My View—
Submarine Development Group TWO

By Frank Andrews (1962-1964)

May 1999 is the 50th anniversary of a hugely successful effort of the US, Post WWII, Submarine Force. It was born the “DevGroup” but changed its name to “DevRon” when it started to become famous. Hanging in there for 50 years, still going strong, and still contributing. These are reasons enough to look back, celebrate, and look forward.

Origins

In 1946, many—mostly aviators and black shoes—thought the Submarine Force no longer had a mission. After all, the Soviets were building submarines not surface ships, and every body knew submarines could not sink other submarines. Indeed, the Battle of the Atlantic in which as many as 700 or so German U-Boats were sunk by US-Allied forces, was strictly an aviator and surface ship triumph. US submarine efforts in the Atlantic were near zip.

On the other hand, US submarine action in the Pacific against the Japanese was simply superb. Hard to argue with the destruction of more than two-thirds of all Japanese shipping by maybe 1% of US Naval forces. But sorry! In 1946, we will fight Russian subs on all oceans but with the techniques of the “Battle of the Atlantic” not the “Pacific”.

Thus there were two challenges for the sub tigers just back from a monumental naval victory in the Pacific. The first—and with only a hand full of stripes to fight back—was tough opposition from the Surface and Air Admirals in the US Navy. The other was from Mr. Joe Stalin, Soviet Admirals, and their run for world hegemony.

The first Commodore of the DEVRON was Captain Roy Benson later COMSUBPAC. I talked to him in 1982 to obtain his input for an article requested by Bill Ruhe, Editor of the Naval Submarine League Review.

Adm. Benson told me that a most important group in early 1946 was the Submarine Conference in OPNAV. The Conference had, in fact, been established in 1926 to bring recommendations directly to the CNO. Discussions in 1946+ centered on new missions and new type submarines. Conference ideas lead to the conversion of Fleet Boats to Guppies, to an SS Oiler design, a Radar Picket, a Troop Carrier and SSKs. New Construction, too. The Tang class was pushed as was the small SSK-1 meant to be mass produced with the latest in sonar and fire control equipment. Nuclear Power and Hydrogen Peroxide Power were subjects of major interest. Also discussed and later tried out were the SST (target and training), the X-1 (midget harbor penetrator), Albacore (single screw, body of revolution), and the SSG (guided missile launcher).

Adm. Benson said “Gin Styer, the assistant to OP 03, presided over the Conferences. Vice Admiral Lockwood, ComSubPac for most of WWII attended. Other attendees included Rear Admiral Jimmy Fife, John Scott, Carl Hensel, Dave White, Joe Grenfell, Rear Admiral Swede Momsen Sr., and Dan Daspit”. In those days Op 31 was the only submarine designated group in the Pentagon. Daspit would be a Captain USN as would the above named conferees except Styer, Lockwood, Fife and Momsen. The latter two in 1946 were making ready to leave for New London and Pearl respectively.

There might be 75 or more submariners attending the conference meeting each month with maybe 10 from OP31 and the rest from various non submarine jobs scattered through out the Pentagon or even coming in from the Fleet. OP 31 would usually have the lead in initiating the agreed upon action.

In a later Oral History for the Naval Institute, Benson talked more in detail about his own actions that led to a Fleet based Submarine Development Group. In 1947, RADM Fife left Washington for New London to become COMSUBLANT. He took Benson with him to be the New Development Officer on his staff.

In 1948, Benson sold Fife on the idea of a special Development Group of four submarines to work with the Under Water Sound Lab (USL), Woods Hole Oceanographic Institute, and any other scientific crowd Benson could encourage to visit and help. His mission was to devise means for countering the Russian buildup in submarines. His method was to use the group as a sea going test bed with solid technical support from the best brains in the Nation he could contact, especially USL right down the Thames River.

