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The Silent Sentinel

February 2011



Our Creed and Purpose

To perpetuate the memory of our shipmates who gave their lives in the pursuit of their duties while serving their country. That their dedication, deeds, and supreme sacrifice be a constant source of motivation toward greater accomplishments. Pledge loyalty and patriotism to the United States of America and its Constitution.

In addition to perpetuating the memory of departed shipmates, we shall provide a way for all Submariners to gather for the mutual benefit and enjoyment. Our common heritage as Submariners shall be Strengthened by camaraderie. We support a strong U.S. Submarine Force.

The organization will engage in various projects and deeds that will bring about the perpetual remembrance of those shipmates who have given the supreme sacrifice. The organization will also endeavor to educate all third parties it comes in contact with about the services our submarine brothers performed and how their sacrifices made possible the freedom and lifestyle we enjoy today.

FINDING GOLD

*Tracing the Life of a
World War II Hero*

From Undersea Warfare Magazine, Spring 2010

USS Skipjack (SS-184), shown leaving Mare Island Navy Yard, Calif., in March 1943. U.S. Navy Photo.

Story on Page 7

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The Silent Sentinel via Email

To all of my Shipmates and families who currently receive our Great newsletter via the mail who would like it sent via email or continue to receive it via mail, please fill out the form and mail it to the base or myself. We are trying to cut the cost of the newsletter down from \$3700 to about \$1900 a year. By receiving the Silent Sentinel via email will cut down the printing and mailing cost. The other plus to receiving it via email is you can save it on your computer and not have the paper lying around the house.

A subscription to the Silent Sentinel newsletter will be available to surviving family members via internet email, at no charge, upon notification of the Membership Chairman. If a printed hard-copy is preferred, via US Post Office delivery, an annual donation of \$5.00 will be requested to cover costs.

NAME: _____

ADDRESS: _____

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Would like the SILENT SENTINEL emailed: YES _____ NO _____

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*DUE TO LOGISTICS CONSTRAINTS, ALL INPUTS FOR THE SILENT SENTINEL MUST BE IN MY HAND NO LATER THAN **ONE WEEK** AFTER THE MONTHLY MEETING. IF I DO NOT RECEIVE IT BY THIS TIME, THE ITEM WILL NOT GET IN. NO EXCEPTIONS! MIKE*

February Meeting

Our monthly meetings are held on the second Tuesday of the month at VFW Post 3787, 4370 Twain Ave., San Diego. Our next meeting will be on 8 February 2011. The post is located one-half block West of Mission Gorge Road, just north of I-8. The meeting begins at 7 p.m. The E-Board meets one hour earlier at 6 p.m.

Check us out on the World Wide Web
www.ussvisandiego.org

BINNACLE LIST

Al Strunk
CJ Glassford

Submarine Losses in January

Submitted by C J Glassford



STURGEON [BELL }(SS25) - Duty Section on Board
Battery Explosion, on 15 Jan 1916, In New York Navy Yard:
“ 4 MEN LOST “

S – 34 { BELL }(SS139) - 43 Men on Board
Accidental Signal Cartridge Explosion, on 11 Jan 1934:
“ 1 MAN LOST “

S – 26 { BELL } (SS131) - 46 Men on Board
 Sunk, on 24 Jan 1942, After Collision with USS (PC460),
 In the Gulf of Panama:

“ 43 MEN LOST, 3 SURVIVORS “

ARGONAUT { BELL } (SS166) - 105 Men on Board
 Sunk, on 10 Jan 1943, By Japanese Aircraft and Destroyers, Southeast of
 New Britain, in Solomon Sea:

“ ALL HANDS LOST “

S – 36 { BELL } (SS141) - 45 Men on Board
 Scuttled, on 20 Jan 1943, After running aground, In Makassar Straits:

“ NO LOSS OF LIFE “

SCORPION (SS278) - 76 Men on Board:
 Probably Sunk, on 15 January 1944, by Japanese Mine, in the Yellow or East China Sea:
 “ ALL HANDS LOST “

SWORDFISH (SS 193) - 89 Men on Board:
 Possibly Sunk, on 9 Jan 1945, by Japanese Coastal Defense Vessel or Mine, Off
 Okinawa :

“ ALL HANDS LOST “

SAN FRANCISCO (SSN 711) - 127 Men on Board:
 Struck a Sea Mount, on 8 Jan 2005, while Traveling Submerged at High Speed,
 South of Guam :

“ 1 MAN LOST “ – “ 23 MEN INJURED



Minutes of the San Diego Base Submarine Veterans Meeting, January 11, 2011.

1900 – Monthly meeting of the San Diego Submarine Veterans called to order by Bill Earl, Senior Vice Commander.

Conducted opening exercises:

Reading of the Creed:

Pledge of Allegiance:

Base Chaplin lead in opening Prayer and Tolling of the Boats for January

USS STURGEON (SS174) 1916 4 MEN LOST

S-34(SS139) 1934 1 MAN LOST

S-26(SS131) 1942 43 MEN LOST

USS ARGONAUT (SS166) 1943 ALL HANDS LOST

S-36(SS141) 1943 NO LOSS OF LIFE

USS SCORPION (SS278) 1944 ALL HAND LOST

USS SWORDFISH (SS193) 1945 ALL HAND LOST

USS SAN FRANCISCO (SSN711) 1 MAN LOST

Secretary report: 37 members and one guest, Larry Oiler, present.

Treasures report is posted in the Sentinel.

Chaplin report: No new individuals on the Binnacle list, but Al Strunk is not doing well, your prayers are appreciated.

Parade Committee:

Next parade is 23 April 2011 in La Mesa.

July 4, 2011 located in Julian.

Veterans Day parade this year will be 11/11/11. Mark this down it is a great event.

Final note: we need some repairs done on the float; we will set up a repair day to be announced.

Membership Committee: We presently have 344 members. 38 members are behind in dues. Two new members signed up tonight.

Scott Rocker and Charlie Shelby.

Scholarship Committee: Scholarship applications are now listed on the website. You can file your application on line but the paper work must be in by April 15.

Storekeepers report: The new storekeeper, Phil Richeson stated he will have a catalogue next month for ordering items.

Breakfast Committee: 30 January will be the next breakfast. We need some volunteers to help serve. Breakfast starts at 0800.

1922 Break

1936 Meeting called to order:

Unfinished business:

New Ball caps are on order, but since David Ball is not present we will sell the ball caps next month.

Christmas Party was a big success. Everyone had a great meal and a wonderful time.

The vote on next years Budget will be held at next months meeting.

Food handler's class will be held next month on Saturday, February 12, at 0900.

New business:

Linda Vista will conduct a parade on 16 April 2011.

USSVI has a new policy for Holland Club membership. Holland Club members must continue to pay yearly dues. We would like to make a similar proposal for our local membership, but we will get more information and present this new proposal at the next monthly meeting.

CJ announced that there will be an "Old timer's luncheon" soon and he will get the exact time and date for the membership.

Good of the Order: The VFW will be celebrating the unit's 54th anniversary on 27 January 2011. All hands are invited, happy hours drinks will be 50 cents.

