

UNITED STATES NAVY

SUBMARINE DEVELOPMENT GROUP TWO

AND

**SUBMARINE DEVELOPMENT SQUADRON
TWELVE**

**A ROYAL NAVY EXCHANGE
PERSPECTIVE**

1955 TO DATE (2007)

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**A REPORT UPON THE LONG ESTABLISHED RN OFFICER EXCHANGE POST
IN THE USN SUBMARINE DEVELOPMENT GROUP TWO / SQUADRON TWELVE.**

Introduction.

In January 1949, following representation from the Commander US Submarine Force Atlantic Fleet, the USN Chief of Naval Operations directed that "Fleet Commanders assign one division in each fleet to the sole task of solving the problem of using submarines to detect and destroy enemy submarines. All other operations of any nature, even type training, ASW services or fleet tactics shall be subordinated to this mission". Submarine Development Group TWO, consisting of four submarines, was created at the Submarine Base, New London, Groton, Connecticut; its Commodore reporting to COMSUBLANT. Direct liaison with the Naval Underwater Sound Laboratory and other technical facilities was authorized.

A Royal Navy (Submarine) Exchange Officer, Lieutenant Commander A.M.B. Buxton, was assigned to SubDevGruTWO in 1955 as an operational analyst and the post has been filled continuously to mutual US/UK advantage ever since. In February 1963 a Tactical Analysis Group (TAG) was established within SubDevGruTWO to "pursue a unified ASW tactical analysis program in the Submarine Force" and the RN Exchange Officer was incorporated into it.

In May 1977 SubDevGruTWO was redesignated as Submarine Development Squadron TWELVE and its development tasking continues into the 21st Century despite major changes in the perceived threat.

In May 1999 a 50th Anniversary Symposium was held at the Submarine Base, New London reviewing the "Past, Present and Future" of submarine warfare and tactical development. The symposium was attended by 250 delegates including the current RN Exchange Officer and seven of his predecessors. A copy of the Proceedings has been lodged at the RN Submarine Museum.

Aim

The purpose of this paper is to record the liaison that has existed between the submarine commands of the Royal Navy and the US Navy through the activities of the RN Exchange Officers at the USN Submarine Development Group TWO / Squadron TWELVE.

Discussion

The history and accomplishments of the Submarine Development Group TWO / Squadron TWELVE were presented by its 1976-1978 Commodore (RADM Robert R. Fountain Jr. USN) at the 50th Anniversary Symposium in May 1999. He stated, "Very early on (ie early 1950s) the DevGru visited the Royal Navy at Londonderry to learn of their wartime experience with passive sonar. From this visit grew a close association which continues even to this day."

Within flexibly interpreted USN security limitations the Royal Navy Exchange Officers have contributed to the accomplishments of the DevGru/DevRon throughout the years from 1955 to the present. A list of the RN Exchange Officers is at Annex A. Sadly many of these officers have 'gone aloft' but several of the survivors have contributed their recollections at Annex B.

The original instructions to COMSUBDEVGRU TWO from the Chief of Naval Operations, dated 11th March 1949, suggested a procedure involving:

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| Phase I | Training: to operate sonar and reduce self-noise |
| Phase II | Determine sonar performance capability under various oceanographic conditions |
| Phase III | Solve the Sonar Fire Control Problem: passive and active ranging techniques. |
| Phase IV | Develop doctrine and tactics vs. submerged submarines |
| Phase V | Evaluate the capabilities of submarines vs. submarines. |
| Phase VI | Determine operational requirements for equipment for submarine vs. submarine mission. |

From the late 1950s, as diesel submarines were superseded by SSNs and, from 1960, as SSBNs joined the US, Soviet and British Navies, the task of the SubDevGru and, in the UK, the RN's Submarine Tactical Development Group (STDG), later Submarine Tactical Weapons Group (STWG), were more significant.

In the 1960s, DevGru's Tactical Analysis Group (TAG), including the RN Exchange Officer, was tasked:

- To develop tactics for submarine weapon systems of the new THRESHER class SSN
- To analyze all submarine ASW exercises, establishing common reporting and analysis techniques
- To provide analysis continuity from exercise to exercise and year to year
- To establish numerical definitions of submarine weapon systems' ASW performance
- To assist in uniting the SUBLANT and SUBPAC assault on the submarine ASW tactics problem
- To establish a simulation program to provide statistical answers to problems that cannot be answered from at-sea exercises.

