**DIRECTOR’S CORNER**

*Ed Dalrymple*

By now everyone should be back into a routine after summer’s vacations and traveling. The organization continues to grow at a steady pace. A number of members have submitted articles; many of which are in this edition. I am truly grateful for those who have contributed articles in the past but as I look to the future our cup does not runneth over. Articles from the members are important in keeping this newsletter going.

Renewal notices to many of you have been included in this mailing. To date we have had a 99% response rate in renewing membership. If you believe you have been billed in error just let me know. The postal rates will rise in the near future but the intent is to keep dues at the current rate of $12.00 per residence for a 2-year membership. Please advise when you have changed addresses, as this will eliminate unnecessary mailing costs.

There appears to be emerging interest from a myriad of sources in documenting the history of SOSUS. These are works in progress and it will be sometime in the future before anything will be published. It does indicate that the “System” has achieved the ultimate status of being considered a part of the Navy’s history. Stay tuned.

We will publish an updated membership list in the near future. Until next time. EKD

P.S. Please provide your email address to me at eddaliuss@aol.com if you’d like it published in the membership list.

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**EDITORIAL CORRECTION**

An editing error was made in the previous issue of THE CABLE. Winter 1998 Vol. 3, No.1. In the article titled “Prehistory of SOSUS/IUSS” the following corrections should be made:

**ELEUTHERA-Bahamas** – the closing paragraph should read “...an installation of barium titanate hydrophones designed by Bell Labs went on line recording the first measurements of the infrasonic sea noise spectrum. The watch in the sea had begun.”

Secondly, under SANDY HOOK – the closing sentence should read “It was Sandy Hook in October 1951 that the first demonstration of passive detection took place.”

The editorial staff regrets any inconvenience or misconception the aforementioned errors may have caused and apologize to the author of the article. EKD

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**NAVIFAC MEMORIES**

*by Mrs. Richard E. Bolin*

We started out in Keflavik back in 1967, living off base with no “take off” privileges which meant we had to buy off the local economy. Drinking demitasse coffee, I watched a sheep’s head boil in a large pot atop our landlady’s stove. Many a frigid walk to the nearby stores yielded net bags of freshly baked bread from the local bakery, Icelandic Esa (sole) and triangular liters of rich milk. Our kitchen, although very large, had only cold running water in a tiny sink inconveniently located and the burners on the stove were thick iron plates that ruined my new pans. Taking a shower was real challenge, as we had to climb a ladder from the laundry room in the basement to a door on the main level of the house and knock to ask if we could bathe. Valla’s piano, located above our bed, woke us many nights as we slept as did their thermostat being set too high. Icelandic children romped in their tank undershirts in the summer when temperatures reached 50 degrees. Most of our meals were eaten out at the NCO club because of high prices in town.

Frozen hands soon thawed in Barbados where a mid wife delivered our first child and avocados were as plentiful as Bougainvillea. My mouth still waters for those luscious fruits as our desires anticipate seeing the beauty of that island again someday.

A similar tour in Antigua brought many nights of balmy breezes while at the outdoor movie theater. The softball field sat behind our base house. Many holes in the soil on that field housed Horse Spiders (tarantulas). But still, on base quarters were good, as we had been robbed as we slept one night while living off base.

The waves carrying us and our boogie boards to the shore at Bellow’s Beach, Hawaii, our last tour, somehow are not as high in our memories as those are on the East Coast of the Outer Banks of North Carolina. Last year Rick and I took our very first formal vacation since his retirement in 1986 to Buxton where the NavFac was

*continued on next page*
NAVFAC MEMORIES (continued)

NavFac was located. Our housing unit was no longer there. We heard through the grapevine that a tornado associated with a hurricane had wiped it out a few years back. Only a few of the original quarters remained, soon to be torn down and replaced with two story beach front dwellings that all looked the same.

