



USS THRESHER

LEST WE FORGET

Prologue



April 10, 2013
will mark the 50th
anniversary of the loss
of the **USS THRESHER**
during trials off the
coast of New England
in 8400 feet of water
and with 129 aboard.

It has been recognized how few of the submarine community members that were active at the time of the loss are still with us today. Many of today's active members were not yet born at that time. That led us to ask what can we do to help perpetuate, within the culture of both the current and future Team Sub community, the impact that the loss of THRESHER had on the development of a safety program for submarines. The conclusion was that putting together the history of the development of the SUBSAFE program as it was established and evolved by collecting stories, recollections of events, and related documents from those that participated would be worthwhile.

- **BOB SCHULTZ**, Deputy Program Executive Officer, Submarines (Ret.) and

JANEY NODEEN, Deputy for Acquisitions, Program Executive Office, Submarines (1994-1997)

“This is a wonderful tribute”

The Kittery-based THRESHER Memorial Project Group is erecting a 129-foot flagpole in the town’s Memorial Circle next year to commemorate the 129 Navy sailors and civilians who died when THRESHER sank in the worst submarine disaster of all time.

This is a wonderful tribute, and this Navy man and former Commander-in-Chief salutes you ... for your commitment to ensure that those who served and those who gave their all are never forgotten.

- GEORGE H.W. BUSH

World War II Navy pilot and former President of the United States, August 31 2012

“You cannot divest yourself of it”

Responsibility is a unique concept: it can only reside and inhere in a single individual. You may share it with others, but your portion is not diminished. You may delegate it but it is still with you. You may disclaim it but you cannot divest yourself of it. Even if you do not recognize it or admit its presence, you cannot escape it. If responsibility is rightfully yours, no evasion or ignorance, or passing of the blame can shift the burden to someone else. Unless you can point your finger at the man who is responsible when something goes wrong, then you have never had anyone really responsible.

- ADM HYMAN RICKOVER

Hearings before the Joint Committee on Atomic Energy, Congress of the United States - 88th Congress, first and second sessions on the loss of the USS THRESHER, June 26-27, July 23 1963, and July 1964

“The country can be proud”

The tragic loss of the submarine THRESHER and 129 men had a special kind of impact on the nation ... a special kind of sadness, mixed with universal admiration for the men who chose this kind of work. One could not mention the THRESHER without observing, in the same breath how utterly final and alone the end is when a ship dies at the bottom of the sea ... and what a remarkable specimen of man it must be who accepts such a risk.

The country can be proud and grateful that so many of its sound, young, eager men care enough about their own status in life - and the welfare of their country - to pool their skills and match them collectively against the power of the sea.

- DR JOYCE BROTHERS

1963

Reaction



I was in the radio room of the USS ALEXANDER HAMILTON with the boat at periscope depth when we received the message restricting our depth due to the loss of the THRESHER. This news had a profound effect on our boat, as the ALEXANDER HAMILTON's Blue crew Executive Officer, Lieutenant Commander Rawlins, had just left the THRESHER, turning over the position to my former Communications Officer from the USS SKATE, LCDR Pat Garner. My good friend, LT John Smarz, a shipmate on the USS WAHOO, was also on the THRESHER when she was lost.

- THEODORE G. DICK
RMC(SS) USN (Ret.)

My first memory of THRESHER is always the loss of LTJG Ron Babcock. Ron was two years ahead of me at USNA, but we were in the same company, lived across the hall from one another, and ran battalion track together. Although an upper classman, Ron was more interested in our development as midshipmen than harassing us as plebes. A good man I'll never forget. RIP.

- DICK VOPELAK

I graduated from USNA in 1960 and went directly into submarines. I was at sea on board the USS HALIBUT when we received news of the loss of the THRESHER. LT James J. Henry III was one who was lost. Jim was my roommate at USNA. He stood #3 in our class and most everyone I knew thought he would make Admiral. Jim was never too busy to drop whatever he was doing to help a classmate. He spent many hours helping me with calculus which was a God-send, believe me.

I have often thought about Jim Henry and the THRESHER. The SUBSAFE program probably saved many lives. Unfortunately, it took a THRESHER to make it happen.

- LEN LAMMERS

Reaction to loss of the THRESHER

At the time I was XO of the USS DOGFISH and we were in Portsmouth undergoing a regular overhaul. I asked my skipper, to check with the Thresher CO, John Harvey to see if I, along with [a couple other] DOGFISH officers, might be able to ride along on THRESHER's upcoming sea trial. I got word back that he had talked with John Harvey and he said something to the effect of "Next time, welcome, but we have a lot of extra ship riders this time and no extra room."

A couple of days after the loss I was assigned as the Casualty Assistance Officer for LCDR John Lyman's widow.

A memory that stands out in my mind was watching one of the Board of Inquiry's tests. An old SS radar console was placed on the floor of one of the empty dry docks and a high pressure stream of water was directed against the console. The noise was overwhelming. I remember thinking that nothing could be heard over the noise of the water smashing up against the radar casing and how at deep submergence no orders could be heard over the roar of water striking anything in its way.

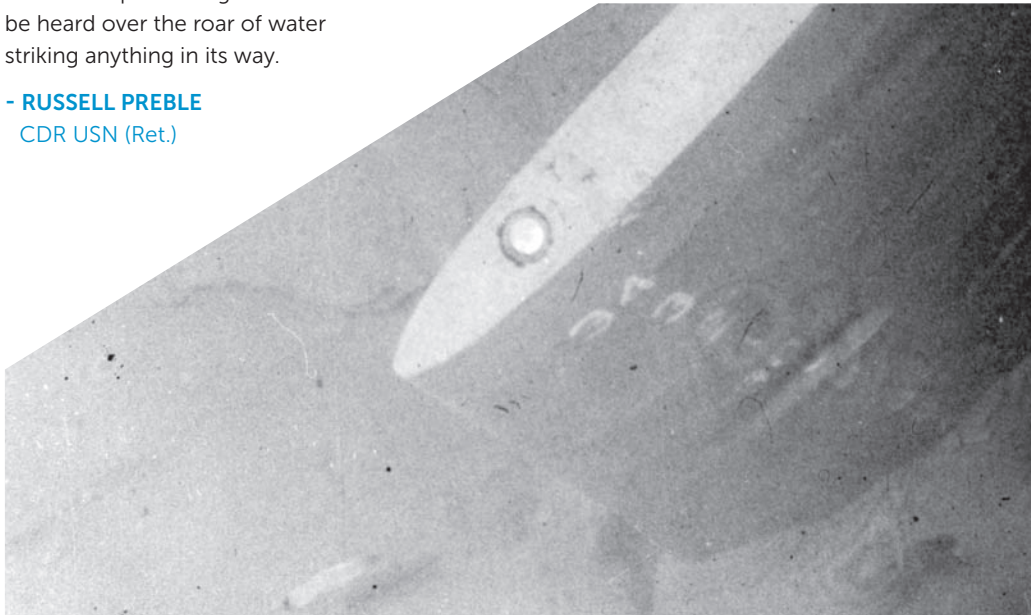
- RUSSELL PREBLE
CDR USN (Ret.)