The long running "Big Daddy" exercise program provided data for the SSN594 class ASW performance assessment that supported the SSN 637 class operational requirement. The ineffectiveness of the Mk37 torpedo against high speed targets was highlighted, causing the Mk48 torpedo program to be accelerated by two years.

Quoting Bob Fountain, "The 1970s encompassed the glory years of submarine ASW, passive narrow band and towed array sonars, the Mk48 torpedo, inception of the SSN688 class, and intensive reconstruction and analysis of real world encounters." These years saw the involvement of the DevGru in fleet exercises with staff members as Submarine Controller / Submarine Element Coordinator in fleet flagships pioneering the tactics for employment of SSNs in Integrated Escort / Direct Support of fleet units. The RN Exchange Officers were in the forefront of the development of concepts and tactics for SSN(DS) as a primary role for the 688 Class SSNs.

On 1 May 1977, with eight or more 637/688 class submarines assigned and their missions no longer predominantly DevGru associated, COMSUBLANT decided to change the name to Development Squadron TWELVE. Incidentally, this change removed the long standing confusion with Submarine Squadron TWO, also based alongside in Groton, and Submarine Group TWO, the local Base Commander; however, there was no other change in the structure or manning of the DevRon.

The 1980s brought digital combat systems and tactical missiles, increased emphasis on 'over the horizon' targeting and even closer fleet integration. The Royal Navy's SSNs with home-grown towed sonars and US sourced Harpoon missiles were involved in the tactical development, particularly for SSN(DS). Tactical land attack missiles (TLAM) elevated the requirements for communications interoperability still further, with the Royal Navy contributing hulls and TLAM missiles to exercises and joint operations in subsequent years.

The break-up of the Soviet Union at the end of the 1980s reduced the apparent priority of submarine versus submarine capability and many non-ASW specific tasks began to take precedence in SubDevRon tasking even as budgets and hull numbers declined. Again quoting Bob Fountain, the DevRon "labored mightily to be all things to all men" through the 1990s as technical change accelerated. In 1999 the mission assigned to SubDevRon TWELVE was "to develop the tactics and promulgate the tactical doctrine to conduct submarine warfare", a very broad remit indeed.

Within the DevGru staff in early/mid 1970s at least, below the Captain level of the Chief Staff Officer who doubled as Deputy Commander for Development, the command experience of the RN Exchange Officer was unique. In those times, the USN officers in the Tactical Analysis Group were diesel submariners with post graduate Operations Analysis qualifications. The TAG also included several very able civilians funded by the Office of Naval Research and was hugely supported by an expanding number of very competent contractors, including many ex-submarine officers. Close liaison with the Naval Underwater Sound Laboratory and the Naval Underwater Systems Centres in New London and Newport was maintained to mutual benefit. Sonar and fire control systems in assigned SSNs were regularly groomed by

laboratory technicians to improve performance and self-noise quieting. Regrettably, perhaps because of security clearances or lack of a duty free bar, the liaison between the officers of the SSNs and the TAG were not as close as in the RN's SSNs and its Tactical Development Group. For some years RN Exchange Officers were denied access to assigned SSNs on exercises and opportunities to visit them alongside were often limited. Access to the engineering spaces of US SSNs for RN Exchange Officers was taboo.

A major task for the Development Group/Squadron throughout its existence has been the promulgation of its conclusions and recommendations to operational submarines and also the submarine schools. In the mid 1970s the DevGru was given responsibility for the production, coordination, maintenance and distribution of the Submarine Tactical Library, the NWP-70 series. This 40 volume accumulation of fundamental tactical guidance in ASW Search, Approach and Attack, Direct Support, Acoustic Data, and Weapon System Employment Manuals, modelled on Reactor Plant Manuals, has kept the TAG busy. Many of these publications bore the caveat NOFORN (No Foreign Dissemination); however selective access, for instance related weapon system capabilities, was permitted such that the RN Exchange Officer was able to contribute much to the work despite some language differences.