Rick spent lots of hours on that beach by the Cape Hatteras Lighthouse. Our stomachs never yearned for fresh fish in those days. The sound of CS1 Fred Varrias' voice as he passed by our house is still loud and clear. "Rick...I'm going 'pishing!'". Rick was never far behind him. Larry and Joanne Hammond were gone when we arrived last year in September but as small worlds go, their daughter Debbie just happened to work at the Comfort Inn where we stayed. A little girl all grown up!

Never thinking we would be fishing during our short visit, we had not planned to take our poles and tackle boxes. To the rescue, however, I was able to locate one rod for rent at a nearby shop and pickup a couple of lures. Our eyes popped open before daylight and we were on the beach, again a short jaunt across the dunes, before the sun came up.

Déjà vu for sure, I sat on the sand with my coffee and watched as Rick ran down the beach waving his surf casting pole in the air signaling something to me. "They're breaking! Over there! Look!" I hadn't seen him move that fast in years!! A school of Spanish Mackerel was only ten feet from the shoreline making quite a stir on the surface. But they were not nearly exciting as the smile breaking across Rick's face...........Days gone were back.

Glenda is married to OTMC Richard E. Bolin, USN (Ret) and resides in Urbana, Ill. The Cable is truly appreciative of Glenda's article and hope it is the first of many and serves as a catalyst for others to write about the varied aspects of life in the “System.”

LETTER from BOB ZAK

Thanks for the first installment. Lots of interesting news and information in the Newsletter. I was especially moved by the picture taken in Eleuthera since it brought back lots of memories. Although the pictures were probably Bell Labs people, I specifically remember the tents used by the "Seabees" during the construction. I was ordered to the Eleuthera Experimental Facility in 1957 for further transfer to NavFac Eleuthera when completed. I was a Petty Officer Third, Electronics Tech at the time and had been on a Tin Can homeported in Norfolk. I was lucky in that the barracks were finished when I arrived so I never had to rough it. The TEB was shortly thereafter. For the first couple of months we started the inventory and storage of electronic spare parts: 300 of one type vacuum tube and thousands of resistors, caps, etc. No transistors!

The operators were mostly convetees from bo' sun mates to enginemans. In fact, I reported to a CPO ET who had been an EN. Lots of PO1's and very few Indians. The first CO was a LT who had commanded the “M-Boat” prior to commissioning. I bought a Rolex watch for $40. My son in Greece still has it.

They shipped in grass sod to put around the Admin bldg. It died, so they did it again and again.

I am a plankowner and got a piece of cake. Long before momentos came along. I spent a very enjoyable year at NavFac Eleuthera (means “freedom” in Greek) mostly at work. There was little else to do except go to the limbo contest on Saturday night in Gov. Harbor.

I didn't get back there until 1971. I was shocked to see all the all the vegetation on the base but enjoyed my stay.

Bob Zak joined Western Electric after his Navy service and served at a number of NavFacs and COSP stuff as Resident Engineer. He is now retired and residing in Maine.

NAVFAC BRAWDY IS NO MORE

Submitted by
Mr. Frank Gambino

I recently spent a week in Wales and decided to visit the old homestead. Both, RAF Brawdy and, of course, the NavFac no longer exist. The base is now occupied the 14th Signal Regiment. The buildings have been repainted a matte dark brown and there is absolutely nothing to tell you that we were over there. The bowling alley, I'm told, still gets a lot of use by the locals.

Some of the locals who were involved in the cable landing tell me that the site had something to do with tracking submarines but I think I've convinced them that it is nothing more than a telephone cable we put in because the local service was so bad.

Frank Gambino was one of the pioneers of the System. He was originally at DPU, located at the Brooklyn Navy Yard, then to Main Navy and EPO-3 with Joe Kelly and then many years with the Program Office in Crystal City prior to his recent retirement. Frank was intimately involved in the planning and installation of NavFac Brawdy. He now resides in Germantown, MD.
The Origins of SOSUS (Part 1)

by Dr. Ash H. Carter

This is the first of a two part history of the early beginnings of the System provided by Dr. Carter. Part 2 will be published in the next edition of The Cable.