On Saturday, February 12, North Island will be celebrating 100 years of Naval Aviation.

It will be a major event at North Island, check the news for times and events.

1952 – Meeting adjourned by Senior Vice Commander.

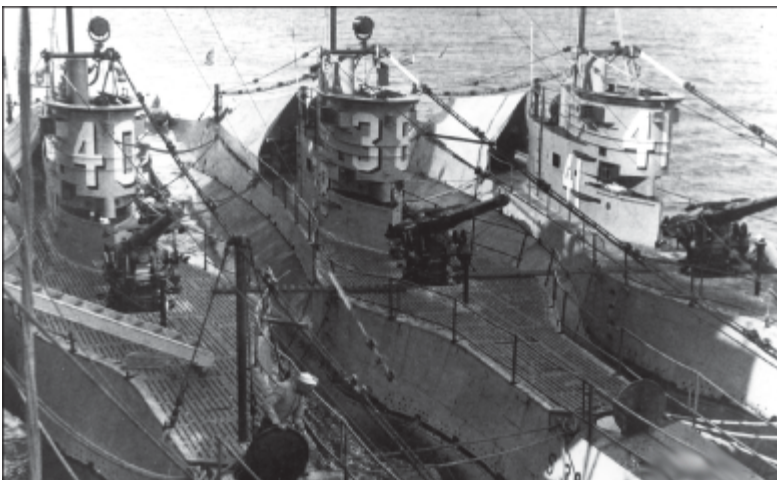
SAILING LIST FOR January 11, 2011

FRED FROMBY	BILL EARL	ROY BANNACH
PHILL RICHESON	JIM HARER	JACK KANE
ED WELCH	PAUL HITCHCOCK	CHARLES SHELBY
TOM POLEN	DAVID KAUPPINEN	JOEL EIKAM
JIM BILKA	DON MATHIOWETZ	WILLIAM JOHNSTON
MANNY BURCIAGA	JACK ADDINGTON	GLENN GERBRAND
CHARLIE MARIN	RAY FERBRACHE	RON GORENCE
BOB FARRELL	TOM WARNER	ED FARLEY
MIKE HYMAN	CJ GLASSFORD	DENNIS MORTENSEN
SCOTT BRUCKART	DAVE NIESA	KURT GREINER
MATT BAUMANN	MERT WELTZIEN	BOB OBERTING
MICKE COSGROVE	HARRY MCGILL	FRANK MCCOY
LARRY OILER		

The following is a greatly condensed adaptation from the book Full Fathom Five: A Daughter's Search, by Mary Lee Coe Fowler, University of Alabama Press, 2008.

Fifty-five years after my father, Cmdr. James W. "Red" Coe, was lost with all 76 men aboard the submarine *Cisco* (SS-290), I went looking for him. I had no idea what I'd find. My mother, who remarried when I was just a year old, had told my siblings and me little about our father. In 1999, when I went to my first conference of World War II "orphans"—the term the post-war Bureau of Veterans Affairs assigned us, even though we had mothers, and often stepfathers—I found that this bare-bones account was typical of an era when war widows were advised not to look back but to move on and make up for lost time. So most of us "orphans" were starting from scratch, typically in middle-age, with our kids grown and careers winding down. When I first heard what some others had discovered in their research, I wobbled a bit in my determination to "find" my own father. One told me that his father died on the Bataan Death March because he disobeyed Japanese orders and grabbed as much discarded stuff along the road as he could carry. His son concluded that his dad was probably a victim of his own greed, or at least foolishness. Another discovered that his father did not die in battle, as he thought, but apparently committed suicide while under suspicion of stealing from his regiment. Others found that their father's relatives quickly cut off all contact with his widow and children. Hearing these stories, I figured maybe I was lucky my father remained shrouded in silence, which at least ensured that I would not be disappointed. But mementos I found in my mother's apartment after her death in 1998 persuaded me otherwise. They showed that she cherished Red Coe's memory, tending his 1935 overcoat, polishing his Naval Academy ring, and keeping close at hand a picture of him with my siblings that she had never shown me. This evidence of her abiding love compelled me to find out more about my father. One of the first things I found was that he was funny. Veterans of *S-39*, my father's first command, recalled him and Wreford "Moon" Chapple, skipper of *S-38*, playing a version of polo at the Army-Navy club in Manila, riding bikes straight at each other while trying to whack a soccer ball with golf clubs. Another time, the two boats had a softball game, and Red Coe, having discovered that his radioman, Howie Rice, had been a high school gymnast and could walk on his hands, arranged for a hand-walking contest between innings. But the *S-38*ers learned that Rice was a teetotaler and plied him with beer. At a submarine veterans' convention some 50 years later, Rice recalled not even being able to walk upright, much less on his hands. Later, when Red was captain of *Skipjack* (SS-184), a supply officer at Mare Island, Calif., rejected his requisition for toilet paper, stating that the "requested material couldn't be identified." Attaching a square of toilet paper to his reply, Red wrote that he couldn't help wondering what they were using in Mare Island in place of this "unknown material, once well-known to this command." He went on to say that in the 11 months *Skipjack's* crew waited for a response, they frequently hadn't been able to wait, making the situation quite dire. Meanwhile, they were making do with all the non-essential paperwork flowing into the boat, in compliance with the Bureau of Ships request to reduce paperwork. Eager to find out more, I spent the next three years piecing together my father's life from interviews, submarine literature, World War II archives and naval documents. I made a

collage of Red Coe pictures for our living room; read many submarine books; toured World War II-vintage submarines like *Lionfish* (SS-298), in Fall River, Mass.; pored over *Skipjack* patrol reports; queried sub vets about the war years; and talked with my sister and brother about their vague childhood impressions of our father. *Three of the Asiatic Fleet's six S-boats, including S-38, the boat commanded by Red Coe's close friend, Wreford "Moon" Chapple.* U.S. Navy Photo. Red had dreamed of being an aviator; a large photo of Charles Lindbergh adorns his Naval Academy scrapbook. He was assigned to air training after graduation, but poor circulation kept him from passing the physical, so he went to surface ships. After completing Submarine School