I showed up at the Type Desk in the spring of 1963 right after the THRESHER went down. I was 27 years old. THRESHER was the submarine community's 9/11. The atmosphere around the Type Desk was both somber and hectic. The SUBSAFE program was being put together while under immense scrutiny and pressure, and we were still trying to ascertain the root cause of the disaster.

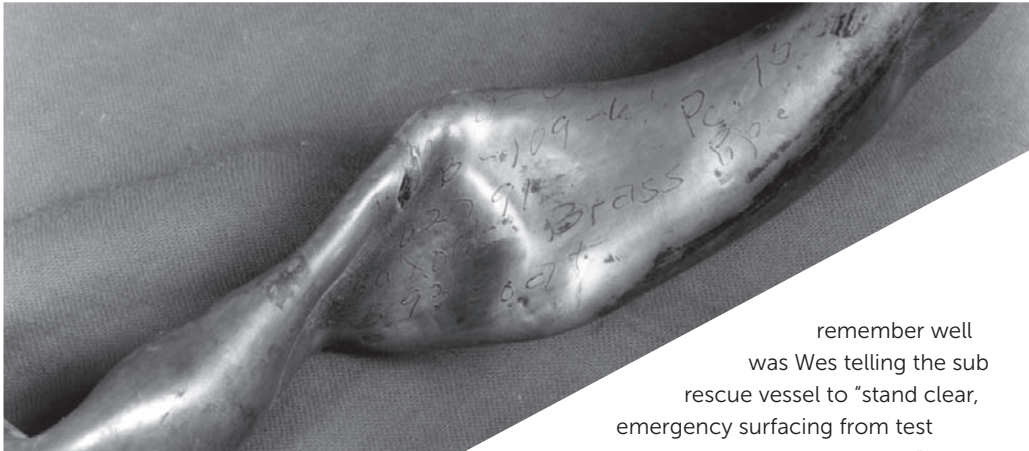
- PAUL SACILOTTO

I was mess cooking on board the USS AMBERJACK and my wife was pregnant. I went on leave and my son was born on 10 April 1963. At breakfast at Charlotte Memorial Hospital the next morning I saw the news paper and was blown away. I'll never forget my first child's birthday ... nor the THRESHER.

- FENTON WELLS



Reaction



I was CO of the USS SHARK at that time and on a special op. I couldn't believe the message we received.

The CO of THRESHER, Wes Harvey, was a close friend and one of the most qualified nuclear engineers I ever had the honor to serve with. We put the USS TULLIBEE nuclear prototype and USS TULLIBEE, our first nuclear SSK, in commission. Wes was the engineer for both and I was XO.

In November 1963 ADM Rickover had me ordered to the Pentagon to OP 31. VADM Dennis Wilkerson was my boss there. The task he assigned me, among others, was to get together all the information pertinent to the loss of the THRESHER, and write the presentation to Congress by VADM Red Ramage (OP 03) concerning the case. I was also assigned as project manager for the SUBSAFE program for CNO. My saddest memory was listening to the tapes of the underwater phone conversations between Wes and the submarine rescue vessel, which was his escort for his sea trials, after a major overhaul at Portsmouth Naval Shipyard. Wes had relieved him as CO while the sub was in the shipyard. The first conversation that I

remember well was Wes telling the sub rescue vessel to "stand clear, emergency surfacing from test depth, flooding in the engine room."

His voice was calm and easily recognized. I could hear the air blow start and the screw speeding up. In less than a minute, the emergency blow trailed off and the screw started slowing down. Wes's last report was "attempting to blow." Wes knew and I knew that there were no orders that started with "attempting." His voice was still calm even though he knew by then his sub was lost. I believe to this day that he was telling us something was wrong with the air blow system. Even someone as good an engineer as Wes couldn't figure out why the air blow stopped. The next thing on the tape some minutes later was the collapse of the first bulkhead, followed shortly after with the others collapsing. Calculations later estimated the sub reached 300-400 feet depth before the flooding stopped her ascent. Six weeks later when she was located, the bow was buried about thirty feet deep. Calculations show she was going over 100 knots when she bottomed. The front half of the sub was vertical and the sub broke in two at the reactor compartment. I could read the name of the next to last reactor watch officer on the log sheet on the bottom of the ocean from the hundreds of pictures taken.

- ZEB ALFORD

“ I believe to this day that he was telling us something was wrong with the air blow system. Even someone as good an engineer as Wes couldn't figure out why the air blow stopped. ”

I was a newly hired design engineer at Portsmouth Naval Shipyard when the THRESHER was launched on 9 July 1960, an event that was awesome to me, having never seen a ship, let alone a submarine, launched before. As she completed construction, I had occasion to go aboard and tour the boat often. I recall after she completed sea trials how proud the shipyard was for designing and building the most advanced submarine of her day. I also recall when she finished her shakedown cruise and came back to the shipyard for an extended Post Shakedown Availability two years later. During that period, I was a member of a small survey team consisting of a planner, a structural inspector, and myself. We were charged with entering every tank on the ship to inspect for damage and specify repairs if necessary, so I became very familiar with all the structural details of the ship.