Introduction
The year 1999 will mark the 45th anniversary of the SOSUS system. In November 1954, the first station became operational. The events leading up to SOSUS constitute a fascinating story. This short history is based on a recent examination of various archives at AT&T Bell Laboratories and on the results of research by the late Captain Joseph P. Kelly, the Navy project manager of SOSUS from 1952 to 1973.

The Launching of SOSUS
The modern era of sonar began in the 1920 when there was a steady advance in applying underwater sound to practical needs. During this period, depth sounding by ships was developed and echo ranging on submarine targets received a great impetus from advances in electronics. Thomas Edison and other luminaries became involved in research on passive listening devices. Numerous scientists explored the physics and oceanography on which later work would be based.

Work began in earnest at the start of World War II, when German submarines torpedoed Navy-escortcd convoys. In the darkest days, 120 U-boats were operating in the Atlantic. Wolfpacks frequently outnumbered escort ships by a factor of two-to-one. At one stage our ships were being sunk faster than we could replace them, and some of the sinkings occurred within sight of our coasts. Keeping supply lines open for thousands of miles was agonizingly difficult.

The mobilization of the Nation’s resources turned the tide - all the shipbuilding skill, training ingenuity, and scientific effort that could be mustered. Without sonar, the U-boat threat could never have been contained. But the toll by the end of the war was enormous: 4733 Allied ships, 966 enemy boats, and a great loss of human life. It was a stiff price to pay to maintain supply lines.

In the waning days of the conflict, the Germans developed the Snorkel submarine - a true submersible that could operate under diesel power at periscope depth. Its designers claimed cruising ranges of 20,000 miles at speeds approaching 25 knots. The Snorkel submarine was a weapon that far exceeded its predecessors; thus, a new challenge had been presented to the anti-submarine warfare community.

In the 1940s, even as the world was at war, experiments were conducted at the Woods Hole Oceanographic Institution and elsewhere which demonstrated the long-range propagation of sound in the ocean at low frequencies. This phenomenon is associated with the vertical sound speed structure and, in particular, the existence of a deep sound channel in most ocean areas. A system for locating ships downed at sea was one of the first applications to be considered. The system was called SOFAR for Sound Fixing and Ranging. It consisted of three or more hydrophone configurations placed near the sound channel axis with sufficient horizontal separation to obtain an accurate triangulation fix on the signal from a small explosive charge released by the flier. Several SOFAR stations were established, but were never used as intended. Instead, they became important sites for continuing research on the characteristics of sound transmission and noise.

In 1946, True Magazine published a story on how the deep sound channel might be exploited for the passive detection of submarines. That same year, Dr. Glenn Camp of the Operations Evaluation Group in CNO described the existence of low-frequency distinct line components in the radiated spectrum of diesel submarines. For classification of the signal he suggested the use of a visual speed analyzer developed by Dr Ralph K. Potter of the Bell Telephone Laboratories. Dr. Camp promoted his idea, but nobody listened; he was ahead of his time.

Early in 1949, the Naval Research Laboratory reported submarine detection ranges of 10-15 nms in tests using SOFAR hydrophones off Point Sur, California. By the end of the year ranges of several hundred miles had been achieved. That same year a SOFAR station was established at Bermuda by Dr. Maurice Ewing, a world-famous oceanographer and one of the great contributors to our knowledge of underwater sound.

During this period the Soviet Union set out to create its own political and economic sphere, independent of the West. The Russians mobilized their scientific resources to develop first the atomic bomb and then the hydrogen bomb. The danger nuclear war became a central fact of modern life and a furious arms race began.

On the seas the admitted goal of Soviet admirals was to achieve naval supremacy, to use the navy as a key element of Soviet global strategy. Great emphasis was placed on completely modernizing naval armaments, especially the submarine force, which became the largest in the world. The threat posed to the Free World was viewed with alarm by our military leaders and analysts.
In 1949, the Committee on Undersea Warfare of the National Research Council informed industry about the state of anti-submarine warfare and polled organizations on what might be done to meet the threat. Dr. Mervin J. Kelly, then president of Bell Telephone Laboratories, was so impressed with the importance of the problem that he called on Admiral Sherman, CNO, and discussed ASW in detail. Considered basic to national survival was the ability to use the high seas to transport men and materiel in face of the threat posed by enemy submarines.