in Groton, Conn., in December of 1933, he went to Pearl Harbor, Hawaii, where he worked his way up on two World War I-vintage *S*-boats (also known as “pigboats”). In 1937, he was assigned to teach navigation at the Naval Academy. In 1939, he and my mother went to Manila, in the Philippines, where—at the young age of 30—he got his first operational command: *S-39*, another old “pigboat.” *Pigboat 39*, a book by Bobette Gugliotta that chronicled my father’s years in that decrepit but gallant boat, led me to retired Capt. Guy Gugliotta, widower of the author. Guy lined up some other *Skipjack* veterans for us to meet, and they inspired me to continue my research. They all had that wonderful combination of keen intelligence, passion for the boats, and modesty that I have come to associate with submariners—as well as a zest for life that came from knowing how lucky they were to survive. My father took command of *S-39* as the era of “no strain in Asia”—Navy shorthand for luxurious living in the Far East—came to an end. With hostilities looming, the Navy brought in strict, no-nonsense Adm. Thomas C. Hart to head the expanding Asiatic Fleet. Hart beefed up training and sent Navy wives and children back to the States. Although *S-39* had no air conditioning, Red Coe worked his men hard to make up for its lack of sonar and radar and its constant leaks and mechanical breakdowns. He kept up morale with competitions with *S-38*, “field-trips” to local breweries, games of liars dice, chess by blinker-light with other subs at the dock, and competitions for the best sea stories. *S-39* was on patrol near the San Bernardino Strait when the Japanese attacked Pearl Harbor and the order went out to “execute unrestricted... submarine warfare against Japan.” On Dec. 8, the sub spotted a cargo ship flying no flag, surfaced, and prepared to sink it with gun fire. But first Red Coe did everything possible to make contact. He used a megaphone to order the ship to identify herself, and he signaled by whistle, but the ship kept going. Only when he ordered a shot across the bow did someone on board finally hoist a Philippine flag. My Quaker upbringing and protests against the Vietnam War made me a pacifist when I was in college, but this event put the lie to the glib assumption of Vietnam-era protesters that everyone in uniform was a warmonger. Far from trigger-happy, Red Coe hesitated to attack an unidentified ship. The sub vets I interviewed told me that career Navy men of that day were the last to want war because they knew what it meant. Once it broke out, they didn’t expect to make it home. On Dec. 11, *S-39* ran into a Japanese convoy. Japanese destroyers spotted them and gave them their baptism of fire, holding them down for a full day of vicious depth-charging. Oxygen deprivation made the crew lightheaded. The temperature soared to 110 degrees, and the men had to take off their undershirts and wrap them around their necks like scarves to prevent their sweat from making the deck any slipperier. Finally, the destroyer sounds receded, and they could surface, but as soon as they had replenished the boat with fresh air, they saw what looked like a ship. My father ordered the men to fire two torpedoes. Hearing no explosion, he approached cautiously and realized he had fired on an island. The next night, they sighted a Japanese submarine but chose to creep away. The skipper then spotted an enemy freighter through the periscope, about 12,000 yards off the port bow. Ordering battle stations, he began the cautious approach required in pre-war training, with short glimpses through the periscope to plot target range, course and speed alternating with depth excursions to a hundred feet to close range. *S-39* fired two torpedoes from within 3,000 yards and, after a tense two and a half minutes, heard two explosions. The target went down by the stern, listing to port. In a 1943 newspaper interview, my father said he was so entranced that he failed to spot destroyers approaching from behind until they fired at the periscope. Diving to 150 feet, he ordered the crew to rig for silent running and depth-charge attack. This time, they were pinned down even longer, with four destroyers pinging but, strangely, not dropping depth charges. At last, with little oxygen left, my father prepared to surface in the face of the enemy. He ordered then-Ensign Guy Gugliotta to pack the boat’s documents in a canvas bag for quick dispatch overboard, with some wrenches to weigh it down. As they were about to surface, the sonarman reported the pinging receding. The sounds died away, and they surfaced to find the sea blessedly empty. My father, in another newspaper interview, speculated that the Japanese submarine they spotted earlier must have been the reason the destroyers did not drop depth charges. Returning to Manila to refuel and stock up on torpedoes, they found the city, airfield and navy yard in ruins. *S-39* received orders to patrol southward in the Philippines and then proceed to Java. They made it to Surabaya, Java, in February and were just getting crucially needed repairs under way when the Japanese bombed the port to rubble. Grabbing repair materials, the crew of *S-39* hurriedly put to sea. They were then ordered to look for a group of downed British airmen reported on the nearby island of Chebia but found only evidence that the Japanese had beaten them to the hapless airmen. *S-39* turned dispiritedly towards Fremantle, Australia, a voyage of at least five days though waters reportedly heavily patrolled by the enemy. As they set out on March 4, 1942, they spotted Japanese ships and sank the tanker *Erimu Maru*. They paid for this with the most vicious depth-charging yet, with the Japanese calling in aerial bombers to join the destroyers. Misled by erroneous Dutch charts, *S-39*

had grounded on the muddy bottom and inadvertently churned up telltale clouds whenever she tried to creep away. When the skipper finally realized *S-39* was churning up mud, he ordered a sharp burst of speed to break her loose, took her up just enough to let the mud-clouds dissipate, and crept away. Still, it was seven more hours before the sounds of destroyers and planes faded away. It was night when they surfaced near a low, dark island, which seemed a safe place to recharge batteries. But well before they finished, they heard a Japanese destroyer approaching. It shined a searchlight on one end of the island, then started a precise sweep along the shoreline in the direction of the sub. Trapped in water too shallow to dive, *S-39* could do nothing but turn off all sound and reduce its silhouette by turning to face the destroyer. The men stood by the deck gun ready to fire as the light swept nearer. Some fortunate wobbliness or carelessness on the part of the sailor handling the searchlight suddenly sent the beam up to the treetops behind them. It hovered there a second, then descended to shore-level on the other side of the boat. The *S-39*ers stood there, hardly breathing, as the light swept on to the end of the island, and then the destroyer slowly turned and chugged out to sea. Giddy with relief, the *S-39*ers fled toward the Sunda Strait, where, as crewman Charles Witt told me, Red Coe pulled them through hell that night, struggling to control the boat while a swift current 100 feet down swept her sideways and Japanese ships swarmed overhead. The exhausting voyage continued. Short of drinking water, the crew had to catch rainwater in a barrel on deck. Food was almost gone as well. Tropical heat prostrated the men and gave them painful white blisters and skin rashes. The port engine blew, and the boat lost three days trying to fix it before giving up and proceeding on one engine. With a worn out clutch to boot, the old boat limped along at only seven knots, a sitting duck, for the roughly ten days it took to reach Fremantle. Morale at Fremantle was low. The submarine crews all had stories of defective torpedoes and desk-bound brass blaming the poor results on improper set-ups by the skippers. The brass also blamed the skippers for lack of aggressiveness, despite pre-war training emphasizing daylight submergence and cautious approaches. Skippers now had to come up with offensive tactics on the fly or be “bilged” out of submarines. My father escaped criticism because of *S-39*’s two credited sinkings, a rare success for any *S*-boat. On March 28, only a week after reaching Fremantle, he was given command of the fleet-boat *Skipjack* (SS-184). In his first patrol (*Skipjack*’s third), Red Coe sank four ships, the best single patrol so far in that theater. Aggressive and innovative, he even turned a mistake into the first successful “down-the-throat” shot. Misjudging an approach and getting too close to wait for a favorable track and gyro angle, he had to shoot a spread from only 650 yards at the narrowest angle as the ship approached. The magnetic exploder of one MK 14 torpedo functioned perfectly, blowing the bottom out of *Kanan Maru*. But defects in other MK 14s ruined many attacks. Red’s patrol report pulled out all the stops, describing vapor from torpedo wakes going all the way to a target as the torpedoes passed harmlessly underneath, running too deep to detonate. What’s more, this occurred most often in runs of less than 1,000 yards—wasting hard-won attack positions. The patrol report recommended controlled tests at short ranges so submariners would at least know the torpedoes’ limitations. Rear Adm. Charles Lockwood, Commander, Submarines, Southwest Pacific, had *Skipjack* run tests with the three torpedoes remaining from her patrol, leading to the first of many fixes needed to make the MK 14s reliable. *The six S-boats of the Asiatic Fleet’s Submarine Squadron FIVE nested alongside the submarine tender USS Canopus (AS-9). S-39 is on the right. U.S. Navy photo.*