It was 9 April 1963 when she left for sea trials after completion of that availability. Everyone on the shipyard awaited reports of her initial deep dive. I especially recall the day she was lost because it was my 24th birthday, a day that ended very sadly indeed. The search effort for her remains was conducted by the TRIESTE, operating out of Boston Naval Shipyard. Throughout the early summer, reports of the search effort by the deep submersible TRIESTE were followed closely. She had been reconfigured with the sphere suspended from a

gondola filled with aviation gasoline and, I believe, designated TRIESTE 2. The gasoline provided the necessary floatation for the manned sphere. During the early search effort, TRIESTE had a casualty where the batteries were shorted out due to flooding, resulting in the loss of power and a hole burned through the gondola deck plating. It was a very hairy experience for the crew. Search efforts were suspended and a team of engineers and tradesmen was assembled at Portsmouth to make repairs and develop a modification to prevent recurrence. I was selected as the structural engineer member of the team, traveling every day from Portsmouth to Boston to work on her. One of the proposed solutions to prevent recurrence was to fit an inflated rubber bag into the battery compartment, the idea being that if water got into the compartment, the rubber bag would protect the batteries. I was assigned the project of designing, building, and testing the bag. All went well until the attempt to test it for integrity while inflated and submerged. The idea was to simulate the function of the bag at search depth. This became an exercise in futility, since the bag was so big and buoyant that we could never submerge it in the test tank.

The TRIESTE crew finally solved the problem by applying plasticol, a plastic compound applied in liquid form and then cured, on all the battery terminals, and it worked great.

- GEORGE "SKIP" HODGKINS

Subsafe

Task 13 of the 1963/64 Congressional/AEC hearings report, which lists the 16 Submarine Safety Program tasks that evolved, is of specific interest as it relates directly to THRESHER. This task required a "Review of the safety aspects of shock tests against manned submarines." From April to May of 1962, THRESHER was at EB for modifications in preparation for high shock testing and was tested for ability to withstand controlled underwater high shock off Key West in late June of 1962. She then went into Portsmouth NSY for major overhaul.

- DON JOHNSON
92QB (1992 - 1996)

I was part of the USS LEWIS AND CLARK pre-comm unit and believe that, at least for a Newport News boat, the 644 was first to be SUBSAFE fully throughout the design and production stages. The USS SIMON BOLIVAR was about two months ahead of us and we found that many of our valves and other SUBSAFE items had "SSBN-641" etched on them. The reason for this was that some SUBSAFE items manufactured from scratch for the 644 were used on 641 to maintain the latter's production schedule. Then, by the time the 644 actually needed the items, the original 641 items had been "SUBSAFE'd" and were then used in the 644. I believe there was minimal impact on the 644 production schedule as a result of this, but don't know if the 641 was on time or an adjusted schedule.

- THOMAS E CLARK
FTCM(SS) USN (Ret.)

Following duty aboard the USS RAZORBACK, USS WAHOO, and USS SKATE, I reported to the USS ALEXANDER HAMILTON (Gold) as a Chief Radioman on 6 November 1962 at Electric Boat, Groton, Connecticut. The boat had been launched on 18 August of that year and was undergoing fitting out when I reported aboard.

The 28 June 1963 New London Day commented in an article that "Ships under construction at the wet dock commissioning area are the USS NATHAN HALE, the USS DANIEL WEBSTER, and the USS TECUMSEH." The USS FLASHER was nearby. Another article from that newspaper (Volume 82, Number 33) stated that, "Officials estimate a five-month holdup while modifications are made to Polaris subs now being assembled in boatyards. The changes are being made in hopes of preventing a recurrence of the disaster which sank the THRESHER last April...."

- THEODORE G. DICK
RMCS(SS) USN (Ret.)

I was assigned to COMSUBDEVGRU TWO I put the USS STURGEON in commission, which was the first boat designed from the keep up with the SUBSAFE program. My rate at the time was MMC (SS) and my job was Chief Auxillaryman. In that capacity, I was very much involved in the installation, testing, and inspection of all the components comprising the SUBSAFE package. During our initial sea-trials I was also the Diving Officer/Chief-of-the-Watch when we conducted our first emergency surface utilizing the SUBSAFE systems. I believe STURGEON was the first boat to conduct this milestone.

- HERMAN H. MARQUETTE

I was assigned to COMSUBDEVGRU TWO when the THRESHER went on eternal patrol and had been scheduled to go with her as a staff rider, along with CAPT Frank Andrews. His schedule was changed due to an unexpected meeting that came up with COMSUBLANT in Norfolk, so our trip to THRESHER was cancelled.

Over the next several months, CAPT Andrews was in charge of the THRESHER Search Team. While I was on the staff we gathered a lot of information and made up several reports on the causes and lessons learned about the loss of the THRESHER.

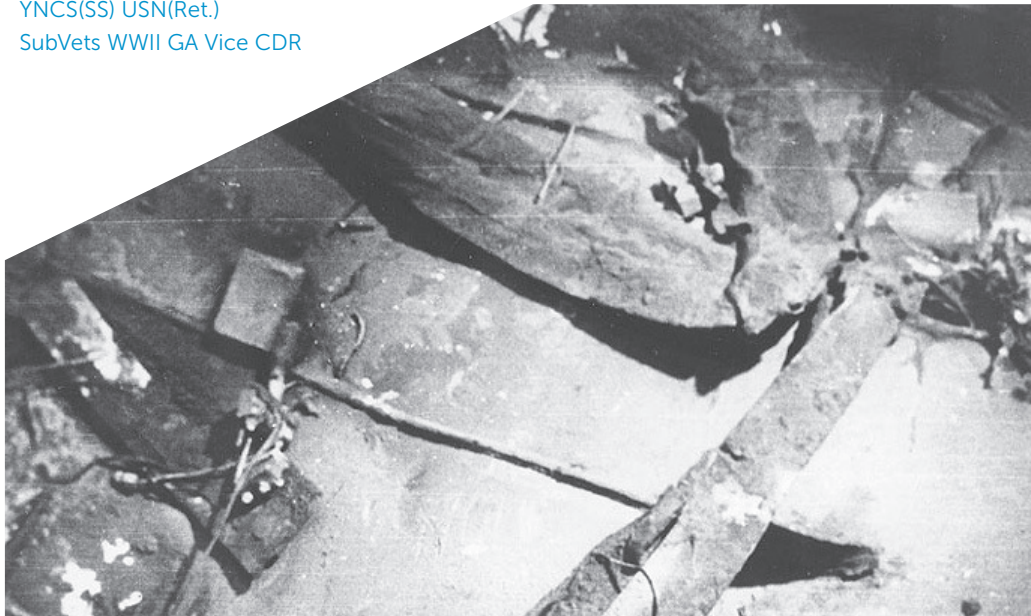
Also, because of the lessons learned, several new SUBSAFE Systems were designed and tested on the USS ALBACORE, assigned to COMSUBDEVGRU TWO. Most of these systems proved to be working properly and were later adopted for use throughout the Submarine Force.