In a letter dated 23 January 1950 to Admiral C. B. Momsen, Assistant Chief of Naval Operations, the Committee on Undersea Warfare recommended that a long-term program be formulated to meet the submarine threat. Subsequently, Admiral Momsen and Admiral Solberg, Chief of Naval Research, met with Dr. Kelly and Dr. James B. Fisk, Dr. Kelly's assistant and later his successor, together with Dr. Julius Stratton, provost of MIT. It was decided that a broad study should be conducted that summer on the security of overseas transport. Professor Zacharias of MIT chaired the study and Commander Groverman of ONR was assigned as liaison officer. The code name Hartwell was adopted and the participants became known as the Hartwell Committee.

At about the same time, the Fifth Undersea Symposium was held in Washington, D.C. At that gathering, Professor Ted Hunt of Harvard, a renowned acoustician and director of the Harvard Acoustics Laboratory that contributed so much to sonar during World War II, presented a momentous proposal outlining new concepts in underwater detection. He suggested the exploitation of the deep sound channel to achieve very long ranges, concentration on frequencies below 500 Hz, the construction of arrays at least 20 wavelengths long and oriented vertically to delineate ray paths, and the use of magnetic recorders for post-analysis of data.

Also at that time, SUBDEVGRP 2 at New London (the antecedent of the Underwater Sound Laboratory and NUSC), announced detections of diesel submarines using 1/8th octave filters. They found low-frequency sounds between 25 and 200 Hz with peaks at 100 Hz. Investigators at Woods Hole concluded that the line components in the spectrum were highly stable, and that, consequently, the filter bandwidth could be substantially reduced to improve the signal-to-noise ratio.

The Hartwell Committee delivered its report in the fall and recommended the development of nuclear-powered submarines. It suggested the marriage of missiles with submarines, which led to Polaris. It urged the construction of fast, modern transport ships. It also targeted the detection of submarines using real-time spectral analysis of radiated sound energy as holding most promise for the future of ASW. Its specific recommendations included the following: (1) the real-time narrowband analysis of radiated sounds; (2) the use of low-frequency noise for underwater communication or navigation; (3) the possible reduction of submarine-radiated signals by feeding back sound in phase opposition. It was believed that low-frequency spectrum analysis would do to the detection of the submarine threat what the magnetron had done for radar in 1939.

In October of 1950 Dr. Kelly called on Admiral Sherman once again and offered the services of Bell Laboratories. Admiral Sherman responded with a letter which stated "I have directed Admiral Solberg, Chief of Naval Research, to proceed with arrangements with Bell Telephone Laboratories to institute a program of research and development in the field of low-frequency sonar." Bell Laboratories was already at work adapting Dr. Potter's visual speech analyzer to the task before Dr. Kelly's Washington visit.

Western Electric Company wrote a proposal and went to Washington on the 29th of October with a letter of intent. A contract was signed a month later between ONR and WECO for the R&D effort. The amount was for one million dollars; half of the funding came from ONR, half from the Bureau of Ships.

In the months that followed, rapid progress was made in confirming that prominent low-frequency line components were present in the submarine's spectrum and that the sounds were of sufficient intensity to offer exceptional potential for long-range detection. At Sandy Hook, New Jersey, a small experimental system comprising a cable and a few hydrophones was installed in shallow water. The cable was terminated in a building owned by the U.S. Army. Despite high ambient noise due to the heavy shipping in the area, rudimentary range tests were conducted which demonstrated the feasibility of surveillance.

The first report on the project, which came to be called Jezabel, outlined the parameters for a LOW-Frequency Analyzer and Recorder, or LOFAR. Bell Laboratories presented a working model of the spectrum analyzer with an analysis band of 1-1/2 Hz, operating in real time. Schemes were described for hydrophones, cables, delay lines and networks for simultaneously presenting multiple beams to achieve wide azimuth coverage. The first longboard model of a lofar was delivered in May 1951.