For some, the language difference became most significant in the RN Exchange Officer's final report addressed to the UK Flag Officer Submarines but routed through the DevGru Commodore and COMSUBLANT. After two years writing documents for USN consumption, aided by an American typist, it was still a challenge to write a worthwhile report that would be fully understood by both USN and RN readers. Copies of these reports, dating back to November 1958 (by Lieutenant Commander Smith), are held by the current RN Exchange Officer; unfortunately levels of classification from Confidential to Secret limit access and quotation.

At least until recently the RN Exchange Officer in the DevGru/DevRon was the only "foreigner" actually serving within the USN submarine force. Since WWII, an exchange of US/UK submarine officer riders had been made for occasional operational patrols, and friendly relations were maintained at the highest levels of rank and security. The acquisition of DREADNOUGHT's nuclear power plant, the Polaris, Trident, Sub-Harpoon, and TLAM missile systems, and other specialist equipment has surely underpinned the understanding between the USN and the RN. It is believed that the US/UK special relationship, that is widely spoken of, has no closer link than in the submarine forces. The RN Exchange Officers in Groton have enjoyed it immensely, not least through the social life that blossomed in the village of Mystic as described at Annex C.

Conclusion

The RN Exchange post in the US Submarine Development Group TWO / Squadron TWELVE made a significant contribution to the ASW capability and success of operations of US submarines over the years of the Cold War. The experience brought home by the exchange officers has added to the competence of the RN submarine force and the good relations established have often proved valuable in subsequent jobs. As exemplified at the 1999 reunion, those good relations continue and are very much enjoyed.

Annexes

- A. RN Exchange Officers
- B. Commentaries by RN Exchange Officers
 - 1. Captain Peter Hamilton-Jones
 - 2. Captain Terry Thompson
 - 3. Captain Mike Everett
 - 4. Rear Admiral Jeremy Larken DSO
 - 5. Captain Don Mitchell
 - 6. Captain Richard Farnfield
 - 7. Commander Anthony Steiner OBE
 - 8. Captain Dan Conley
 - 9. Lieutenant Commander Iain Breckenridge
 - 10. Lieutenant Commander Ryan Ramsey
- C. The Social Scene

Annex A

Royal Navy Submarine Exchange Officers

Lieutenant Commander A.M.B. Buxton	1955 - 1957
Lieutenant Commander R.T. Smith	1957 - 1958
Lieutenant Commander P.R. Compton-Hall	1958 - 1960
Lieutenant Commander G.R. King	1960 - 1962
Commander P.N. Hamilton-Jones	1962 - 1965
Lieutenant Commander T.D.A. Thompson	1965 - 1967
Commander A.D. Turvill	1967 - 1969
Lieutenant Commander M.H. Everett	1969 - 1971
Commander E.S.J. Larken	1971 - 1973
Commander D.W. Mitchell	1973 - 1975
Commander R.H. Farnfield	1975 - 1977
Lieutenant Commander A. St.J. Steiner	1977 - 1979
Commander R.T. Best	1979 - 1981
Commander D. Conley	1981 - 1983
Commander D.R. Morgan	1983 - 1985
Commander A.P. Johnson	1985 - 1987
Commander D.J. Russell	1987 - 1988
Commander R. Dean	1988 - 1990
Lieutenant Commander G.C. Thomas	1990 - 1992
Lieutenant Commander J.S. Westbrook	1992 - 1995
Lieutenant Commander S.W. Garrett	1995 - 1997
Commander R. Allen	1997 - 1999
Lieutenant Commander C. Shepherd	1999 - 2001
Lieutenant Commander I. Breckenridge	2001 - 2003
Lieutenant Commander R. Lindsey	2003 - 2005
Lieutenant Commander R. Ramsey	2005 - 2007
Lieutenant Commander S. Walker	2007 -

Annex B.1

By Captain P.N. Hamilton-Jones, RN Exchange Officer, SubDevGruTWO, 1962 -1965

I joined COMSUBDEVGRU TWO in November 1962, just after the Cuban Missile Crisis. As I came into my office, the NOFORN notice was still pinned to the door leading into the office of the Operations Officer. It was taken down the next day and I was immediately made to feel welcome. I had met the Commodore, Captain Frank Andrews, before; he came to sea with us during my perisher six years earlier to find out how the RN trained submarine Commanding Officers.