Fife bought in and sent Benson to OPNAV to sell the idea as a precursor of a formal letter to CNO recommending action. Over several days of visit, Benson found universal agreement amongst the submariners there, was told no letter is necessary and that the CNO would immediately sign out a directive creating a Group in New London and one in the Pacific. This must have been the origin of Project Kayo telling the Fleet to set up means to “solve the problem of using submarines to attack and destroy enemy submarines”

Keep in mind the relative youthfulness of these Submariners leading the post WWII Sub Force in new directions. For example in 1946, Grenfell (class of ‘26) would be 20 years in the Navy; Daspit (class of ‘27) 19 years; and Benson (class of ‘29) 17 years. And these men were really the old timers in the Submarine Force at the time having been the war patrol skippers in the first years of WWII.

Backing them up, working somewhere behind the scenes, were in fact the real WWII tonnage skippers out of the Classes of ‘31 like C.C. Kirkpatrick, Ramage, and Barney Sieglaff; or Pete Galantin ‘33 or Rueben Whittaker ‘34 or a large group of double or even triple Navy Cross people of the Class of ‘35.

Think of it. In 1944, the Class of ‘35 would have had nine years in the Navy as they came to command. Names in the Class of ‘35, like Cutter, Dornin, Maurer, Fluckey, and many more will always be part of Naval Submarine history. And this does not begin to mention others like Rindskoff, Dave Bell, Street and many other Navy Cross skippers in classes after ‘35.

Bottom line! This young and junior gang that sunk two thirds of all the Japanese shipping in the Pacific was not about to be told in 1946 by anybody, especially Air and Surface Admirals, that US submarines no longer had a mission.

USS K-1

In fall 1950, I received a set of orders as PCO of the new construction US K-1. It was to be assigned to the DEVRON on commissioning and was to be my introduction to the unique culture of this organization.

K-1 is a story by itself but all part of Project Kayo and derived from the 1946+ meetings of the Submarine conference in OPNAV. In his Naval Institute Oral History, Benson gives RAdm. Momsen credit for being the lead conferee in pushing the K-1 design through OPNAV.

The Submarine conference was stimulated greatly by the German Type XXI submarine design. Thus followed the array sonar, the snorkel, and thoughts about mass construction, and a streamlined hull.

Commander Hank Arnold, a Submarine EDO and class of ‘37, was the Navy member of a US team that went into Germany a few days before VE day. He told me that the group’s purpose was to locate and document military R&D efforts of Nazi Germany. Details about the Type XXI were one of his group’s discoveries as was the German study of heavy water. This Type XXI was motivated by Admiral Doenitz’s discouragement in 1943 with the major losses of his Type VII and IX boats. In late 1943, a group of first class German ship and weapon designers were assembled for months in a secluded mountain area with funds and orders to do something. They did so and the Type XXI was the result. It became operational in 1944. It was semi mass - constructable, had a stream lined hull and superstructure, a super size battery and array sonar and a snorkel.

By war’s end in 1945, 119 of these boats had been completed. None ever made an effective operational patrol because of difficulties with hydraulically operated equipment like periscopes and diving planes and the like. Designed speeds were 16 to 18 knots (hour rate). One of the Type XXIs was delivered to the US for operational test. This information plus that from Arnold’s group made a significant impact on the thinking of the Submarine conference in OPNAV.

K-1 joined the DEVGROUP in 1951. The boat was meant to be mass constructable following the idea of the Type XXI. Hence the letter- number on the hull instead of the traditional fish name. It had a crew of about 40, four tubes forward, three small diesel engines, a length of 196 feet, and maybe 8 knots max on the surface and submerged. The diesels were actually the type used as the auxiliary diesel on a Fleet Boat.

The main thing K-1 brought to the DEVGOUP mission was the first operational large passive array sonar- called the BQR4. It was built by EDO Corporation and meant to be an improved mimic of the bow array found on the Type XXI sub. On its first real Fleet exercise off Bermuda, snorkeling Halfbeak was picked up at 30 miles and tracked for 4 hours before simulated attack. And this at a time when operators knew nothing about Convergence Zone propagation. We did understand reducing self-noise, had a “rig for Ultra Quiet “bill and regularly practiced hovering. In Ultra quiet, every thing was turned off except the master gyro and a small lube oil pump used for lubricating the main motors. The boat was hot but very quiet. And we knew nothing about the CZ.

