vice President; Hiromi Povio is Treasurer and Carol Newman our Secretary and Sandy Bernard continues as our Chaplin.

I am encouraging all ladies of the SubVettes to participate in our monthly meetings. Call someone you haven't seen at a meeting in awhile and encourage them to join us!

Did you know that wives need not have to have been married to your "sailor" while he was on active duty to be a member of the SubVettes? We encourage the wives, widows, sisters, mothers and daughters of any man who served on submarines, at any time, to join our organization. Our meetings offer women an opportunity to "share our own sea stories"!

April Birthdays

Lori Bergstedt - 4/4
Carolyn Newman - 4/12
Bonnie Cash - 4/14
Muriel Grieves - 4/16
Sandy Herrington - 4/20
Jan Ballenger - 4/22

I encourage you ladies to bring in ideas for improving our auxiliary. I would like your input on fundraisers to bolster our coffers. Bring your suggestions to the next meeting!

The next meeting is April 21st at Taylor's Chowder House at 12:30 p.m.

I am looking forward to seeing all of you on the 21st!

Mary Denzien, President, SubVettes of Perch Base

SUBVETTES MEETING MINUTES
March

These are the minutes of the March 17, 2007 SubVettes Meeting. This month's meeting was again held at Taylor's Chowder House, located next to the American Legion Hall, where our Submariners Meet.

The meeting was called to order at 12:25 a.m. by our president, Nancy Nelson. The Pledge of Allegiance was then conducted by her. Sandy, our chaplain, said the opening prayer. Hiromi was asked to give the Treasurers Report and Sandy was asked if she had anything to report from the Chaplains office.

OLD BUSINESS

We had a brief discussion on the new SubVettes shirts. The idea went over pretty well so Hiromi said she'd get busy on the design and type of shirt we wanted.

The question came up about having any other candidates or nominations for our new officers other than the ones that we voted on last month. This was discussed and no one came up with anyone so a motion was made by Jackie to close the nominations. It was seconded by Sandy. Motion was carried. Before the vote Nancy gave a special, emotional, thank you to all of us for allowing her to be our president.

NEW BUSINESS

Since we have a clean slate of 1 person per office we decided on a voice vote.

- Secretary: Carolyn Newman
- Treasurer: Hiromi Povio
- Vice President: Nancy Nelson
- President: Mary Denzien

The vote for all was unanimous.

Other new business was discussed. The 1st Annual Southwest Regional Caucus convention is being held in Laughlin, April 9 thru 12. The Kay Harnish Memorial Scholarship Fund was also discussed. So far there is a \$175.00 in the fund so let's keep it working for us.

GOOD OF THE ORDER

Our April Birthday Babies are:

- | | | | |
|----------------|------|------------------|------|
| Lori Bergstedt | 4/4 | Muriel Grieves | 4/16 |
| Carolyn Newman | 4/12 | Sandy Herrington | 4/20 |
| Bonnie Cash | 4/14 | Jan Ballenger | 4/22 |

A VERY HAPPY BIRTHDAY TO ALL

We had the swearing in ceremony at 12:45 a.m. A motion was made to adjourn, it was seconded, and voted on unanimously. We adjourned at 12:55 a.m.

Jacqui Hawkins, Secretary, Perch Base SubVettes.





Eternal Patrol April 10, 1963

Editors Note: *Less we forget, each month, one boat on eternal patrol will be highlighted in this newsletter. Sailors, rest your oars.*

The Final Patrol

Lord, this departed shipmate with dolphins on his chest
Is part of an outfit known as the best.
Make him welcome and take him by the hand.
You'll find without a doubt he was the best in all the land.
So, heavenly Father add his name to the roll
Of our departed shipmates still on patrol
Let them know that we who survive
Will always keep their memories alive.



U.S.S. Thresher (SSN-543) April 10, 1963 129 men lost



General characteristics

Ordered: Jan. 15, 1958; Keel laid: May 28, 1958,
Launched: July 9, 1960; Commissioned: Aug. 3, 1961
Displacement: 3,540 tons light, 3,770 tons submerged
Length: 279ft, Beam: 32ft, Draft: 26ft
Speed: 20+ knots, Complement: 16 officers, 96 men

Propulsion

1 Westinghouse S5W Pressurized Water Reactor,
Westinghouse Geared Turbines 15,000shp

Armament

Four 21" torpedo tubes amidships

Motto

Vis Tacita (Silent Strength)

The second USS Thresher (SSN-593) was the lead ship of its class of nuclear-powered attack submarines in the United States Navy. Her loss at sea during deep-diving tests in 1963 is often considered a watershed event in the implementation of the rigorous submarine safety program SUBSAFE.