- BOB HURLEY
YNCS(SS) USN(Ret.)
SubVets WWII GA Vice CDR

During the construction of the USS FLASHER, the THRESHER went down and was lost. The FLASHER was cut in two and had a 13-foot section added to her length, which gave her additional room for high pressure bottles to store increased blow capabilities. All of the blow connections (both regular and emergency blow) to the tanks were increased in size to prevent freezing. The FLASHER was the first to go to sea and test all the blows from test depth, which was quite a ride! Some of the certification audits were x-raying all of the hull penetrations and all sea piping. This was probably the first Functional Audit and delayed the FLASHER's commissioning.

There were no significant problems or hurdles that could not be overcome and still provide safety. May the memory live on!

- CLIFTON SNOW
IC1(SS)



Subsafe

I was assigned to USS LINCOLN while she was going through refueling, upgrade to A3 Polaris missiles, and SUBSAFE installation. As I remember it from a briefing given at Electric Boat, THRESHER was lost because of four design/construction flaws and an operational flaw.

The principal flaw was the failure of one or more silbrazed joints in the auxiliary seawater (ASW) systems that were compounded by not having hull valves to isolate an ASW leak. Any deep depth leak will produce significant spray and the reactor control panels had no spray shields so the reactor shutdown shortly after the ASW system leak occurred.

Next was the failure of the ballast tank blow system routed through strainers that iced up, causing the intermittent blows recorded as THRESHER fought to reach the surface, a fight she surprisingly came close to winning. Lastly was the lack of an operational procedure to use the residual steam in the steam generators to maintain from three to five minutes of propulsion after a reactor shutdown. As most submariners know, the fastest way to the surface is planes and propulsion.

SUBSAFE addressed these issues in the LINCOLN at Electric Boat, where every silbrazed weld was x-rayed. It was sobering to see how many of our welds failed x-ray and had to be replaced.

Hull valves with local hydraulic actuators were installed at multiple locations in the boat that would isolate all hull openings. This included a local pressurized hydraulic accumulator that would shut the valves even with the loss of the boat's hydraulic system.

A new emergency MBT blow system was installed that dumped the HP air banks directly

into the forward and after ballast tanks through large piping and controlled by forward and aft actuating switches in the control room.

And lastly, spray guards were installed around the reactor control panels as well as receiving a procedure to utilize the residual steam in the steam generators in case of a life threatening emergency.

Some of these features were then certified at test depth during sea trials. Most unimpressive was the emergency blow system. I was the Diving Officer when we simultaneously blew the forward and aft groups. The noise was deafening, but the digital depth gage seemed to take forever to move one foot, then two feet, and then it started to accelerate. I have no idea how far we came out of the water when we finally hit the surface, but it must have been significant judging from the way the boat reacted.

From that test, I never forgot the importance of having speed and planes at depth. However, speed also creates the potential hazard of exceeding test depth should one experience a stern plane failure where gravity would take the stern planes to full dive. We practiced that possibility at slow speed near the surface by putting the stern planes on full dive and recovering by backing down emergency while emergency blowing the forward ballast tanks.

I have read conflicting reports as to the cause of the loss of THRESHER, but knowing the condition of our Portsmouth-made ASW silbrazed joints, I accept the EB version. The loss of THRESHER was an enormous tragedy, but all nuclear submariners benefited immeasurably from the resultant SUBSAFE program.

- DICK VOPELAK



When I reported for duty to the Naval Reactors Representative's Office at Portsmouth Naval Shipyard in 1981, the first thing I was handed was my own personal copy of a three-inch thick binder of ADM Rickover's notes, memos, writings, and speeches on the evolution of the Naval Nuclear Propulsion Program. We referred to that binder simply as "The Boss." I was expected to not only thoroughly read it, but also to accurately quote from it at the relevant and opportune time and place. It was unclassified and I still have my copy.

When I reported to NAVSEA as SEA 92Q in 1993, I was surprised to learn of many misconceptions about the SUBSAFE Program. There was a very brief history of the program in one of the sections of the SUBSAFE Manual, but nothing compared to the indoctrination I had received upon my introduction to the Naval Nuclear Propulsion Program. I recall one of the safes in the SUBSAFE office that was packed top to bottom with interesting letters, memos, and decision papers detailing the evolution of the program starting with April 1963 - some nights I would get lost in that safe before realizing the sun was coming up. The biggest problem was so much of that history still was classified, even much of the stuff from the 1960's and 70's that really wasn't relevant to more modern technical information classification criteria. Even the nucs were doing a better job of declassifying information that no longer was technically sensitive or relevant for other than purely historical purposes.

Even more recent program history carries its share of misconceptions. In 1996 the first NAVSEANOTE 5000 was issued, the document that "grants license" to activities authorized to perform SUBSAFE work. Several years ago I was having a conversation with another former "Q" and the topic of NAVSEANOTE 5000 came up. His understanding was that the document had been created to give NAVSEA better control over fleet-performed SUBSAFE work. I responded, "No, the Submarine Fleet was never that big of a problem. It was created to close a major hole in shipbuilder-performed SUBSAFE work, specifically work that Electric Boat was having contracted through the NAVPROs rather than through SUPSHIP Groton, specifically for the purpose of its escaping Navy oversight, audit and certification."

Even working around all the classification (which was probably really over-classification) of documentation of SUBSAFE Program history and evolution, one could probably produce a Navy "in-house best seller" on the subject that should sit at eye-level on a shelf behind the desk of every person with responsibility or interest in one of the most successful military programs in all history.

- JESS SCHRUM

Subsafe

As we were pressing toward the USS VIRGINIA certification for sea trial, it became increasingly clear that we needed to formalize safety critical electronic component certification requirements for systems such as the VIRGINIA Class fly-by-wire ship control system. John Butler (O7TC at the time), Dave Armstrong, the ISEA (NSWC employee), and myself as the VIRGINIA Class Tech director took on the challenge. As the three of us wrote the manual, leveraging the format and approach of the SUBSAFE Manual, we concurrently established a boundary book to clearly define the FBW system and the safety critical elements (hardware and software) of the system. We updated the JFMM material controls requirements following in a manner similar to DSS SOC components while concurrently working through lead ship cert. Jaeyoo Ko was my lead for the actual FBW cert for VIRGINIA, and we levered Dave Restifo and his team to pull together material cert verification tests to establish pedigree for safety critical components. We levered the message format from SUBSAFE, and involved SOSG and Fleet SUBSAFE Directors and QA Officers throughout. By anchoring the approach to the SUBSAFE methodology, we were able to get it coherently codified in a manner that was readily understood by maintainers, cert folks, and the operators.