Dr. Ashley Carter has been an engineering and technology pioneer during his years at Bell Labs and architect of SOSUS as we knew it. He was Department Head for SOSUS System Engineering at Bell Labs from 1953 to 1988.
Congratulations to CDR (Sel) Kathy Donovan, USN. Best wishes to CAPT Mary Mosier on the occasion of her retirement and as she embarks on a new phase of her life. We extend the same best wishes to NCC(IUSS) Marilyn Champion, who retired in July at NTTC Corry Station, Pensacola where she served as the Command Career Counselor. She currently resides in Largo, Florida. John “Big Bird” Emory retired from Federal Service on 29 Sept 1998, having served 41 years in IUSS. Most assuredly IUSS will not be the same without John. John was the Technical Director at NOPF Whidbey Island at the time of his retirement. Fair winds and following seas to all of you.

OTMC Stephen Brown, USN (Ret), wife Ann and daughter Johanna, age 4 reside in St. Louis where Stephen is a senior engineer and store manager for Digital Equipment Corporation. OTC Jim Beckett, USN (Ret) writes that he is now a Senior Scientist for Lockheed Martin working on nonproliferation and counter-terrorism activities for the U.S. Department of Energy. He is also a principle and a director for a new company, Spectrum GIS, Inc., a company involved in remote sensing and geographic information systems.

OTCM/STGCM Forrest Baxter, USN (Ret) retired in 1996 and resides in Boise, Idaho with his wife Fayce.

CDR Lisa Carey, USN has moved to Springfield, VA as she begins a new tour of duty in WASHDC. George Chapman, TRW, recently ended his 15-year association with IUSS in his position of contract and acquisition management support to PMW 181 (Fixed System Program Office). George will retire from TRW on 1 November and with his wife Nancy enjoy their home in the Shenandoah Mtns, situated between the fairways of two golf courses. CAPT Steve Conn, USN has moved to River Ridge, LA where he has assumed duties as Commanding Officer, EPMAC New Orleans. OTMCS Roy Derrick, USN (Ret) resides in Oak Harbor, WA. Roy retired in 1989 and his last tour of duty was at NOPF Whidbey Island.

OT1/OTAI/STG1 Bobby Edmonson, USN accompanied by his family, is stationed at JMF St Mawgan, where he is a Watch Coordinator and Training LPO. Most watch sections are now comprised of more personnel than used to be in an entire OPS department at a downrange NavFac. Ex-OT Bob Eller left the USN in 1983 and resides in Hayes, VA. Bob has been employed by Hughes Aircraft Co (now Raytheon) as a SURTASS site rep at NOPF Dam Neck and now is a SURTASS instructor at IOSC, Little Creek. STGC(AW) (ex-OTAC) Diane Farmer’s current tour of duty is in Norfolk where she is an instructor at SUBTRAFAC. John Fox, who last served as a watch/Intel officer in the System in 1969 at COSP San Francisco and Pearl Harbor, resides in Brewster, N.Y. John retired from the State Univ. of N.Y. at Buffalo where he was a financial administrator. I had the great pleasure of meeting LCDR Chuck Gagnon recently. Chuck has returned to serve on CUS staff after his tour of duty as OPSO at JMF St. Mawgan. LCDR Ken Gyure, USN (Ret) now resides in Richelleville, PA. OTAC Bill Haars and OTAC Judy Haars, USN (Ret) are retired and living in Leesburg, Florida. Bill spends his free time on the golf course and Judy continues to hone her skills as she progresses in the sport of Tak Wan Do. OTCM Chuck Harding, USN (Ret) lives in Virginia Beach and writes that he has 4 grandchildren, enjoys golf, ham radio (NW3K) and web site development. Good to have you join us! Joe Hearn, Western Electric/AT&T, is retired and resides in Lexington, N.C. Joe retired after having spent 32 years supporting the CAESAR Program as a Senior Engineer in the Acoustic Source Group. CAPT Dick Hoffman, USN (Ret), COMOCEANSYSPAC (’71-’74) lives in LaJolla, CA.