She was named for the Thresher Shark, harmless to man, and easily recognizable because its tail is longer than the combined length of its body and head.

The contract to build the Thresher was awarded to Portsmouth Naval Shipyard on 15 January 1958, and her keel was laid on 28 May 1958. She was launched on 9 July 1960, was sponsored by Mrs. Frederick Burdett Warder, and was commissioned on 3 August 1961, with Commander Dean L. Axene in command.

Early career

Thresher conducted lengthy sea trials in the western Atlantic and Caribbean Sea areas in 1961 and 1962. These tests provided a thorough evaluation of her many new and complex technological features and weapons. Following these trials, she took part in Nuclear Submarine Exercise (NUSUBEX) 3-61 off the northeastern coast of the United States from September 18 to September 24, 1961.

On October 18 Thresher headed south along the East Coast. While in port at San Juan, Puerto Rico on 2 November 1961, her reactor was shut down and the diesel generator was used to carry the "hotel" electrical loads. Several hours later the generator broke down, and the electrical load was then carried by the battery. The generator could not be quickly repaired, so the captain ordered the reactor restarted. However, the battery charge was depleted before the reactor

reached criticality. With no electrical power for ventilation, temperatures in the machinery spaces reached 60 C (140 F), and the boat was partially evacuated. Cavalla (SS-244) arrived the next morning and provided power from her diesel engines, enabling Thresher to restart her reactor.

Thresher conducted further trials and fired test torpedoes before returning to Portsmouth on November 29. The boat remained in port through the end of the year, and spent the first two months of 1962 evaluating her sonar and Submarine Rocket (SUBROC) systems. In March, the submarine participated in NUSUBEX 2-62 (an exercise designed to improve the tactical capabilities of nuclear submarines) and in antisubmarine warfare training with Task Group ALPHA.

Off Charleston, SC, the Thresher undertook operations observed by the Naval Antisubmarine Warfare Council before she returned briefly to New England waters, after which she proceeded to Florida for more SUBROC tests. However, while mooring at Port Canaveral, Florida, the submarine was accidentally struck by a tug which damaged one of her ballast tanks. After repairs at Groton, Connecticut, by the Electric Boat Company, the ship returned south for more tests and trials off Key West, Florida. Thresher then returned northward and remained in dockyard for refurbishment through the early spring of 1963.

Loss

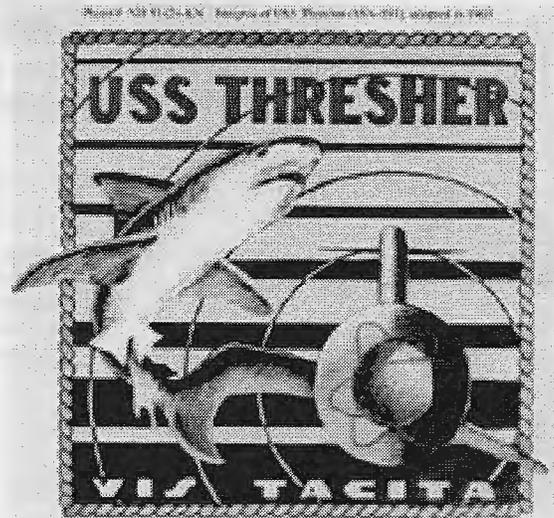
On April 9, 1963, after the completion of this work, Thresher, now commanded by LCDR John Wesley Harvey, began post-overhaul trials. Accompanied by the submarine rescue ship USS Skylark (ASR-20), she sailed to an area some 350 km (220 miles) east of Cape Cod, Massachusetts, and on the morning of April 10 started deep-diving tests. As these proceeded, garbled communications were received over the underwater telephone by Skylark, indicating that after initial problems Thresher had tilted and the crew were attempting to regain control. A few words were understandable, including the famous final phrase "... minor difficulties, have positive up-angle, attempting to blow." When the garbled communications—which were followed by the ominous sound of pressurized air escaping—eventually ceased, surface observers gradually realized that Thresher had sunk. All 129 officers, crewmen and military and civilian technicians aboard her were lost.