- GARY DUNLAP

After I qualified in submarines, made ET-3, and finished my tour on the AMBERJACK, I went to nuke school. I didn't do too well and opted out of the program (which I had really hated), and was sent to the USS TRIGGER in June 1964. TRIGGER was in the yard and, as a part of the yard overhaul, was being out fitted with a new Emergency Main

Ballast Tank Blow System and all quarter turn-quick shut off valves on all "to sea" fittings. I believe we were the first diesel boat to get these safety upgrades and these were a direct result of what happened to the THRESHER.

On 2 September 1964 we left Charleston Shipyard on sea trials and made four emergency ascents, three from 100 feet and then one from 300 feet. Almost sunk us. We rolled first to port, then to starboard, and finally surfaced at about a 70-degree roll, a roll so bad that we tumbled the gyro. I was in the CO's state room, sound powered head set on and with my hand on the 2A ballast tank vent valve. The rumor was that the diving officer couldn't straighten us out and our COB, Chief Bowdon took over and manually operated the vents to straighten the boat out. At least we didn't roll over, which would have been a one way trip.

Whatever happened, the eight or nine guys on board during this trial from the David Taylor Model basin took off when we got back to Charleston and never came back. Our skipper, an excellent CO, LCDR P.F.H. Hughes had "Qualified Submarine Balloonist" certificates made up and had them issued to each of the crew. He even signed them as Chief Balloonist. I still have mine and it is framed and hung proudly in my office.

I was 19 years old at the time and didn't realize how serious this situation actually was. Now, a lot older, I feel how ironic the situation was, especially if the system installed to prevent another THRESHER disaster could have caused our disaster.

- FENTON WELLS

The THRESHER was the last ship our Blue Crew Commanding Officer, Dean Lane Axene, skippered prior to his assignment to the USS JOHN C. CALHOUN in January of 1963. In July of 2008 at the biennial meeting of the Calhoun Veterans Association, we voted to create an Award of Merit in RADM Axene's name and presented it to his son, Eric, posthumously, at the admiral's memorial service in Pensacola on 20 March 2009.

The admiral's engineering skills allowed him to recognize potential problems in the construction of the THRESHER and the other submarines being built at the time. His courage made it possible for him to share his concerns with his superiors at the Portsmouth Shipyard, at BUSHIPS, and before the Board of Inquiry after the loss of the THRESHER, testimony which provided the Navy with direct and personal information about the flaws in construction that may have contributed to the disaster. His dedication to the Navy and to the safety of all submarine sailors encouraged him to support the SUBSAFE Program when promulgated.

- **JONATHAN B. WEISBUCH MD, LT(MC),**
Medical Officer, and

USS JOHN C. CALHOUN, Vice President,
Calhoun Veterans Association

I joined the Engineering Duty Corps in 1971 after getting a degree at the US Naval Post Graduate School. My first assignment was to Mare Island Naval Shipyard where I was assigned as senior ship superintendent for the USS PLUNGER SUBSAFE overhaul. The overhaul took 25 months (a record duration at that time) and cost upwards of \$125,000,000 (a lot of money back then). The ship was gutted from one end to the other as dozens and dozens of SUBSAFE modifications were implemented, including:

- The numerous welds for the main sea water piping were called silver brazing. Unfortunately, no method had been in place to validate the quality of the joints after welding/brazing and, after numerous investigations, it was estimated that the sil-brazing technique joined (or welded) far less than 50% of the circumference of the two connecting sections. Some estimates were as low as 8%. In other words, the sections were barely held together at all. One can only imagine what happened at test depth when an 11- inch diameter main sea water weld gave way. We will never know for sure.
- Emergency reservoirs were installed in the hydraulic systems that ported oil directly to all critical sea water valves in the engine room, thus providing an emergency supply independent from the main hydraulic system. The valves could be shut at several locations local and remote.
- Air system modifications diverted air to blow ballast tanks directly from the HP air flasks inside the ballast tanks. One of the problems was that the air being used to blow ballast tanks may have frozen in the long run of piping lines thus causing the emergency blow to be totally ineffective. The solution was to port air directly from the flasks into the ballast tanks thus providing a much shorter run which prevented air freezing in the lines.

As Shipyard Commander at Portsmouth Naval Shipyard from 1984-1987, we hosted an annual memorial of the THRESHER in the base chapel. The good news, if you can call it that, is that the SUBSAFE program probably saved many lives. Unfortunately, it took a THRESHER to make it happen.

-**LEN LAMMERS**

Subsafe

What impressed me about the SUBSAFE project was how quickly the Navy came up with fixes on the air blow system and the bypass for the reactor system in addition to eliminating silbrazing (we never had a non-destructive test method). These problems were on all the nuclear subs we had built, but none ever went to THRESHER's test depth or had to blow ballast tanks for as long as she did. ADM Rickover was right: "Lord my sub is so small and your sea is so great." We have to keep improving on what we have done to date - in memory of THRESHER.

I was lucky to play a small part in a major effort where the Navy made a complex military system work. Admirals Ramage, Rickover, and Moorer had the complete confidence of the Secretary of the Navy and the Congress. They reported the findings of the Board of Investigation to the Congress as soon as it was completed. They reported all the things the Navy planned to do to make sure that problem wouldn't happen again, and finally they reported what the costs would be - several billions of dollars. The Congress accepted their reports and approved the money for the program. The rest is history. I believe the loss of THRESHER will be remembered as long as there are submariners.

- ZEB D. ALFORD

The SUBSAFE program has positively impacted other facets of the overall submarine program as well. When we built and delivered USS VIRGINIA, part of the design was a new fly by wire electronic ship control system, fundamentally different from anything we had done on previous classes. We determined we needed a new certification regime for this new, different, and absolutely vital ship system. When I was PM, I assigned CAPT Gary Dunlap the task of creating,

documenting and implementing the new certification requirements. As a model, we used the SUBSAFE 0010 manual.