Tom Gill and I spent many an anxious moment with Dick when he would have us ride with him in his borrowed Mooney Aircraft flying to Ferndale, Coos Bay, Pac Beach and San Nic. Like we had a choice; he was Commodore and we weren’t. Dick helped us locate CAPT Bill Green, USN (Ret) who is living in Coronado, CA. Bill was Chief Staff Officer, then COMOCEANSYSPAC after Dick. OTCM Jack Holdzkom, USN (Ret) writes that he and wife Louise have joined the ranks of empty nesters with the departure of son, John, who completed his PhD in physical oceanography and now works for NOAA in Silver Spring, MD. Daughter Chris is a staff administrator at Thomas Jefferson National Lab in Newport News, VA while daughter Donna, a CPA, is married to a Navy Chief Diver/EOD Tech. They and their children, Jackie and Ryan, are serving a three-year sentence in Guam (at least that is how Jack and Louise see it).

Bob Knetl, Senior Govt engineer/manager remains in WASHDC as part of the SPAWAR liaison office. Bob
did not make the trip west to San Diego but remains close to the action and the Pentagon. Bob was Program Manager for a number of international programs while part of the System Program Office (PD 18). LCDR Gerrit Mayer is currently serving as XO, HQ Support Activity, Norfolk. System tours included Brawdy, RTF and NOPF Dam Neck and a related tour at COMOPTEVFOR. OTCM Werner Miller is twice retired and resides in Norfolk. His third career is in full swing as he provides vocational instruction in computer cabling installation. Werner was an SOC in the early 60’s, then progressed to STCM, then converted to OTCM in early 70’s. Looks like we are coming full cycle as many of today’s active-duty personnel convert from OT to ST. OTCM(SW) Doug Nash, USN (Ret), wife Darlene and step-daughter Samantha reside in Virginia Beach. Doug is currently the Counter Manager for Budget Rent-A-Car of Norfolk. Doug indicates he is seriously looking for more meaningful employment in the Tidewater area. If you have any leads call him at (757)479-9824. Ex-OTA1 Rudy Ramirez is in Ruther Glen, VA where he is employed as a Site Network Analyst at Capital One, a credit card company. CWO3 Ron Rising, USN (Ret) resides in Mims, Florida where he works for Interactive Media of Orlando as the lead designer for an IUSS On board training system. OTCS Leroy Roark, USN (Ret) is REALLY retired since 1986 and lives in Barrigada, Guam. Leroy says he may move back to the States sometime in 2003 or 2004. Not a bad plan. OTC John Ross, USN (Ret) retired in 1984. His last duty station was NOPF Ford Island. John resides in Appleton, WI where he is the Associate Dean, Business & Marketing Division of Fox Valley Technical College. CWO3 Sandy Sanborn, USN (Ret) retired in 1992 and resides in St. Leonard, MD. He is employed by SEMCOR working on a SPAWAR TSC project exploring FTA system applications. CDR Kris Sims, USN is currently serving as Operations Officer on CUS staff and resides in Virginia Beach. Kris’ future plans call for getting married next month (Nov 98) and retirement in July, 1999. Our congratulations on your upcoming marriage and best of luck to you both (her name will change to Kris Miracle). CAPT Bernie Storr, BFS continues to correspond from San Salvador. I’m sure he would enjoy hearing from any ex-Salites. His address is Polly Hill, San Salvador (I find that you need to add “Island” to the address or it ends up as a non-delivery in Central America). John Stuart, Lucent Technologies/Bell Labs retired in 1996 and lives in Greensboro, N.C. John was involved in the development of digital signal processing technology for our systems in the 1970’s while at Bell Labs. Ex-OT2 Bill Turner, wife Joanne, sons Mark and Brian live in Tallmadge, Ohio. Bill served at Keflavik (’69-’70) and COSL (’70-’72). He teaches instrumental music in the Akron, Ohio area and still plays trumpet professionally. LCDR Buddy Kriebel reported he attended a wedding in New York of OTCM Bob VanAlstine’s oldest daughter. Nick VanHerpen and Phil Blauvelt also attended.