Red Coe received the Navy Cross for his high-scoring first patrol in *Skipjack* and his work in *S-39*. But two more patrols and over two years of continuous command left him exhausted. *Skipjack* also badly needed an overhaul, limping into Pearl Harbor in December 1942 with the crew sick from bad drinking water. On the dock at Pearl was a mountain of toilet paper in belated response to the skipper’s June letter to the Mare Island supply depot. Toilet paper flew from masts and flagpoles, people meeting the boat had toilet-paper ties, and a brass band had toilet paper unrolling out of their trumpets with every blast. *Skipjack* went to the shipyard, and my father to “new construction.” In January 1943, he joined his family at Portsmouth Naval Shipyard in Kittery, Maine, where he would monitor the construction and sea trials of *Cisco* (SS-290), a boat of the new *Balao* (SS-285) class. He

spent a precious six months with my mother, brother and sister. (I was not born until the following year.) Portsmouth was vying with other shipyards for who could build boats fastest. A *Balao*-class boat typically took more than 100 days from keel-laying to launching; *Cisco* did it in a record 56 days. But she may have paid a price. Records of her sea trials show continual repairs to fix a persistent oil leak. While she was docked one night, a fuel tank with all valves closed was ruptured by a high-pressure air bank that was bled into it. The tank had to be cut out and dimpled plating replaced and re-welded. *Cisco* reached Fremantle in late July 1943. After training off Brisbane, she proceeded to Darwin, where she was to start her first patrol Sept. 18th. A few days before her departure, the head radioman, Howie Rice—the gymnast from the *S-39*'s softball game—who had petitioned for a berth under his former skipper, came down with a case of jaundice and was ordered ashore. In sick bay, he ran into Red Coe, who was getting a physical as part of his promotion to commander. Rice remembers saying goodbye on the street outside the sick bay. The skipper was quiet and somber, and when he got into the jeep, and the driver took off, he turned around and stared at Rice until they were out of sight. Rice remembers it as a puzzled look, as if he were thinking, "Why am I losing my head radioman at a time like this?" This makes me think of a passage from a letter my father wrote to his mother earlier in the war: "I am finally a lieutenant commander. . . but rank doesn't mean a thing to me now, and that's no fooling. This war has changed all that—it's the job you're doing and how you're doing it that counts. The gold braid is superfluous. . ." (J.W. Coe to Phoebe Coe, Aug. 11, 1942). He amply demonstrated this attitude by an egalitarian leadership style that had him up to his elbows in the bilges of the *S-39*, feeling for leaks, or eating with the enlisted men on *Skipjack* and *Cisco* to make sure their food was as good as the officers'. On Nov. 6, the day *Cisco* was due back from patrol, Rice went down to the docks and climbed up to the bridge of the squadron's submarine tender. Escorts waited at the entrance buoys to guide *Cisco* in, but the horizon remained empty. Rice spent the next few weeks returning *Cisco*'s waiting mail to the senders, little distraction from the guilt he felt for not being on *Cisco*, where perhaps he might have done something in her final hours that a less experienced radioman wouldn't think of. Fifty-five years later, when I met him at a sub vets' conference, the first question he asked me was, "Did your mother get her returned mail?" This is the feeling that tinges Memorial Day services for the 52 boats lost in the war, which I've attended ever since I "found" Red Coe. "Why me?" the old submariners wonder, some of them out loud. World War II memorial services would have been the last place you'd have found me until I started my research, but Red Coe changed that. In interviewing sub vets who had served with him, I discovered a rare mix of competence, humility and first-hand knowledge of their own mortality that gave their words weight. I learned at a late age to separate the men and women in uniform from the policy-makers when I thought about war. That's what we didn't do—to my shame—during Vietnam. Red Coe taught me more. Now, when I look in the mirror, I no longer bemoan new gray hair, more lines around the eyes. I look for him in my face, curious about how he would have aged if he had what I now know is the privilege of a natural lifespan. He lives inside of me

NEWS

Researchers Test Underwater Acoustic Laser

By George Seffers, *Signal Online Magazine*, 21 January 2011

A U.S. Naval Research Laboratory team recently tested an underwater acoustic laser capability that might one day provide a source of voice or data communications for submarines; navigational data for submarines or underwater robots; and sonar to locate mines or other objects in shallow water—all from an aircraft and without the need for hardware in the water.

Communicating with or from a submerged submarine remains a challenge in the 21st century and often requires the submarine to surface, exposing crewmembers to potential danger. Using trailing wires or buoys for submarine communications limits maneuverability and hinders stealth. In addition, underwater robotic vehicles often rely on inertial navigation technologies that tend to become more error-prone the farther the robots move. And searching for underwater mines is difficult, dangerous and time-consuming under any conditions. Underwater laser acoustic technologies, however, could potentially perform all those functions and more from an aircraft, explains Ted Jones, a research physicist with the Naval Research Laboratory Plasma Physics Division, who led the team of scientists.

"Right now, when you want to make sound in water, you have to have an acoustic source, like a hydrophone, in the water, and that puts your equipment at risk or requires equipment on location. We're developing a laser acoustic source so that you don't need anything in the water," says Jones. "We're not the first ones to use lasers to generate underwater acoustics, but we've done a lot of innovations and improvements on techniques that I think have really brought the laser acoustic source forward quite a bit and made it more practical for the Navy and for commercial purposes."

Those innovations include the use of high-intensity lasers with very short pulses that ionize the water, superheating a small volume that creates a tiny piston, which generates an intense acoustic pulse. The team also uses a wavelength that propagates

well underwater, so that they can control the shape of the piston and the intensity of the acoustic pulse. In addition, they use a combination of nonlinear optical focusing techniques that increase the standoff distance between the laser and the surface of the water. By using different colored lasers, they precisely control the acoustic pulse. "The technique is called group velocity dispersion. You're taking advantage of the fact that different colors of light travel at different speeds. You put the slow colors at the front of the pulse, and the fast colors in the back, and you have this stretched-out pulse. You can program exactly where that compresses longitudinally in the water," says Jones.

The tests were conducted at the Glendora Lake Hydro-acoustic Test Facility in Crane, Indiana, which marks the first time the capability has been tested outside a laboratory. The nanometer wavelength laser, which is housed in a floating structure, generates underwater acoustic pulses, which travel to a distant hydrophone-equipped boat. Steering mirrors directed the pulses down through a focusing lens and into the water surface. Each laser pulse produced an acoustic pulse with a sound pressure level of approximately 190 decibels, which traveled up to 190 meters. Previous laboratory tests resulted in propagation distances of only three meters.

The team is planning for more tests in the spring and summer, which could look at propagation below the surface. They also hope to improve propagation distances. Initial results show they should be able to generate 230 decibels with a pulse that is less than one joule of energy.