Another thing, the US SUBSAFE program serves as a model for other navies' submarine programs. The Royal Australian Navy, for example, has its own version of the program, modeled on the US's, and occasionally NAVSEA monitors the program and offers feedback.

- JOHN HEFFRON
CAPT, USN (Ret.)
Adelaide, Australia

I was an ET3 on the USS SABALO at sea in the Pacific when we lost THRESHER. I was also the first Damage Control Assistant, then on USS WILL ROGERS when we received our SUBSAFE manual 12 hours before getting underway for an SSBN patrol. We had just finished replacing the shaft on the after hatch and had not done any real testing. I opened the manual topside and verbally directed the requirements for SUBSAFE.

I was also the first PEO to certify a new construction ship (USS SEAWOLF). In one of the most serious episodes with that process, SECNAV threatened to fire me, my boss, and everyone he could because the scheduled commissioning might be delayed. I called him on that face to face and told him he could fire me and everyone else, but SEAWOLF was not going to sea until we could assure safety for all. When I held the cert meeting I heard from nearly everyone telling me the ship was ready to go. When all had finished, I asked "Q" (probably Al Ford) if "Q" was ready. He looked at me, ignored the stares of others, and said, "No."

If only NASA had done the same.

- ROBERT FRICK

... On April 10, 1963, while engaged in a deep test dive, USS THRESHER was lost at sea with 129 officers and men on board. Based on the findings of a Court of Inquiry and the Joint Congressional Committee on Atomic Energy hearings into the loss, it was concluded that a flooding casualty in the engine room, resulting from a piping failure in one of the sea water systems, was the most probable cause of the loss.

From this tragic event, the Submarine Safety (SUBSAFE) Program was established on December 20, 1963 to ensure implementation of recommendations resulting from findings of the THRESHER Court of Inquiry and THRESHER Design Appraisal Board. Today, the technical and administrative requirements of the SUBSAFE Program continue to evolve, and the most current are contained in the Submarine Safety Requirements Manual, NAVSEA 0924-062-0010 Revision C.

Simply stated, the purpose of the SUBSAFE Program is to provide maximum reasonable assurance that sea water is kept out of the submarine and that the submarine and crew can recover if there is a seawater casualty.

Our challenge today is to maintain the standards established by the SUBSAFE Program and to avoid ignorance, arrogance, and complacency.

The culture of the SUBSAFE Program needs to be continually reinforced at all levels of our community. The rigorous compliance with SUBSAFE requirements and attention to detail begin with design and extend through every aspect of construction, maintenance, and operations. The ability of our submarines to continue to operate successfully and return home depends on the vigilance and integrity of each one of us who works in this community. The ability of USS NEWPORT

NEWS and USS SAN FRANCISCO to survive collisions at sea and to return home is testimony to the success of the SUBSAFE Program and the training of the personnel who operate our ships.

Recent findings regarding weld wire problems at a new construction shipyard with a long-standing successful submarine construction history demonstrate the need to be forever vigilant, particularly on well-established programs. We must continually re-examine our established practices and processes to ensure that we are doing the right things the right way. Every aspect of everything that we do needs to be approached with an attitude of "trust but verify."

Our outstanding submarine safety record since THRESHER is a direct result of rigorous compliance with the technical and administrative requirements of the SUBSAFE Program. This success has not gone unnoticed. The Columbia Accident Investigation Board used the SUBSAFE Program as a model of an organization that successfully operates a high-risk program.

We must continue to maintain our vigilance, intensity, and integrity in all matters involving the SUBSAFE Program. The supreme sacrifice of those lost with USS THRESHER can best be remembered by never letting it happen again.

REMEMBER, SUBSAFE IS A REQUIREMENT ... AN ATTITUDE ... AND A RESPONSIBILITY.

USS THRESHER ... Let us pause today to remember.

- **RADM THOMAS ECCLES**
NAVSEA 07
10 April 2008

USS Dolphin

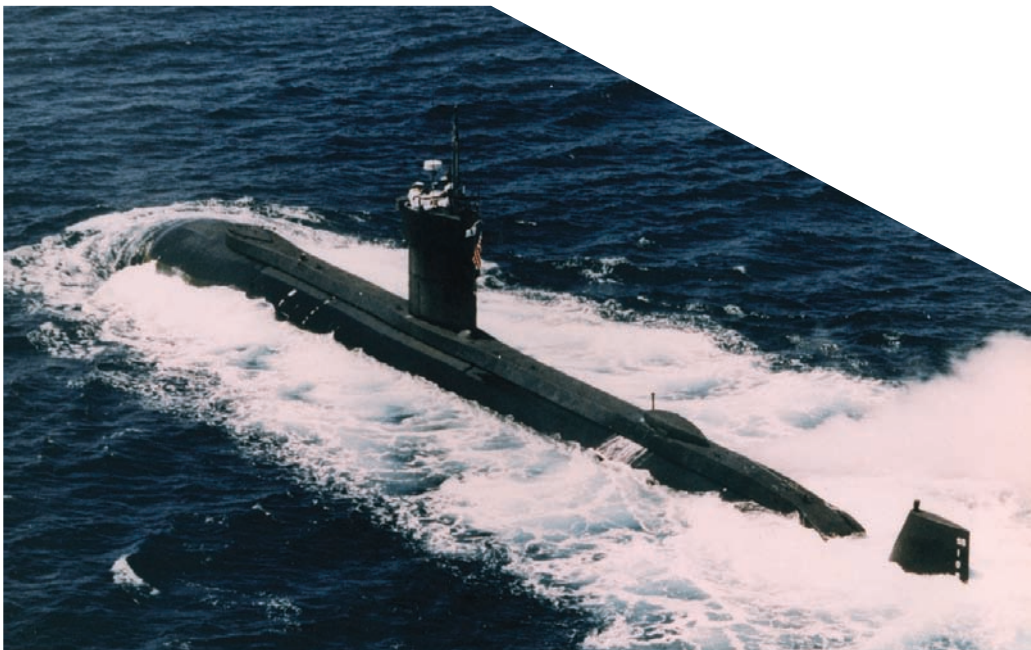
On 21 May 2002, we experienced the near-loss of USS DOLPHIN (AGSS-555) off the coast of San Diego. The summary is as follows:

- The boat was at sea on a test mission with crew of 41 and two civilians onboard
- DOLPHIN was on the surface in rough seas, snorkeling to recharge the battery
- As a result of the seas, water started to come into the boat, eventually causing flooding and fires which were beyond the ability of the crew to stop; the CO was forced to abandon ship
- 43 souls went into the water, the main hatch was shut, and, fortunately, the entire crew plus civilians were rescued
- With the hatch closed, the flooding ceased, the fires eventually burned out, and the battery discharged
- The submarine was towed into port and carefully opened up after a suitable waiting period

Our best estimate was that about two minutes remained before the submarine would have lost positive buoyancy.