I end on a sad note. One of Walt Olkowski’s sons was killed in a motor vehicle accident near Elizabeth City, N.C. on 11 August 1998. Although not a member of the Assn, Walt is a well-respected and widely known member of our IUSS community. Until next time.

EKD

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**IN MEMORIUM**

CWO4 Malcolm Pope, USN (Ret) passed away on 5 April 1998 while in a Gulfport hospital after an extended illness. OTCM John Ellis performed the eulogy.

Malcolm was interred in the Biloxi National Cemetery.
Few SOSUS operators knew the extent that deep ocean survey development was driven by the need to install the arrays. Systematic offshore surveys in the deep ocean did not really exist prior to Project CAESAR. Systematic, surveyed knowledge of the ocean floor beyond visual navigational aids and very short-range electronic navigational aids was unknown. Knowledge was limited to ocean tracks and a few shoal investigations. Cable had been laid across oceans for nearly a century with the routes surveyed with spot soundings using various mechanical "lead lines" or later echosounders. These allowed a representation of the cable route and avoidance of major hazards. The difference was that the objective was limited to getting dots and dashes from continent to continent. Your system required something a bit different – finding a place to put an array to give clear acoustic coverage of an area likely to be inhabited or transited by submarines. This was a lot more complicated than finding a safe route from one continent to another. It required finding a spot where everything was cable and array safe, met the engineering properties, and had a clear "look" into the area of interest. Then it had to be connected to shore. This was where things were pretty much parallel to commercial work. We just had to do it secretly – we hoped.

The closest thing to deep ocean surveys before Project CAESAR is described in Chapter XLIII, Oceanic Soundings, in the American Practical Navigator (Bowditch) published by the U.S. Navy Hydrographic Office in 1962. It describes a reconnaissance for shoal investigation, not a survey. Other publications described deep ocean "surveys" as running lines using a baseline formed by two buoys anchored and positioned by the best available celestial or electronic means. A review of the electronic aids available during this period, again in the 1962 "Bowditch", will reveal the limitations. Loran-A was considered "precise". These did not support the precise bathymetry needed to do what CAESAR had to do.

The CAESAR problem was to support deep-water engineering – not navigation safety, not general navigation, and not pure knowledge of the oceans. An array had to be placed in a suitable location on a bottom location meeting multiple and particular characteristics. The array had to stay where it was placed. I believe one early continental shelf array got away and took off down a slope the surveys had missed. If I recall, the investigation of that event was the point at which the project made a distinct break with "hydrography" and began developing its own "engineering" survey culture. This engineering factor is the key to why CAESAR surveys remained distinct from other similar work, such as Ocean Survey Program (OSP) until the end. CAESAR was required to "do construction" on the ocean floor. I once explained the difference to a Flag officer's staff person who was questioning our need to "be unique" by pointing out a power line nearby. It was the difference between a USGS 7.5' topographical sheet and the "blueprints" needed to plant those power pylons. You could do general planning on the 7.5" sheet, but you’d better get precise information along the resulting planned route or very ugly surprises await.

Some interesting things happened on the ocean floor. The old idea of quiet, eternal silence and rest in the deep oceans are ideas I expect SOSUS operators know to be quaint. One little factor is the classic turbidity flow where something like an earthquake sets a chunk of seafloor roaring down a slope. The speed of these undersea avalanches was actually measured by the sequential loss of communications of commercial cables. They are fast! There are very long sea channels that are often tied to glaciers, past and present, carrying "grit" that will sand blast a cable. There are slumps, where the bottom sort of drops out and the cable is "suspended" where it should be supported. Of course, it might just be snapped in the slump itself. I once walked by a large wall display of long range side scan sonar in a civilian agency and started muttering little curses. The person I’d come to see asked what was wrong. I couldn’t explain and said something about wishing I’d had this sort of information years ago. About five years before I’d been heavily involved in surveying a new route that had become troublesome. There on the wall was a picture of why. If we’d had those big pictures the route would have been moved to avoid a "slump rich" zone – then "if pigs had wings".