Researchers in other parts of the country focus more on the communications and signal processing technologies of underwater acoustic lasers, but the work being done by the Naval Research Laboratory will likely benefit researchers in those and other areas. "We have some interest from other parts of the Navy. I've even been contacted by people in the oil industry who are interested in measuring the water depth in wells," says Jones. "We're interested primarily in generating a very intense acoustic pulse. We trying to make the loudest acoustic source possible with the most compact laser possible."

Stopgap Budget Creates Problems For Sub Work

EB needs full funding for two 2011 boats soon

By Jennifer McDermott, The Day, Jan 25, 2011

Groton - The stopgap spending measure that is currently funding the federal government poses problems for two major endeavors at Electric Boat, the construction of Virginia-class submarines and the design of a new class of submarines.

After the House and Senate failed to pass a budget this fall, Congress and the administration agreed to a continuing resolution that freezes funds at last year's levels to keep the government running until March 4. The hitch is, the Navy needs more money this year to pay for submarine construction and design than it did last year.

Last year the Navy bought one Virginia-class submarine for \$1.96 billion. This year it is supposed to buy two for \$3.44 billion. The current contract with Electric Boat requires that the Navy pay for the two fiscal 2011 submarines - in full- by the end of this month.

And, anything short of the current fiscal year's full funding for the Navy's next generation of ballistic-missile submarines, past this March, will jeopardize the design maturity and construction start dates, driving up costs, according to the Navy.

To keep the Virginia-class program on track, the Navy wants to push back the deadline for fully funding the second submarine, and instead pay for the first submarine plus the construction materials for the second submarine to keep that second sub on track, the Navy said in a statement.

"They have been working with us to make sure we can modify the contract in such a way to avoid any disruption to the production schedule or the procurement of materials schedule," EB President John P. Casey said.

The picture becomes more complicated if the continuing resolution is extended. Past March 4, the current spending levels "will not support needed progress" on the Virginia-class program, according to the Navy.

Electric Boat and Northrop Grumman Shipbuilding in Virginia are supposed to start building the first Virginia-class submarine for this year's order, the 13th member of the class (SSN 786), in March.

Construction work on the second submarine, (SSN 787), is scheduled to start in the fall.

Navy officials signed a \$14 billion contract with Electric Boat in December 2008, committing the service to buy one ship per year in 2009 and 2010 and two ships per year from 2011 through 2013.

U.S. Rep. Joe Courtney, D-2nd District, said he would push for an "anomaly" in any new continuing resolution, or language that would support the two submarines annually.

"There really is not a whiff of opposition out there in terms of funding it, in the administration or in Congress," he said. "This is trying to get the mechanics of the budget process completed."

EB is planning to hire between 300 and 400 more engineers for its growing New London design and engineering campus, many of whom will work on the next generation ballistic-missile submarine to replace the current fleet of Ohio-class, or Trident, boats.

The Navy said it needs the full funding for the current fiscal year in March for further research and design, as well as engineering evaluations. The administration included about \$670 million in this year's defense budget, yet to be approved, for the ballistic-missile submarine, an increase over the \$495 million approved last year.

"There was a ramp-up plan," Casey said. "And to be honest, it's a lot less clear to me whether there's a problem or not because that's in a big pile of research and design money. I think the Navy and the Department of Defense have the authority to program those funds as they see fit."

He added, "We're on the path to do what we were planning to do this year, and I know the Navy is trying to make sure that program stays on track. No one is trying to change that I hope."

China Seeks More Quiet

StrategyPage.com, January 16, 2011

The last of four Chinese Yuan diesel-electric submarine has appeared. There was no official information released, but based on photos available it appears to be another development in China's taking Russian submarine technology and adapting it for Chinese designs. China has been doing this for as long as it has been building subs (since the 1960s). But this latest version of what appears to be the Type 41 design, shows Chinese naval engineers getting more creative. Two or more Yuans are believed to have an AIP (air independent propulsion system) that would allow them to cruise underwater for two weeks or more.

The Type 41A, or Yuan class, looks a lot like the Russian Kilo class. In the late 1990s, the Chinese began ordering Russian Kilo class subs, then one of the latest diesel-electric design available. Russia was selling new Kilos for about \$200 million each, which is about half the price other Western nations sold similar boats for. The Kilos weigh 2,300 tons (surface displacement), have six torpedo tubes and a crew of 57. They are quiet, and can travel about 700 kilometers under water at a quiet speed of about five kilometers an hour. Kilos carry 18 torpedoes or SS-N-27 anti-ship missiles (with a range of 300 kilometers and launched underwater from the torpedo tubes.) The combination of quietness and cruise missiles makes Kilo very dangerous to American carriers. North Korea and Iran have also bought Kilos.

The last two Yuans, appear to be an improvement on the first two. The first two Yuans appeared to be a copy of the early model Kilo (the model 877), while the second Yuan (referred to as a Type 41B) appeared to copy the late Kilos (model 636). The last two Yuans may end up being a further evolution, or Type 41C. The objective of all this evolution may be a sub that appears similar to the Russian successor to the Kilo, the Lada.

The first Lada underwent three years of sea trials before they were declared fit for service two years ago. Two are under construction and eight are planned. The Kilo class boats entered service in the early 1980s. Russia only bought 24 of them, but exported over 30. It was considered a successful design. But just before the Cold War ended in 1991, the Soviet Navy began work on the Lada. This project was stalled during most of the 1990s by a lack of money, but was revived in the last decade.

The Ladas have six 533mm torpedo tubes, with 18 torpedoes and/or missiles carried. The Lada has a surface displacement of 1,750 tons, are 71 meters (220 feet) long and carry a crew of 38. Each crewmember has their own cabin (very small for the junior crew, but still, a big morale boost). When submerged, the submarine can cruise at a top speed of about 39 kilometers an hour (half that on the surface) and can dive to about 250 meters (800 feet). The Lada can stay at sea for as long as 50 days, and the sub can travel as much as 10,000 kilometers using its diesel engine (underwater, via the snorkel). Submerged, using battery power, the Lada can travel about 450 kilometers. There is also an electronic periscope (which goes to the surface via a cable), that includes a night vision capability and a laser range finder. The Lada was designed to accept a AIP (air independent propulsion) system. Russia was long a pioneer in AIP design, but in the last decade, Western European nations have taken the lead. Construction on the first Lada began in 1997, but money shortages delayed work for years. The first Lada boat was finally completed in 2005. A less complex version, called the Amur, is being offered for export. The new Chinese Yuan class boat is larger than the Kilos or Ladas, but has similar external design features. It will be a while before more details can be uncovered.

The Ladas are designed to be fast attack and scouting boats. They are intended for anti-surface and anti-submarine operations as well as naval reconnaissance. These boats are said to be eight times quieter than the Kilos. This was accomplished by using anechoic (sound absorbing) tile coatings on the exterior, and a very quiet (skewed) propeller. All interior machinery was designed with silence in mind. The sensors include active and passive sonars, including towed passive sonar. This quietness is what the Chinese are looking for, because diesel-electric boats are the quietest available (all things being equal), even quieter than AIP.