After an extensive underwater search using the bathyscaphe Trieste, oceanographic ship Mizar and other ships, Thresher's remains were located on the sea floor, some 8,400 feet (2,560 m) below the surface, in six major sections. The majority of the debris is in an area of about 134,000 m² (160,000 yd²). The major sections are the sail (the raised tower atop a submarine's main deck), sonar dome, bow section, engineering spaces section, operations spaces section, and the tail section.

Deep sea photography, recovered artifacts, and an evaluation of her design and operational history permitted a Court of Inquiry to conclude that the Thresher had probably sunk due to the failure of a weld in a salt water piping system, which relied heavily on silver brazing instead of welding; earlier tests using ultrasound equipment found potential problems with about 14% of the tested brazed joints, most of which were determined to not pose a risk significant enough to require a

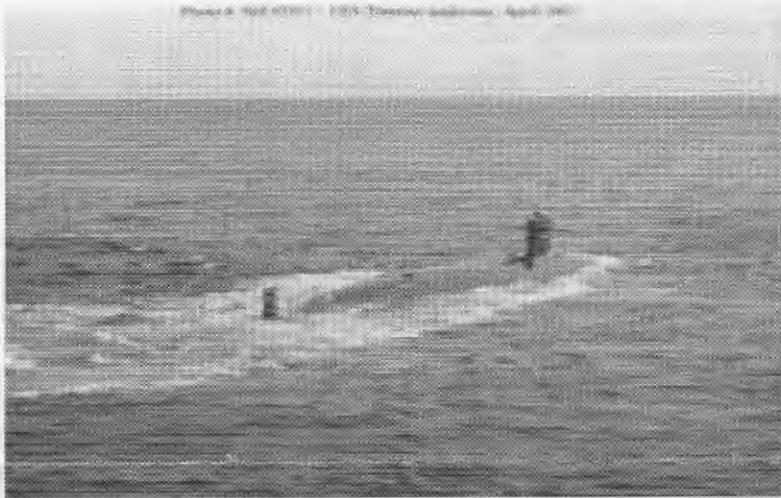
repair. High-pressure water spraying from a broken pipe joint may have shorted out one of the many electrical panels, which in turn caused a shutdown ("scram") of the reactor, causing a subsequent loss of propulsion. The inability to blow water from the ballast tanks was later attributed to excessive moisture in Threshers high-pressure air flasks, which froze and plugged its own flowpath while passing through the blow valves. This was later simulated in dock-side tests on the Thresher's sister ship, Tinosa. During a test to simulate blowing ballast at or near test-depth, ice formed on strainers installed in valves; the flow of air lasted only a few seconds.

Unlike diesel submarines, nuclear subs relied on speed and deck angle (that is, driving the ship to-



wards the surface) rather than deballasting to surface. Ballast tanks were almost never blown at depth; this could cause the ship to rocket to the surface out of control. Normal procedure was to drive the ship to periscope depth, raise the periscope to verify that the area was clear, then blow the tanks and surface the ship.

At the time, reactor-plant operating procedures precluded a rapid reactor restart following a scram, or even the ability to use steam remaining in the secondary system to "drive" the ship to the surface. After a scram, standard procedure was to isolate the main steam system, cutting off the flow of steam to the turbines that provided propulsion and electricity. This was done to prevent an over-rapid cooldown of the reactor, which could actually restart spontaneously and go out of control if the core was cooled too quickly. Thresher's Main Propulsion Assistant, Lt. Cdr. Raymond McCooles, was not at his station in the maneuvering room, or indeed on the ship, during the fatal dive. McCooles was at home caring for his wife who had been injured in a freak household accident — he had been all but ordered ashore by a sympathetic Commander Harvery. McCooles's trainee Jim Henry, fresh from nuclear power school, probably followed standard operating procedures and gave the order to isolate the steam system after the scram, even though Thresher was at or slightly below her maximum depth and was taking on water. Once closed, the large steam system isolation valves could not be reopened quickly. In



later life, McCooles was sure that he would have delayed shutting the valves, thus allowing the ship to "answer bells" and drive herself to the surface, despite the flooding in the engineering spaces. Admiral Rickover later changed the procedures, allowing steam to be withdrawn from the secondary system in limited quantities for several minutes following a scram.

There was much (covert) criticism of Rickover's training after Thresher went down, the argument being that his "nukes" were so well conditioned to protect the nuclear plant that they would have shut the main steam stop valves by rote — depriving the ship of needed propulsion — even at great depths and with the ship clearly in jeopardy. Nothing enraged Rickover more than this argument. Common sense, he argued, would prove this to be untrue.