Lack of mobility eventually killed the K-1 class. On exercises in those days, all the Guppies or regular fleet boats would be along side by Friday at 2PM. K-1 would be in at 11AM on Saturday. Also the boat was in no way mass-constructable.

For myself and the rest of the wardroom, we received a great introduction to the culture of the DEVGROUP established by Roy Benson. That culture concentrated on an open door for all members of the scientific community and industry, a willingness to test out any new piece of equipment at sea and much time spent planning and executing full scale exercises. Close liaison was maintained with the British, who were keen on proper exercise data taking and analysis. And ADMINs were practically unheard of.

Later when I came back as Commodore, I was to learn more about the significant ASW sponsored research effort taking place in the Universities, in the Government Labs and in Industry. The Office of Naval research (ONR), a Committee on Undersea Warfare of the

National Academy of Science(CUW) and BUSHIPS were major players in designing an all around navy to cope with the ever strengthening threat of the ever increasing numbers of Soviet submarines.

Some other details about K-1 in 1951. The assumed target of the day was an eight knot snorkeling, cavitating transitor. Even so the fleet boats in the DEVGROUP with their JT sonar were detecting at maybe 9000 to 12000 yards. K-1's sonar was a broad band detector. Spectral analysis was later adapted from SOSUS work but used a paper plotter to show the line structure of a target. The Spectral Dynamics digital equipment did come along until after1963. All elements in the BQR4 were analog. Classification was by "nature of Sound" Sonar operators with good ears were valued people. We had one who was terrible ashore and we did hold up getting underway several times to manhandle him aboard. Wrong probably, but right for us.

Finally we had access to all the "bearings only" fire control techniques. This included Lynch, Speiss, and Clearwater plots. And the Time-Bearing plot was a major tool. If the Bearing rate started to increase to like 5 to 8 degrees per minute, he was close so get ready!

On K-1 , Joe Callahan'46 and Jimmy Carter '47 worked up the basis of the later -to- be- called Ekelund ranging Plot. We would head toward the target then across the line of sight to lead the target. Joe Callahan worked out the Math and Carter ultimately submitted the finished product as a "Qualification for Command Paper. A few years later, Joe Ekelund, as a Sub School Instructor, independently discovered and proved out the whole idea. I talked to Joe many years after. He had never seen the Carter paper. Joe deserves all the credit for the contribution since he did an excellent job of proving the method and training the whole Sub navy to use it. And Jimmy Carter made out OK.

I left K-1 in 1953 to go command of Harder, then to the David Taylor Model basin as Submarine Project officer. Here I met and became close friends with Marvin Lasky, a civilian scientist who was to be a major player in ONR's role in Propagation studies, in Noise reduction studies and in the introduction of the towed array into the Fleet.

At my time at DTMB, noise reduction studies were just starting. Lasky's main project was looking at quieting possibilities that might derive from the single screw Albacore. Lasky and I made several sea trips with Jon Boyes who was then skipper of Albacore. It was Jon Boyes who convinced war time skippers like Slade Cutter that a single screw sub made sense for high speed submerged performance.

Two Years as Commodore (1962-1964)

This section is the one requested by Bruce DeMars and Bill Browning. I was able to contact Jim Bellah, Art Gilmore, Cal Turk and Herb Crane for input. I would have liked to contact Sam Francis, Dan Bailey, Peter Hamilton-Jones RN and Art Jerbert also but time ran out. Actually Jerbert retired from the Navy within two months or less after I arrived, but the TAG that was sold on my watch owes much to him and Robin King RN -both of whom worked for my predecessor, Jim Zurcher.

My list of major happenings with much help from those named above for both the historical compilation as well as the accomplishment at the time follows-

1. Creating a Tactical Analysis Group (TAG). Exercise Analysis was being done in all earlier eras but the job was getting too much for hand techniques. Also Officers with Op Analysis training were becoming available. Charlie Woods, later DevGroup Commander

was in OPNAV at the time and with support from his boss, RAdm Jack Maurer got BUPERS to provide the billets.