SOSUS operators enjoyed a system built by a rather amazing program and lots of people – knowing and unknowing. I still have some guilt feelings about lying to crewmembers on the USNS ships at times. The natural interest in the island we were passing at the time had to be answered with "I don’t know", when they know and I knew that I did know. We had the charts down below in the restricted spaces. Those people who manned the CAESAR Fleet, both USN and civilian, unknowingly (at least officially) deserve a sort of special thanks. They suffered riding a ship to nowhere without knowing where they’d been, the islands they’d seen and at times at some personal expense to provide us a survey platform. Those of us who knew what we were doing at least had some satisfaction of knowing we were building what I still believe to be one of the best "bangs for the buck" of the Cold War. The story of the CAESAR Fleet and its survey and cable operations is really the story of modern deep ocean survey development.

Mr. Ramon Jackson was an oceanographer/bathymetrist at the Naval Oceanographic Office working with WECO/AT&T on Project CAESAR bathymetric surveys. He sailed aboard most of the CAESAR Fleet ships. He retired from what is now the National Imagery and Mapping Agency in January 1998 and resides in Northern Virginia.
Naval Undersea Museum
Keyport, Washington SOSUS Exhibit

By Ted S. Carlson, DPM, JD

Dear Ed:

I am writing to follow up on our e-mail correspondence concerning the SOSUS exhibit. Enclosed are pictures to coincide with the visit. I hope they provide something to reminisce about. I loved the exhibit, even though I wanted to see more.

A friend of mine works at the Naval Undersea Warfare Station at Keyport, Washington. He informed me of the SOSUS exhibit being displayed at the Naval Undersea Museum, which is located on the navy base.

We met outside the Naval Undersea Museum late one afternoon to view the exhibit. I was truly excited about seeing anything that would revive memories of all the years spent in this rating. In seven years, I had been assigned every possible position, starting as a reader and on to plotter, supervisor, watch officer and post analysis (PA).

The Naval Undersea Museum is a beautiful structure. We entered to the hushed sounds similar to that of a library. I immediately began looking for anything to direct me to the SOSUS exhibit and finally had to ask the volunteer at the reference desk. She had never heard of such an exhibit, and we could not find any literature or signs for direction. A best guess sent us to a small room, and around the corner was my first encounter with SOSUS in almost 25 years. A sign stated:

“SOSUS, The Navy’s Ears in the Sea”

Around another corner and there we were. A small room with maps and plaques describing the initial attempts at starting the program. I started taking pictures, but wanted to see more. One more turn around another corner produced the “beams.” I was in heaven!

I started explaining to my friend how the beams worked and what a typical display room looked like, all the while wondering why this was not still classified. I explained how we tracked targets using a TARF and how the “grams” displayed such targets. My friend listened politely. He wanted to see the torpedoes in the other room.

I read the plaques and touched the beams and reminisced about a very big portion of my life until the museum finally closed. Before leaving, I snuck behind the security ropes that were placed to keep the public a certain distance from the beams, and had my friend take a picture of me leaning on a beam.

Upon leaving the museum, we met Barbara Moe, the curator of the facility. I explained my interest in the SOSUS exhibit and she explained that the museum was promised some unannotated grams, but never received them. I told her about the alumni association, and she was very interested. To that extent, I submit the following:

Naval Undersea Museum
P.O. Box 408
Keyport, Washington 98345
(360) 396-4148

This exhibit only lasted a month and is now in storage for some future use. I was discharged in 1973, so I have no idea what the changes were after that time. Jim Beckett, who remained in the Navy and SOSUS, told me years later that I would not even recognize the display room with all the changes. To that extent, I’m glad there were no updated versions of SOSUS at the museum, not that I would recognize them.