It's more likely that the engine room crew was simply overwhelmed by the flooding casualty, or took too long to contain it. In a dockside simulation of flooding in the engine room, held before Thresher sailed, it took the watch in charge 20 minutes to isolate a simulated leak in the auxiliary seawater system. At test depth, taking on water, and with the reactor shut down, Thresher would not have had anything like 20 minutes to recover. Even after isolating a short-circuit in the reactor controls it would have taken nearly 10 minutes to restart the plant.

Thresher imploded (that is, one or more of her compartments collapsed inwards in a fraction of a second) at a depth somewhere between 1,300 feet and 2,000 feet. Those not injured by the flooding would have died in a split second.

Over the next several years, the Navy implemented the SUBSAFE program to correct design and construction problems on all submarines (nuclear and diesel-electric) in service, under construction, and in planning. It was discovered during the formal inquiry that record-keeping at the Portsmouth Naval Shipyard was far from adequate. For example, no one could determine the whereabouts of hull weld X-rays made of Thresher's sister ship Tinosa, nearing completion at Portsmouth, or, indeed, whether they had been made at all. It was also determined that Thresher's engine room layout was awkward, and in fact dangerous, as there were no centrally-located isolation valves for the main and auxiliary seawater systems. Most subs were subsequently equipped or retrofitted with so-called "chicken switches", which allowed the Engineer Officer of the Watch in the maneuvering room to remotely close isolation valves in the seawater systems from a central panel, a task that would have had to be performed manu-

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ally on Thresher. It's worth noting that such valves might not have been reachable during Thresher's presumed flooding casualty: at such deep depths, the blast of water from even a small leak can dent metal cabinets, rip insulation from cables, and, in the case of a large break, split a man in half. (Water pressure at 1,000 feet is about 450 pounds to the square inch.)

Apart from Scorpion, the U.S. Navy has suffered no further losses of nuclear submarines.

The Navy has periodically monitored the environmental conditions of the site since the sinking and reported the results in an annual public report on environmental monitoring for U.S. Naval nuclear-powered ships. These reports provide specifics on the environmental sampling of sediment, water, and marine life which were taken to ascertain whether the submarine has had a significant effect on the deep ocean environment. The reports also explain the methodology for conducting deep sea monitoring from both surface vessels and submersibles. The monitoring data confirms that there has been no significant effect on the environment. Nuclear fuel in the submarine remains intact.

Details of the disaster

- 7:47 AM: Thresher begins its descent to the test depth of 1300 feet.
- 7:52 AM: Thresher levels off at 400 feet, contacts the surface, and the crew inspects the ship for leaks. None are found.
- 8:09 AM: Commander Harvey reports reaching half the test depth.
- 8:25 AM: Thresher reaches 1000 feet depth.
- 9:02 AM: Thresher is cruising at just a few knots (subs normally moved slowly and cautiously at great depths, lest a sudden jam of the diving planes send the ship below test depth in a matter of seconds.) Commander Harvey orders a course change: "Twenty degrees right rudder and five degrees down angle."
- 9:09 AM: It is believed that a brazed pipe-joint ruptures in the engine room. The crew attempts to stop the leak while the room is filled with a cloud of mist. Harvey orders full speed, upward tilt of 15 degrees, and emptying the main ballast tank in order to surface. Due to Joule-Thomson effect, the pressurized air rapidly expanding in the pipes cools down, condensing moisture and depositing it on strainers installed in the system to protect the moving parts of the valves; in only a few seconds the moisture freezes, clogging the strainers and blocking the air flow, halting the effort to blow water out of the ballast tanks. The water leaking from the broken pipe most likely would cause short circuits leading to an automatic shutdown of the ship's reactor. The vessel loses propulsion. Harvey orders propulsion shifted to a battery-powered backup system. Assuming that the flooding was contained quickly, the engine room crew begins to restart the reactor, an operation that is expected to take at least 7 minutes.
- 9:13 AM: Harvey reports status via underwater telephone. The transmission is garbled, though some words are recognizable: "We are experiencing minor difficulties, have positive up-angle, and are attempting to blow." The submarine, growing heavier from water flooding the engine room, continues its descent. Another attempt to empty the ballast tanks is performed, again failing due to the formation of ice.
- 9:15 AM: Skylark attempts to contact Thresher, gets no immediate answer.
- 9:16 AM: Garbled transmission received from Thresher.
- 9:17 AM: A second transmission is received, with somewhat recognizable phrase "exceeding test depth ... nine hundred north". The leak from the broken pipe grows with increased pressure.
- 9:18 AM: Skylark detects a high-energy low-frequency noise with characteristics of an implosion.