In my time and before, much good exercise analysis took place and we did do barrier exercises to collect data for the various elements in the Weapon System Effectiveness (WSE) equation. However under Mike Moore, who relieved me, the Big Daddy series of exercise really took off. Sea data on Sub vs. Sub, collected rigorously and realistically, was to make a major impact on the McNamara people in Washington.

The first TAG leader was Big Don Whitmire, an all American football player before he came to the USNA. Hence the name “Big Daddy” exercises.

2. Measuring L-sub-S and calibrating the BQR2. Submarines were not collecting Sound Pressure Level (SPL) data in 1962. Considerable development had taken place at USL before this time, including the basics of calibrating the BQR2 sonar.

Commander Sam Francis, staff sonar officer on my tour, put together a manual for measuring Ls which was promulgated as the way for the operators to execute the action. I remember making a visit with Sam and Dennis Wilkinson, OP31 over to NISC to discuss the matter. At the time they had done very little thinking on the matter. The introduction of the methodology was a Sound Lab and DevGroup project. Art Gilmore was staff sonar expert and was heavily involved in this and a multitude of other DevGroup sonar considerations

3. Torpedoes. DevGroup produced the first firing doctrine for the Mk 37 torpedo. Firing scenarios were tested using the simulation programs available at Electric Boat. The WetHen Plotter was devised by the UK officers affiliated with DevGroup and further refined by the DevGroup (Cal Turk and Herb Crane). The device was manufactured and distributed to the Fleet by the Group.

DevGroup was also called upon to analyze under ice firings of the Mk 37 and some firings at Dabob Bay associated with sea surface capture of the fish.

4. Barrier Exercise data for OP 03 to sell the 687 class. Data collected over the past 6 years, was put together as best we could given the different conditions existing when it was collected It was mostly on SS vs. SS. But some was available from Tullibee and Thresher OPS.

This started out as a matter of our local interest as simply a part of the DevGroup’s mission. But then SubLant in Norfolk and OP31 in Washington started to take a serious interest. The fight for funding the SSN 637 class was underway. The data gathering continued and I was to make several presentations in OPNAV. The reports were well received because little analyzed data on SOSUS, or VP aircraft or Surface Ship versus Submarine existed at the time. DevGroup and Squadron 10 then became involved in a major report described in the next item.

5. Preparation of a 637 Report to support selling the 637 Class. DevGroup and Squadron Ten were tasked to examine submarines against transitors, intruders, and as trailers or surveillance OPS and as Carrier task force escorts. Squadron Ten covered Trailing and Escort OPS They had the experience—limited as it was—on the Skate and Scorpion class under their command.

The report turned out to be a major effort coordinated by my class mate Norm Nash out of SubLant Norfolk. Many man hours were spent in the lower base headquarters talking with Hank Hannsen from Squadron Ten and our own people. Bo Coppedge was the coordinator from OP31 and Denis Wilkinson as OP31 was probably the 2 star leader in OPNAV to put it all together for the big pitch to whomever.

6. Sonar equation manual with data. In 1950 Captain Barney Sieglaff put together a DevGroup briefing team to visit the entire submarine force and elsewhere in the Navy. His goal was to sell Sub vs. Sub. My classmate Charlie Bishop was Barney's Sonar officer and would attempt to teach the sonar equation to the attendees. It was a new concept. Many never did learn the meaning of its terms and some would take a long time. The notion of decibel was particularly had to grasp.

On my arrival in DevGroup, Art Gilmore taught me the Equation and how to use it to predict detection ranges if one had the right input numbers. And Sam Francis had the numbers. He put them in a loose leaf notebook called his wizard book. He had obtained the data from the USNUSL people and the secret SAD (Sonar Acoustic Data) report by Urick and Pryce.