When we convened a Flag Review Board, we were aware that there had been a THRESHER Design Review Board convened in 1963 to review the design and maintenance for the submarine. We wanted to use that as a template, but it was not generally available. We located a copy of the report and "re-promulgated" it through the submarine technical community. We then used it to guide us in our DOLPHIN investigation.

Fundamental issues with DOLPHIN's near loss are chilling and remind us that continuous surveillance is required - design configuration of critical safety features must never be compromised. This is especially true for one-of-a-kind submarines and submersibles. Some of the unique items we found:





- Configuration control had not been rigidly enforced over the 35-plus-year life of the boat
- As a research asset, DOLPHIN was not completely stewarded as a fleet asset; responsibility and accountability were partially split between the Office of Naval Research and SUBPAC
- The importance of many of DOLPHIN's unique safety design features were lost due to a long history as a research asset, and modifications were installed, many by TEMPALTS, that compromised her robustness to respond to off-design conditions
- These unique design features contributed to the incident
 - A single hatch which serves as both escape route and for diesel induction
 - The fairwater IS the main induction sump
 - The fairwater has unique features installed which allow it to drain off water to prevent flooding of the submarine
 - Many critical electric power distribution components were located close to the bilge, and were vulnerable to flooding
- Critical documentation used by the crew (Training Aid Booklets, for example) had been red-lined, but not revised formally and were outdated

DOLPHIN was refurbished, altered, and modified to correct the deficiencies. We actually altered the SUBSAFE boundary to include the unique fairwater features that prevented flooding of the submarine.

The lessons learned from DOLPHIN were very fortunate. When there is a near miss such as this, we are reminded to go back to our roots and work from first principles for safety, and review the extent to which similar conditions may exist on other fleet units. In this case, the issues related to DOLPHIN's single ship design and life-cycle management, but this incident generated a closer look at other one-of-a-kind units.

- **PAUL SULLIVAN**
VADM, USN (Ret.)

Poetry

An Unknown Father

Contributed by Tim Noonis, a son of Walter Jack Noonis, who was aboard the THRESHER when it went down, 10 April 1963

How I often think about that fateful morn
Our hearts to be broken, all hope forlorn

On a fog shrouded morning the
Thresher headed for sea
The date was April 10th, Nineteen Sixty Three

She was sleek and fast; a proud ship was she
1st in her class, her number 593

With her faithful sub tender, Skylark in tow
To test depth that morning the Thresher
would go

Skylark to Thresher... "Are you ok?"
Thresher to Skylark... "Having troubles today"

Skylark to Thresher... "Are you still there?"
Nothing from Thresher but bubbles of air

With a loud clap of thunder, her fate
was sealed
What happened to Thresher would not
be revealed

One hundred and twenty-nine men ...
on a ship in harms way

Their God, they would meet,
before the end of the day

6,000 feet and more the Thresher lay deep
An ocean of tears her families would weep

Thresher lay in pieces .. on the ocean floor
Those fine handsome sailors forever no more

Her end was violent and quick we are told
'Twas thought with this, our hearts
be consoled

Did you have time to think or a chance
to pray?
Had you any idea what fate held that day

Wives, sons and daughters, uncles and
aunts too
Waited on shore and prayed for you

The news came slowly and when it did,
it was grim
All souls lost! ... My thoughts were of him

No gravesite to visit, not a body to grieve
No respite from anguish, no sorrow's reprieve

You were thirty-four and me just one
A heavy burden to bare, for a life just begun



Silent Submarine Service

By Rachel Eckard, age 11



On
Veteran's
Day, we sit
and pray, for
those who die in
the battles we fight.
Your teacher teaches,
You hear the speeches,
You sing with all your might.

Well, what would they do
if they came home to
no home, no parade, just sand?
They would look around,
not a soul to be found.
All they'd see is a barren wasteland.

But that won't happen.
Keep peacefully napping.
Let the "real" heroes do their job.
They're the ones who come back
with experiences you lack.
No parade, no surrounding mob.

When you think of wars,
you think of the deafening roars,
of WWII and the Vietnamese.
You think of joining the soldiers,
while drinking your Folgers.
You live your life with ease.

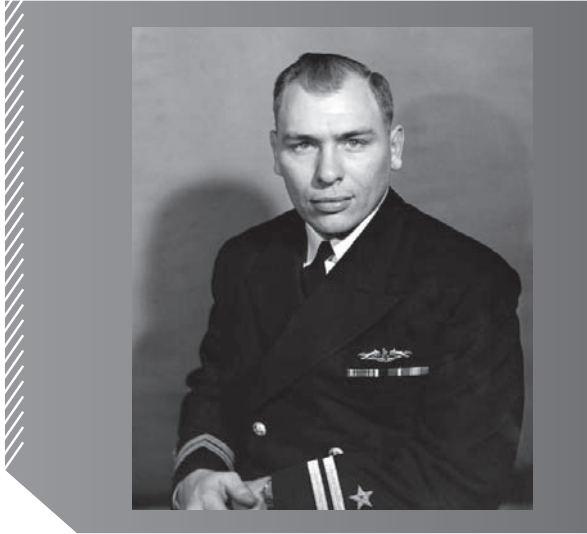
They go off missing holidays,
like Christmas and birthdays,
For years they've helped us stand proud.

You're thinking, "You're just jealous"
So we may be, fellows.
But I think we're just against the crowd.
There's nothing wrong with the Army men,
In fact, one is a friend.
But I don't like ones who boast and brag.
The fight for America, too,
and stand for the red, white, and blue,
And we all pledge to the same flag.

I just want you to know,
who missed the premier show,
that you waited for for days.
Many branches, many wars,
Many opened and closed doors,
Many fought in many different ways.