On April 11, at a news conference at 10:30 AM, the Navy officially concluded the ship lost.



Submarines . . . of Today

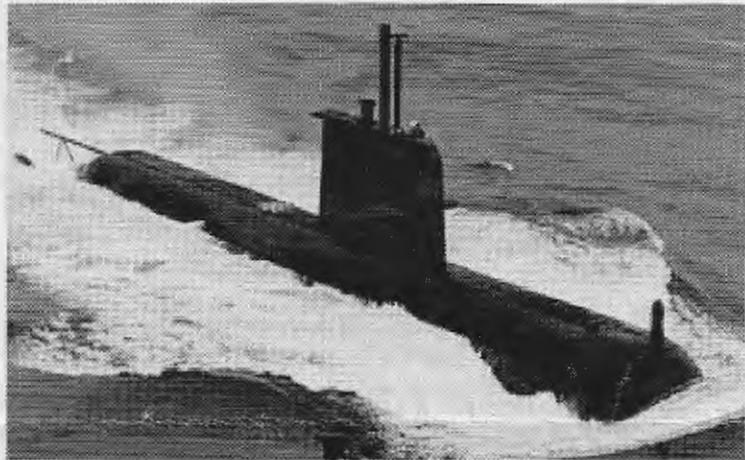
Deadliest Diesel Boat . . . Deadliest Diesel Boat in the World Goes to Sea

StrategyPage.com, April 5, 2007

Australia has completed the refurbishment and upgrades on the first of its six Collins class subs. The United States, in a rare move, gave Australia access to American sonar and underwater warfare systems technology for this.

Australia is spending nearly a hundred million dollars each, to upgrade the sonar and fire control systems on its six Collins class subs, and this new deal with the U.S. means that those diesel electric subs will carry the most advanced electronics in the world. The Collins class boats, mainly because of the quality of their crews, have proved to be among the most capable diesel-electric subs in the world. This is known because Collins class boats often train with U.S. Navy ships and aircraft, and usually come out ahead.

This has made the American admirals more concerned about the threat from diesel-electric subs.



For the moment, however, none of America's potential naval foes have submarine crews as well trained as the Australians. The new electronics will provide the Collins class boats with combat capabilities similar to the new U.S. Virginia class SSNs.

The Collins class boats were built in Australia during the 1990s, and are based on a Swedish design (the Type 471.) At 3,000 tons displacement, the Collins are half the size of the American Los Angeles class nuclear attack subs.

However, boats that size are nearly twice the size of subs Europeans are accustomed to designing and building for their own use. Australia needed larger boats because of the sheer size of the

oceans that surround Australia. There were a lot of technical problems with the Collins class boats, which the media jumped all over. The design of these subs was novel and ambitious, using a lot of automation. This reduced the crew size to 45.

Australia didn't formally "accept" all the Collins class boats until three years ago, when everyone agreed that all the major technical problems were fixed, or at least identified. The current problem is recruiting a sufficient number of qualified sailors to keep these subs at sea. Last year, because of personnel shortages, each available Collins class sub was only able to get to sea for 88 days. In 2005, each boat averaged 113 days. The Australian armed forces, in general, are having recruiting problems, and the government is providing more money (the traditional, and most effective, cure) to deal with the problem.

New arms race under the waves

By Tim Shipman and Chad Bouchard, *The Standard*, April 2, 2007

A dramatic increase in the number of submarines being built in Southeast Asia has sparked claims that a new arms race is under way beneath the waves in the Western Pacific.

Dozens of hunter-killers, armed with missiles and intelligence-gathering equipment, are being built, fanning fears of potential conflict in a volatile corner of the world and threatening to alter the global balance of military power.

The Indonesian government has announced that it wants to build 12 submarines by 2024 to patrol the strategically vital waters around its 17,000 islands. Singapore, Malaysia, Vietnam, Thailand, South Korea, Bangladesh and Pakistan are all buying submarines "off the shelf."

China and India - the two emergent superpowers of the Asia-Pacific region - are now planning a new generation of nuclear-powered boats that, in China's case, could fire nuclear missiles capable of hitting the US mainland.

A report published by the Australian Strategic Policy Institute think-tank warns: "There is an element of an arms race at work here." Andrew Davies, the author of *The Enemy Below*, said: "Submarines will be able to seriously threaten the operation of surface fleets and commercial trade."