Preceding the Yuans was the Type 39, or Song class. This was the first Chinese sub to have the teardrop shaped hull, and was based on the predecessor of the Kilo, the Romeo class. The Type 41 was thought to be just an improved Song, but on closer examination, especially by the Russians, it looked like a clone of the Kilos. China currently has 13 Song class, 12 Kilo class, three Yuan class and 25 Romeo class boats. There are only three Han class SSNs, as the Chinese are still having a lot of problems with nuclear power in subs. Despite that, the Hans are going to sea, even though they are noisy and easily detected by Western sensors.

Israel: New Submarines Make Their Way to the IDF Navy

By Israel News Agency Staff, Jan 15, 2011

Jerusalem, Israel — January 15, 2011 The Israel Navy is now preparing to receive a new submarine. In the last two enlistment cycles for the IDF Submarine Flotilla Corp, there was an increase by 30 percent for combat soldiers trained for the position, a result of two new submarines acquired by Israel from Germany.

IDF Navy officials explain that the submarines' arrival will increase the number of such vessels in the IDF and their reach in deterring an attack on Israel. In order to have enough combat soldiers to successfully operate the new submarines, more IDF combat fighters will complete the course each cycle.

Hundreds of Israel Defense Forces soldiers completed their naval course just two weeks ago.

"We're at the peak of a process and we're slowly adding more crews to be trained for the position," explains Commander of the Naval Training Base, Col. Ronen Nimni. "Additionally, we made sure to increase the number of commanders to maintain more personalized instruction for soldiers."

Until today, the mix of IDF naval officers has mostly included those for the IDF Missile Boat Flotilla. As a result of the new additions, however, this could change,” says the IDF spokesperson’s office. The training base explains there might be a 35 percent increase in the number of IDF cadets trained for submarines.

The decision to increase the number of IDF combat soldiers and officers in the Israel Submarine Flotilla also affects logistics at the Naval Training Base including a need for more spacious rooms for soldiers, more classrooms and more instructors. “The training base is prepared for any increase in the number of officers and combat soldiers,” says commander of submarine operations school, Maj. I.

Private security analysts tell the Israel News Agency that the IDF Submarine Flotilla has become the most potent weapon in the IDF’s arsenal of weapons, overshadowing the elite Israel Air Force.

“Israel submarines deliver real time INTEL from all over the globe on Islamic terror threats against Israel. From this INTEL we are able to neutralize threats before they become actual.”

“Although Israel has never confirmed nor denied having planted the Stuxnet computer cyber war virus which has neutralized much of Iran’s nuclear program against Israel and Europe, it is believed that if Stuxnet did not deploy, the IDF submarine fleet was more than ready to physically destroy each and every missile targeting Israel and Europe. And Israel’s Mossad remains ready to neutralize those politicians and technicians in Iran who are behind the development of the Iran nuclear program.”

Iran President Mahmoud Ahmadinejad recently admitted that that a computer worm incapacitated centrifuges of the Iran military nuclear program.

“The Israel submarine fleet runs very deep and very silent. They can sit in one position for months off the shores of an enemy state in both a defensive and offensive mode,” says the analyst. “There is no doubt that Israel maintains a very strong and potent edge for making a first strike and last strike in the next war.”

According to The Telegraph Israel acquired the capability of launching a nuclear strike against Iran and Syria from submarines before 2003. This would place Israel and the IDF among a handful of countries able to deliver atomic weapons from land, sea and air.

With US help, Israel technicians have modified US-supplied cruise missiles to carry nuclear warheads. Commentators believe that the disclosure, in the Los Angeles Times, was intended as a message to Iran about the risks of its nuclear ambitions.

The Israel government does not comment on its nuclear capacity. But experts agree that Israel has the world’s sixth largest nuclear arsenal with some 400 warheads, deployed on subs, fighter aircraft and ground units.

The Israel Navy is said to maintain daily contact and cooperation with the US, UK, Germany, France and members of NATO. Israel’s participation in monthly and annual war games with US and European allies has transcended into one very large, democratic, military force completely coordinated to meet and neutralize any Islamic Jihadist terror threat around the world.

Foreign media reports state that Israel’s secret effort to acquire a nuclear bomb began in 1956 when France supplied a nuclear reactor and technical help. By 1968 Israel had a nuclear capability.

In June 2002, former US State Department and Pentagon officials confirmed that the US Navy observed Israeli missile tests in the Indian Ocean in 2000, and that the Dolphin-class vessels have been fitted with nuclear-capable cruise missiles of a new design. In November 2005, outgoing German Chancellor Gerhard Schroeder approved the sale of two modernized Dolphin-class submarines to Israel for a total cost of \$1.27 billion. A third of the cost will be financed by the German government.

Israel is hoping to acquire two more submarines that are even more advanced in the near future, the Meko A-100.

If the Israel navy purchases the two vessels, it reportedly will arm them with air-defense capability, thus creating the world’s first air defense corvettes – and giving the Israel surface fleet independent air cover for the first time.

Israel has allegedly deployed a permanent submarine presence in the Persian Gulf to maintain a 24/7 eye on Iran, according to media reports. The three German built submarines are reportedly equipped with nuclear cruise missiles.

“Flotilla 7” is comprised of three submarines that have visited the region before – the Dolphin, the Tekuma and the Leviathan. Each IDF crew includes between 35 to 50 soldiers and is commanded by a colonel.

At least one will remain in the area at all times, until further notice, according to “Colonel O,” the commander of the IDF force quoted in the reports. “We are an underwater assault force, operating deep and far – very far – from our borders,” he said.

The submarines can stay submerged as deep as 2,000 feet below the surface, for as long as a month, and can remain at sea for some 90 days.

The force is intended primarily as a deterrent, however. “The 1,500 kilometer range of the submarines’ cruise missiles can reach any target in Iran,” noted a IDF naval officer quoted by British newspaper The Sunday Times.

Israel Navy Commander Maj.-Gen. Eliezer Marom told those completing Israel’s 98th Submarine Commando course: “The Submarine Commando was established over 50 years ago, and has taken part in countless national security operations. The daring and courage of the submariners, and the professional manner in which they operate this advanced war machine, are the secret of the commando’s success.”

The objectives of the Submarine Commando is to destroy enemy ships, ensure control of port entries, espionage and provide aid to other Israeli and ally forces. The Navy’s Dolphin subs are among the most advanced conventional submarines in the world and are the IDF’s most complex and expensive assets.

“We are always found in operational activity, that is why our abilities are among the highest in the world,” says Eyal (a Colonel in Israel’s navy) who is retiring after twenty years of service in Israel’s submarine fleet. “For years the submarine fleet has been an important strategic arm of the IDF, however since the attack on the U.S.S. Cole in Yemen, 9/11 and the Second Gulf War it is more than just that.”

Ambush Evacuated After Fire On Board

Northwest Evening Mail, Jan 22, 2011

AN investigation is being launched after a fire on a £1.2bn submarine.

HMS Ambush, which is in the water in Devonshire Dock, Barrow, was evacuated at around 12pm yesterday when crew members activated the fire alarm.

BAE Systems Submarine Solutions, who built the submarine, said there had been an electrical fault which caused a piece of equipment in the rear of the boat to overheat.