We all agreed it was high time to promulgate an Operator's Sonar manual for use in Range Prediction. Marvin Lasky of ONR sponsored a well known acoustician, Wysor Marsh at Raytheon, to work with Sam to write the Manual. It was first issued as DEVGROUP 1-62. It was simple to apply and best of all it had real data on the JT, BQR-2 and BQR-4. I think it might have been one of the forerunners of the out standing submarine Naval Warfare Publication Series started later on by Bob Austin.

7. Thresher Search. On 10AM, April 14, 1963, a three officer meeting was taking place on the waterfront in SubRon Office spaces. Present were myself; Sneed Schmidt, Com SubRon2; and John Dacey, ComDesDevGroup from Newport RI. In came the duty officer to report—Thresher was down and in trouble. It was off Portsmouth on its first sea trials after a nine months post shakedown availability in the Naval Ship Yard there.

Red Ramage, DepComSublant, was sent immediately to scene on a Destroyer out of Newport. A flag officer on site was deemed most important. Within 24 hours I was sent out to relieve him. It look liked a loss with all 129 people in 7500 feet of water. My job was to take over the search for the hull there 220 miles east of Cape Cod. A Board of Inquiry was soon formed in Portsmouth chaired by Vice Admiral Count Austin, former President of the Naval War College at Newport.

There were two summer search operations conducted with myself as Task Group commander. All the debris was finally located and photographed.

Art Gilmore was on the Staff of DevGroup and went with me the second summer to be Chief Staff Officer. Jim Bellah took over the DevGroup while I was away and most importantly looked after all of the many concerns and problems of dependents.

Art Gilmore wrote these words for this paper. "This was an unfortunate but necessary phase of CSDG2's work. The fact that Thresher was located at all using the crude equipment that was available in 1963 had important long term National Security implications. The 1963 effort to find Thresher brought many concepts and ideas to the fore and provided the seed for future underwater search and recovery efforts. Some of these results are now appearing in books such as "Blind Man's Bluff."

Catholic University (CUA) and its Graduate Acoustic Program (1964 - 1981)

I retired from the Navy in 1964 and joined the Engineering Faculty at Catholic University as a Professor and Manager of the Acoustics graduate Program. Catholic University's program was largely education. It was initiated because our Physics department was getting out of the business of applied acoustics and more interested in fundamentals of nuclear physics
More important for this DEVGRU/RON history is the story of the post WWII transition of the efforts by WWII National Defense Research Committee (NDRC) and its Undersea Warfare Division into follow on organizations and efforts.

In 1962, as DEVGROUP Commander, I was unaware of this history. After coming to CUA I found that all Government Labs (NEL, NUSC, NUC, NADC Johnsville) and University Labs (Univ. of Washington, DRL Penn State, DRL Texas, Harvard, UCLA, MIT) and Oceanographic Institutes (Woods Hole, Scripps, Univ. Of RI) had developed from roots in the WWII efforts of the National Defense Research Committee, Undersea Warfare Division.

A Committee on Undersea Warfare (CUW) of the National Academy of Science and the Office of Naval Research (ONR) were formed almost immediately after WWII's end to take over from NDRC.

Much of the success of the post WWII ASW effort of American Submarines is based on this significant focus by civilian scientists on the problem of sinking submarines. The DEVGRU/RON was both the recipient and contributor to those civilian organizations involved.

Recipient because of techniques furnished by the scientific community on noise quieting (sound mounts, acoustic filters, balancing techniques); signal processing for sonar (spectral analysis and multi beam digital steering); towed and hull array transducer design; acoustic torpedo design; hull and propeller design and quieting; propagation loss studies (bottom bounce, convergence zone, shallow water effects), digital fire control systems.

Contributor because of the real world experience and data the Group was able to give to the Scientific people.

The development of nuclear propulsion is a separate story from all this above as all nuclear trained officers appreciate. With the advent of nuclear power a new and major dimension was added to submarine mobility and independence of the ocean surface. Nuclear propulsion dramatically changed naval warfare as did sail then steam in yesteryear.