"Who are these people," you say,
"who keep a peaceful way?"
Well don't worry, don't you be scared.
These people protect you,
so you can live peacefully, too.
They're the silent Submarine Service.

Personnel



Harvey, John W., LCDR

Commanding Officer
of the USS THRESHER

Allen, Philip H., LCDR
Arsenault, Tilmon J., ENCA (SS)-P2
Babcock, Ronald C., LTJG
Bain, Ronald E., EN2 (SS)-P2
Beal, Daniel W., Jr.
Bell, John E., MMI-P2
Biederman, Robert D., LT
Billings, John H., LCDR
Bobbitt, Edgar S., EM2 (SS)-P2
Boster, Gerald C., EM3 (SS)-P1
Bracey, George (n), 5D3 (SS)
Brann, Richard P., EN2 (SS)-P2
Carkoski, Richard J., EN2 (SS)
Carmody, Patrick W., 5K2
Cayey, Steven G., TM2 (SS)
Charron, Robert E.
Christiansen, Edward (n), SN (SS)
Claussen, Larry W., EM2 (SS)-P2
Clements, Thomas E., ETR3 (SS)
Collier, Merrill F., LT
Corcoran, Kenneth R.
Critchley, Kenneth J.
Cummings, Francis M., SOS2 (SS)
Currier, Paul C.

Dabruzzo, Samuel J., ETN2 (SS)
Davison, Clyde E., III, ETR3-P1
Day, Donald C., EN3 (SS)
Denny, Roy O., Jr., EM1 (SS)-P2
Des Jardins, Richard R.
Dineen, George J.
Di Nola, Michael J., LCDR
DiBella, Peter J., SN
Dundas, Don R., ETN2 (SS)
Dyer, Troy E., ET1 (SS)-P1
Fisher, Richard K.
Forni, Ellwood H., SOCA (SS)-P1
Foti, Raymond P., ET1 (SS)
Freeman, Larry W., FTM2 (SS)
Fusco, Gregory J., EM2 (SS)-P2
Gallant, Andrew J., Jr., HMC (SS)
Garcia, Napoleon T., SD1 (SS)
Garner, John, YNSN (SS)
Garner, Pat M., LCDR
Gaynor, Robert W., EN2 (SS)
Gosnell, Robert H., SA (SS)
Grafton, John G., LTJG
Graham, William E., SOC (SS)-P1
Guerette, Paul A.
Gunter, Aaron J., QM1 (SS)

Crew Members, Officer Observers, and Civilian Technicians

Hall, Richard C., ETR2 (SS)-P2
Hayes, Norman T., EM1-P1
Heiser, Laird G., MM1-P2
Helsius, Marvin T., MM2
Henry, James J., Jr., LTJG
Hewitt, Leonard H., EMCA (SS)
Hoague Joseph H., TM2 (SS)
Hodge, James P., EM2
Hudson, John F., EN2 (SS)
Inglis, John P., FN
Jaquay, Maurice F.
Johnson Edward A., ENCA (SS)
Johnson, Richard L., RMSA
Johnson, Robert E., TMC (SS)-P1
Johnson, Thomas B., ET1 (SS)-P2
Johnson, Brawner G., FTG1 (SS)-P2
Jones, Richard W., EM2 (SS)
Kaluza, Edmund J., Jr., SOS2 (SS)-P1
Kantz, Thomas C., ETR2 (SS)
Kearney, Robert D., MM3
Keiler, Ronald D., IC2 (SS)-P2
Kiesecker, George J., MM2 (SS)-P2
Keuster, Donald W.
Klier, Billy M., EN1 (SS) P2
Krag, Robert L., LCDR
Kroner, George R., CS3
Lanouette, Norman G., QM1 (SS)
Lavoie, Wayne W., YN1 (SS)
Lyman, John S., Jr., LCDR
Mabry, Templeman N., Jr., EN2 (SS)-P2
Malinski, Frank J., LTJG
Mann, Richard H., Jr., IC2 (SS)
Marullo, Julius F., Jr., QM1 (SS)
McClelland, Douglas R., EM2 (SS)
McCord, Donald J., MM1 (SS)-P2
McDonough, Karl P., TM3 (SS)
Middleton, Sidney L., MM1 (SS)-P2
Moreau, Henry C.
Muisse, Ronald A., CS2
Musselwhite, James A., ETN2 (SS)-P2
Nault, Donald E., CS1 (SS)
Noonis, Walter J., RMC (SS)
Norris, John D., ET1 (SS)-P2
Oetting, Chesley C., EM2-P2
Palmer, Franklin J.
Parsons, Guy C., Jr., LTJG
Pennington, Roscoe C., EMCA (SS)-P2
Peters, James G., EMCS-P2
Phillippi, James F., SOS2 (SS)
Philput, Dan A., EN2 (SS)-P2
Podwell, Richard (n), MM2-P2
Prescott, Robert D.
Regan, John S., MM1 (SS)-P2
Ritchie, James P., RM2
Robison, Pervis (n), Jr., SN
Rountree, Glenn A., QM2 (SS)
Rushetski, Anthony A., ETN2
Schiewe, James M., EM1 (SS)-P2
Shafer, Benjamin N., EMCM (SS)-P2
Shafer, John D., EMCS (SS)-P2
Shimko, Joseph T., MM1-P2
Shotwell, Burnett M., ETRSN
Sinnott, Alan D., FTG2 (SS)
Smarz, John (n), Jr., LT
Smith, William H., Jr., BT1-P2
Snider, James L., MM1
Solomon, Ronald H., EM1-P2
Stadtmuller, Donald T.
Steinel, Robert E., SO1 (SS)-P1
Van Pelt, Rodger E., IC1 (SS)-P2
Walski, Joseph A., RM1 (SS)-P1
Wasel, David A., RMSN
Whitten, Laurence E.
Wiggins, Charles L., FTG1-P2
Wiley, John J., LTJG
Wise, Donald E., MMCA (SS)-P2
Wolfe, Ronald E., QMSN (SS)
Zweifel, Jay H., EM2-P1



Eternal Father, Strong To Save

Navy Hymn - submarine verse

Bless those who serve beneath the deep,
Through lonely hours their vigil keep.
May peace their mission ever be,
Protect each one we ask of thee.
Bless those at home who wait and pray,
For their return by night or day.

FOREVER ON PATROL

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