Firefighters from Barrow's Blue Watch crew dealt with the incident. Crew manager Steve Harrison said: "It was a small fire contained in a piece of equipment, and it caused smoke. We used a CO2 hose reel."

Mr Harrison said BAE Systems staff used air monitoring equipment after the procedure.

A spokesman for BAE Systems Solutions Submarines said: "At approximately 12pm, Ambush was evacuated, in line with standard safety procedure, after the submarine's fire alarm was activated by members of crew.

"There were no casualties, and all personnel were quickly and effectively accounted for.

"The incident resulted from an electrical fault, which caused a piece of equipment in the rear of the boat to overheat and give off smoke.

"An investigation will now take place to fully examine the incident."

This is the third fire on board Ambush.

In the first incident in April 2009, while the submarine was inside the Devonshire Dock Hall, a fire was caused by welding sparks igniting external tiles but was put out without serious damage.

Fire also broke out in temporary plastic extraction ducting three decks down inside Ambush in January last year, again while it was inside the DDH.

The first-of-class HMS Astute submarine suffered two fires. Tiles in the submarine's conning tower caught fire while the sub was moored in Devonshire Dock in 2009. Astute caught fire again in May last year while on sea trials with the navy.

Black Sea Fleet Submarine Prepares For Mediterranean Sea Deployment

kyivpost.com, Jan 21, 2011

The Alrosa, the one and only submarine owned by the Russian Black Sea Fleet, will undertake its first deployment in the Mediterranean Sea, which will continue for three months, a military-diplomatic source told Interfax-AVN on Friday.

"The Alrosa will rise to the surface to pass through the Bosphorus in summer. The Turkish authorities will be notified of it. However, this issue has not yet been completely settled," he said.

K-15 Test Rescheduled To Jan 31

By Hemant Kumar Rout, Times of India, Jan 21, 2011

BALASORE: The DRDO has rescheduled the test-firing of submarine launched ballistic missile (SLBM) K-15 to January 31. It was supposed to be test-fired from an underwater platform off the Vishakhapatnam coast on January 20.

"The test was first scheduled on January 16, but was postponed to January 20. Now it has again been rescheduled to January 31 due to delay in arrangements. It is a coordinated exercise of both land and Navy personnel," a source said.

"India can join the league of five nations, Russia, US, France, Britain and China, with the successful launch of the K-15 missile. These countries already possess advanced missiles that can be launched from a submarine," sources said.

The indigenously developed K-15 or the B-05 missile are 10 metres in length, one metre in diameter and weighs ten tonnes with a strike range of around 700 km.

This missile uses solid propellant and carries a conventional payload of about 500 kg to one tone and also be fitted with a tactical nuclear warhead. "The missile is ready for the test. But preparation is on for locating the Pontoon (replica of a submarine) inside the sea. The tracking machineries and technical equipment have been shifted from the integrated test range to Vishakhapatnam," the source added.

The K-15 missile has been tested at least six times and is in serial production. The missile was initially test-fired under the name of Sagarika project. While its launching was recorded partial success twice, the rest were claimed as "successful trials" by the DRDO.

The missile, which can be compared with the Tomahawk missile of US, is India's response to Pakistan's Babur missile. The source further said that the Navy has reportedly been insisting for the test of K-15's cruise variant as it is hard to be obstructed and has pinpoint accuracy.

"Cruise missiles are more difficult to detect and hence less vulnerable to anti-missile defence, which can track and destroy ballistic missiles with comparative ease," a defence scientist said. "Besides, the K-15 missile, India has another missile which can also be launched from a submarine. In a joint collaboration with Russia, a submarine-launched version of BrahMos cruise missile has been developed," he added.

South Korea's Secret SOSUS System

StrategyPage.com, 19 January 2011

South Korea recently announced that it will place underwater submarine sensors off its coasts. Details were not revealed, but this sort of thing is similar to the system of passive (they just listen) sonars the United States deployed on the sea bottom in key areas during the Cold War. SOSUS (SOund Surveillance System) consisted of several different networks. On the continental shelf areas bordering the North Atlantic was the CAESAR network. In the North Pacific there was COLOSSUS plus a few sensors in the Indian Ocean and a few other places that no one will talk about. The underwater passive sonars listened to everything and sent their data via cable to land stations. From there it was sent back to a central processing facility, often via satellite link. SOSUS was accurate enough to locate a submarine within a circle no wider than 100 kilometers. That's a large area, but depending on the quality of the contact, the circle might be reduced up to ten kilometers. The major drawback of the system was that it did not cover deep water areas more than 500 kilometers from the edge of the continental shelf. This is not a problem for the South Korean system, as they only want to cover coastal waters.

SOSUS systems are very expensive to maintain. SOSUS managed to survive the end of the Cold War by making its sensors available for civilian research and by using cheaper and more powerful electronic and communications technology. While many parts of the SOSUS have been shut down, additional portable SOSUS gear has been put in service, to be deployed as needed.

South Korea can obtain more sensitive passive sonar systems that can identify submarine location more accurately. The U.S. has been doing research in this area, and probably has already offered help. South Korea also has the design and manufacturing capability for this sort of device. The first South Korea SOSUS system will be placed off the west coast, near the North Korean border. The South Korean Navy won't say when, but they appear to indicate "soon." North Korean submarines, travelling under water, using battery power and near the coast, are very hard to detect. The South Korean SOSUS will help even the odds.

Going Nuclear

Can small reactors rescue the nuclear-power movement?

By Carl Shockley, *National Review*, Jan 20, 2011

With the arrival of the Tea Party in Washington, a huge rift may be opening up over the future of nuclear power. On the one hand, the Tea Party and new Republicans are foursquare in favor of energy development. "Pass an All of the Above Energy Policy" was item No. 8 in the Contract from America. "This would include off-shore oil drilling, clean coal, nuclear, renewable, and everything else," says Ryan Hecker, the Houston attorney who organized the document. "The important thing is to develop domestic resources."

Yet virtually everyone in the nuclear industry says that it will be impossible to build any new reactors without loan guarantees from the federal government. "We had all the output from our new uranium-enrichment plant in Idaho sold in advance, and we still couldn't get any investment money without a federal loan guarantee," says Mike Rencheck, COO of Areva, the French nuclear giant. "That was only a \$2 billion facility. You're never going to be able to build an \$8 billion reactor without federal help."

Most environmental groups now bypass the traditional scare tactics and declare solemnly that they oppose nuclear only because it is too expensive. "It's like trying to solve world hunger problems with caviar," says Peter Bradford, a former nuclear-regulatory commissioner who's now with the Union of Concerned Scientists.

And therein constitutes the dilemma for the Tea Party. They want new energy sources, but they also want to cut industry's reliance on government. Is there any way around this dilemma?

Marvelously, there is. American ingenuity has once again come up with a potential solution. Over the past four years, half a dozen new companies, plus a few old-guard stalwarts such as Babcock & Wilcox, General Electric, and Westinghouse, have introduced designs for reactors approximately one-tenth the size of the conventional variety. Instead of being laboriously constructed on-site — a process that takes at least four years — these units can be mass produced in factories and shipped to their destinations via truck or rail, where they can be sited individually or combined like Lego blocks.