I also learned about the Journal of Underwater Acoustics (JUA). It is a major publication of classified papers by civilian groups. It is sponsored by ONR and has been in existence for as long as the DevGRU/RON. Craig Olson, Skipper of Hardhead in the DEVGRU/RON 1963 is now the Editor of this publication.

In the JUA, one will find eight articles by Marvin Lasky covering the history of Undersea Acoustic developments from 1916 to about 1980. Any researcher on the subject of Submarine versus Submarine Warfare would learn much from Lasky's reports. Lasky was given two civilian "Distinguished Scientist" awards for his work in ONR in bringing Towed Arrays into being.

Summary

1. In the beginning (1946 Post WWII) for the Submariners, the enemy was gradually identified—The Soviets because of their big submarine force build up and the rest of the Navy from the usual competition for defense dollars.

2. Using the Submarine Conference in OPNAV, young vets of a huge WWII success in the Pacific campaign commenced moving with great energy and fore sight taking full advantage of German innovations. Their goal—to make submarines useful to the mission of the US Navy.

3. ONR and the CUW replaced NDRC after WWII. The two former groups provided the applied acoustic research necessary for solving the sub vs. sub problem.

4. Project Kayo was initiated to match at sea experience with Tactical Development. Prototype and Brassboard model of equipment could be tested at sea.

DEVGOUP/RON became a center of Fleet tactical thinking for Submarines. As the first DevGroup leader, Roy Benson was a key contributor, but so were many other submariners.

5. The early DEVGRU/RON attitude of open shop and tell the truth based on sea trials was established by Captain Benson and has been maintained over the years.

6. K-1 was a good try. It introduced and quickly showed the effectiveness of the Hullmounted arrays for long range detection and aural classification. Its lack of mobility killed any follow up. It was not mass constructable.

7. DEVGRU/RON 1962 - 1964. Big items were: Creation of the TAG, Measuring SPL, Mk 37 Tactics, Barrier exercise data, SSN 637 study for OP31, Sonar equation manual, Thresher search.

8. Fifty years of really significant progress by the Submarine's DEVGRU/RON came in many steps with each one building on the contribution of the segmented pasts.

Comment on a Future US Submarine Force Contribution

I was privileged to be invited to a briefing by Jerry Ellis ComSubPac in November 1997 in Lockwood Hall. It was for the retired Submariners in the area. I was out in Pearl with my wife visiting our daughter who is married to a CEC officer.

RAdm Ellis talked about the need to spread special equipment and assignments for mission development to individual boats and squadrons through out the Force. He had two reasons for this action. One was some uncertainty of the likely enemy targets and the other was funds.

Recently, I looked over a book by Pete Galantin, a very successful WWII sub skipper and former Four Star in charge of NAVMAT. The book's title was "Submarine Admiral". It is his history of his time in the Navy.

It was interesting to see the similarity between the two views; one post Cold War and the other post WWII.

From RAdm Ellis I heard diversity of equipment and missions such as mine field penetration, missile ops, coastal sub targets, escort of SAG and carriers, surveillance, deep submergence, and open ocean attack.

From Adm Galantin I read that the Submarine Conference idea lead to the conversion of Fleet Boats to Guppies, to an SS Oiler design, a Radar Picket, a Troop Carrier and SSKs. New Construction, too. The Tang class was pushed as was the small SSK-1 meant to be mass produced with the latest in sonar and fire control equipment. Nuclear Power and Hydrogen Peroxide Power were subjects of major interest. Also discussed and later tried out were the SST (target and training), the X-1 (midget harbor penetrator), Albacore (single screw, body of revolution), and the SSG (guided missile launcher)".

For the post WWII submariners, the SSK mission soon emerged as the primary one for attack boats. And the Polaris mission came forth too. But not in terms of cruise missiles.

I think the best future strategy is to hang in there and try lots of things. Eventually the primary direction will emerge.

There certainly is as much brain power and heart around today in the Sub Community as there was in 1946. I would expect the same future success as that produced in the past.