His report predicts that the growing number of submarine operations could lead to a serious international incident and that the "potential for miscalculation is significant, leading to accidents or escalation of response."

The major peril in these waters has been, until recently, the prevalence of modern-day paramilitary pirates, who blight the trade routes through the Malacca Strait between Sumatra and Malaysia.

Now they are becoming the hunting ground for a new generation of U-boats capable of sinking ships, attacking ports and oil facilities, laying mines and landing covert raiding parties.

The potential for conflict became a reality last October. The USS Kitty Hawk aircraft carrier, at 82,000 tonnes, is the embodiment of US naval superiority in the Pacific, which has gone unchallenged since the Battle of Midway in 1942.

Supported by an attack submarine and anti-submarine helicopters, it was conducting routine exercises around the island of Okinawa when its crew was startled - and embarrassed - by the sudden appearance of a Chinese Song-class submarine.

The boat, apparently practicing anti-carrier warfare, had gone undetected until it surfaced eight kilometers away - putting the American vessel within range of its Russian-made, wake-homing torpedoes and anti-ship cruise missiles.

US commanders admitted they had been caught off guard because Chinese boats are rarely found in the "blue water" so far from their own coastline. Admiral William Fallon, then the head of US Pacific Command, who has been promoted to take charge of the wars in Iraq and Afghanistan, warned that the incident "could have escalated into something that was much unforeseen."

Indonesia is adding submarines to its fleet faster than any other country of comparable size. Four Russian Kilo-class diesel-powered boats have been ordered from the Russian Far East at a cost of US\$200 million (HK\$1.56 billion) each.



A US\$750 million deal last month with South Korea will supply another two submarines. By 2016, Singapore plans to have six submarines. Earlier this month, a French Scorpene submarine ordered by Malaysia reached its final stage of construction, the first of two destined for the Royal Malaysian Navy.

Vietnam wants two or three Kilo-class boats. Defense advisers in Australia, Britain's closest ally in the region, are voicing concern that the country's regional naval superiority is under attack.

British military officials, who conduct submarine exercises alongside Australia in the South Pacific, fear that nuclear warheads could be mounted on missiles fired by conventional submarines acquired by the other nations, creating a nuclear standoff in the region.

A British military official said: "If you are looking for a nuclear deterrent, it makes sense to acquire a submarine fleet. They are the best solution for nuclear power projection because they are difficult to detect and destroy."

Jason Alderwick, a maritime defence analyst at the International Institute of Strategic Studies, said: "Submarines are potent platforms and will be a key factor in any dispute over Taiwan or the Moluccas."

Indonesia's military spokesman, Rear Admiral MSunarto Sjoekronoputro, said that increasing naval power was critical for a country of 17,000 islands. "To secure our borders, two outdated submarines are not enough," he said. "We will buy new submarines step by step, as the economy allows."

The reason, set out in the Australian report, for the rise in submarine power is China, with which Jakarta has had uneasy relations for 40 years. Since 1996, when the United States sent two carrier battle groups to Taiwan to deter Chinese aggression, China has invested in arms to boost its power.

President Hu Jintao told Communist Party delegates last year he wants a navy prepared at any time for military action. The US Office of Naval Intelligence says China is intent on building five strategic nuclear-missile boats, equipped with 8,000-km range JL-2 missiles, which will give it an arsenal of 60 strategic nuclear missiles at sea, each with multiple warheads. The first will go to sea next year, and the first two of a new class of nuclear-powered attack submarines will enter service this year.

Chinese defense spending will rise 17 per cent this year to 23 billion (HK\$353.08 billion) - the 19th year of double-digit growth. Last November China shifted its defensive posture, from the Mao doctrine, which envisaged destroying enemies within the borders of China, to one that would protect the homeland offshore.

The US Department of Defense's recent military power report on China concluded that the country was working on a combat air wing for a future aircraft carrier, capable of projecting power far into the Pacific.

Robert Karniol, the Asia-Pacific bureau chief of the magazine Jane's Defence Weekly, said: "There are deep suspicions around the region fed by China's lack of transparency. If you build up offshore capability your intention may be defensive but the equipment can be used for offensive action. As military capabilities grow more sophisticated offshore, the possibility of misunderstandings and small incidents building into something serious is heightened."

Chinese submarines may be shifting the balance of power. Karniol said: "The Chinese have made clear they retain a military option on Taiwan. The consensus is that the Americans would not be able to prevent an invasion. They would be able to move and defeat it but they wouldn't be able to stop it happening."



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