This is something unique to nuclear. You can't build one-tenth of a coal or natural-gas plant — at least without sacrificing a great deal of thermodynamic efficiency. But nuclear is so flexible that individual units can be built to almost any size.

The full-size commercial reactors built by Areva and Westinghouse are 1,500 megawatts — enough to power a city the size of San Francisco. By contrast, Babcock & Wilcox's 50-year history of building small submarine reactors for the U.S. Navy finally inspired it to introduce the 125-megawatt mPower reactor in 2010. And NuScale Energy of Corvallis, Ore., has developed a 45-megawatt reactor that could fit into a gazebo and power a town of 10,000. "It's built mostly of off-the-shelf technologies," says Paul Lorenzini, a nuclear engineer and former utility executive who founded the company in 2007. "You could power a major manufacturing plant with one unit, or combine twelve of them into something the size of a conventional power plant."

The biggest advantage of modular reactors is that they can avoid the whole sturm und drang of a ten-year, \$10 billion investment that may turn out to have been unnecessary. Most utilities simply can't afford the risk — their entire net worth may be only \$20–25 million. But adding bite-sized units will be like adding individual windmills — except the reactors won't stand 45 stories tall to produce only 1 megawatt apiece.

Modular reactors offer all kinds of other advantages. Full-size reactors use water-coolant technology, which requires huge quantities of water drawn from a nearby river or ocean plus 50-story cooling towers. But Hyperion Power Generation of Los Alamos, N.M., has an air-cooled 25-megawatt reactor that can be located in the desert. “It can be used to recover shale oil in Saskatchewan or power irrigation systems in California,” says John “Grizz” Deal, the CEO, who discovered the design while serving as “entrepreneur in residence” at the Los Alamos National Laboratory. “You can put it in the basement of a large hospital or industrial complex. The unit includes its own containment structure and can be buried underground for additional safety.”

In fact, small reactors fulfill the dream of the small-is-beautiful crowd for “distributing electrical generation” across the grid in small units, Internet-style, instead of concentrating it in a few large power plants. Centralized generation normally wastes two-thirds of the energy it creates in converting heat to steam to electricity. Smaller units located at individual factories promise vast improvements in efficiency. “Everyone talks about the need for electricity, but we’re a massive user of industrial heat as well,” says Doug May, vice president for energy and climate change at Dow Chemical. “We see small modular reactors sited at industrial locations as a game-changer.”

Does all this sound good? Well, there’s only one catch — the Nuclear Regulatory Commission. The huge, monolithic Beltway bureaucracy has been laboring more than five years to give final approval to the design of the Westinghouse AP1000, a conventional reactor that is already under construction at four different sites in China, with the first scheduled for completion in 2012. The NRC is trying to figure out how to protect the reactor from airplane attacks. (If you have even the remotest concern about this, see here.) It is estimated that the NRC would take five years to approve a conventional reactor — that’s stated as a hypothetical because none have ever actually been approved. The idea of dealing with an exotic new technology is enough to give the Commission a nervous breakdown.

Early overtures by mini-reactor manufacturers were rejected outright, but the commissioners recently relented and sat down for talks. Still, the best estimates are that it may be 2017 before anyone is issued a license. Last March, Secretary of Energy Steven Chu wrote an op-ed in the Wall Street Journal arguing that America could regain a “key competitive edge” by embracing small-reactor technology. But at the current pace, Korea, Russia, France, and Japan will soon be far ahead of us — as they already are in the construction of conventional reactors.

Congressman Devin Nunes, author of Restoring the Republic, is preparing legislation that would require the NRC to complete its review of new license applications within 25 months. The new Tea Party representatives would do well to get behind him. It would be much less painful than trying to decide whether to extend multi-billion-dollar loan guarantees to the nuclear industry.

Polaris A1 Flight Milestone

By John Terry White: President/CEO White Eagle Aerospace, blog.seattlepi.com, Jan 17, 2011

Fifty-one years ago this month, a developmental version of the USN/Lockheed Polaris A1 Fleet Ballistic Missile was test-flown from Cape Canaveral, Florida. The successful test marked a key milestone in the flight-proving of the Polaris missile’s Inertial Navigation System (INS).

The Cold War between the United States and the Soviet Union spawned the development of a Nuclear Triad by both sides. The concept involved delivery of atomic weapons via manned bombers, land-based ballistic missiles and submarine-launched ballistic missiles. This diversity of delivery systems thus provided for deterrence by maximizing the ability for either side to retaliate in the event of a first strike by the other.

The submarine-launched ballistic missile (SLBM) is arguably the most effective leg of the Nuclear Triad when it comes to deterrence. This effectiveness stems largely from the mobility and elusiveness of the nuclear-powered submarine itself. The fact that the missile is launched while the launch platform is submerged greatly enhances the weapons’s effectiveness as well.

The challenges faced by the Navy and its contractors in developing a SLBM capability were numerous and significant. Critical among these was the need to avoid igniting the first stage rocket motor within the confines of the submarine. The solution was to eject the missile from its launch canister via a high pressure gas generation system. The rocket was then air-ignited just after it broached the ocean surface.

A key aspect of the SLBM launch process is missile stability and control both in the water and in the air. During its underwater transit from canister eject to surface broach, the missile is not under active control. However, it must be statically stable in a hydrodynamic environment. Once in the air, the rocket motor must be ignited quickly since missile 3-axis control comes only via thrust vectoring.

Polaris was the first SLBM developed and deployed by the United States. Lockheed Space and Missile Systems (LSMS) began engineering development of the Navy missile in the mid-1950s. Aerojet was the Polaris Program’s propulsion contractor. Flight testing from land-based launch pads began in 1958 with the first submarine-based launch occurring in mid-1960.

The Polaris A1 was a two-staged launch vehicle. It measured 28.5 feet in length and had a maximum diameter of 54-inches. Weight at first stage ignition was 28,800 pounds. The type’s MK 1 reentry body delivered a single MK 47 warhead having a yield of 600 kT. Maximum range was on the order of 1,200 nm.

On Thursday, 07 January 1960, Polaris A1X-7 was launched from LC-29A at Cape Canaveral, Florida. The primary purpose of the test was to prove the proper operation of the Inertial Navigation System (INS). This system was developed jointly by MIT and the General Electric Company. The missile flew 900 nm down the Eastern Test Range (ETR). The flight was entirely successful.

Thirty-four (34) more tests in the Polaris A1X series took place by early July of 1960. The majority were successful. All set the stage for the first submarine-launch of the Polaris from a submerged Navy submarine. Indeed, Polaris A1E-1 did so on Wednesday, 20 July 1960. It was followed less than three (3) hours later by Polaris A1E-2. Both missiles were launched from the USS George Washington (SSBN-598) in the waters near Cape Canaveral. Both flights were successful.

The Polaris A1 became operational in November of 1960. It was followed in 1962 and 1964 by the more capable A2 and A3 Polaris variants, respectively. In the never-ending quest for greater performance and effectiveness, the Polaris was eventually replaced by the Poseidon in the 1970s. The latter was subsequently replaced in the 1990s with the mighty Trident II D5 missile which serves up to the present day as the Nation’s premier SLBM.