My job title was Tactical Analysis. I was told to build on the good work done on the Mk 37 torpedo by my predecessor, Robin King, by concentrating on the rest of the weapon system. I had to plan the exercise (S/M vs. S/M), write the Op-Order, ride one of the submarines taking part, collect the records, do the reconstruction, and write the report. I had one Navigator's Yeoman to help with the reconstruction and I had plenty to do. I found I had a remarkable amount of freedom in how I planned the exercises, and in what I put in the report.

Our aim was not only to develop tactics for SSNs then coming into service, but also to collect data that would enable us to measure, as scientifically and objectively as possible, their effectiveness in ASW. Frank Andrews developed a mathematical model for Weapon System Effectiveness (WSE) based on the product of the probabilities of Detection, Classification, Ability to Close, and Kill. Simple enough, but in practice there were so many variables which could not be ignored, and with our limited resources it was going to take an awfully long time to come up with anything that was statistically valid. Reconstruction in particular was a long and laborious process. I had an interesting time working with consultants in industry and in universities attempting to find ways of speeding up the process with computers and simulators but progress was slow.

Tragically, during my time, we lost the THRESHER (SSN593) while on a deep dive post refit. I was not directly involved but almost everyone else in the Development Group was. The Commodore himself led the search. Naturally it caused a major disruption to our work.

In the meantime Robert McNamara, the Secretary of Defense, was applying his ideas on "Cost / Effectiveness" and was asking the Navy awkward questions about the effectiveness of SSNs. He wanted facts. It seemed the only outfit that had any data in any sort of organized form was the Development Group, and most of that was held in the filing cabinets of the RN Exchange Officer. Suddenly my job was being seen in a new light. The new Commodore, Mike Moore, said to me one evening, "You know you are acquiring knowledge and experience which would benefit an American officer". Not long after, I was joined by a Commander Don Whitmire (known by his contemporaries as Big Daddy) and two Lieutenant Commanders who had done an Operations Analysis Post Graduate Course at Monterey. So began the Tactical Analysis Group (TAG).

Other resources became available, including more submarines. We devised a new series of exercises aimed specifically at measuring WSE. I suggested we call them "Big Daddy"; Don Whitmire was rather pleased. The work of the Development Group had become very important; I knew that my successor would have a challenging task ahead.

I was lucky to be in the Development Group just when improvements in sonar and noise reduction were beginning to open up new possibilities for SSNs in ASW. It was a stimulating and exciting time to be there. I was given a real job to do, and was treated by the US Navy as far as possible as one of their own. I shall always be grateful for that.

Annex B.2

By Captain T.D.A.Thompson, CBE, Royal Navy, SubDevGruTWO, 1965 - 1967

Towards the end of 1964 I was in my second year in command of HMS Turpin, the last British submarine to be based in Malta, bringing her back to the UK, and due to hand her over to the Israeli Navy. I was then to find out as much as I could about my next appointment to Submarine Development Group TWO before sailing with my wife and three children to New York in the Queen Elizabeth in the New Year. There we were met by my predecessor at the Development Group, Peter Hamilton-Jones.

In correspondence Peter told me that the position he would be handing over to me, within the Tactical Analysis Group, was to develop quantifiable data for the SSN594 class submarines' projected performance in their primary war role of offensive operations against the Soviet Union's submarine force, to oversee the development of tactics, and to recommend improvements in equipment in light of the findings.

Having been welcomed by Commander Don Whitmire, Head of the Tactical Analysis Group, and the rest of his team, Cdr John Bothwell, LtCdrs Bob Tolg and Joe Kronzer, and the civilian analyst Maurice Fox, I settled down to reading myself in to the Big Daddy (Don Whitmire's nickname) Series Tactical Doctrine. This had been developed with a view to evaluating the ASW capability of the SSN594, Permit class, submarines that had recently been introduced into the USN. The class was complex and untried in war.

The methodology which the tactical doctrine established aimed to enable consistent data to be collected from open ocean exercises in order, over time, to build up a statistically sound data base which would be fed in to the conditional probability derived model for Weapon System Effectiveness (WSE).

WSE = The probability of detection x The probability of correct classification x The probability of successful approach to a correct firing position x The probability of obtaining an accurate fire control solution x The probability of placing a weapon or weapons in a position from which it/they should be able to sink the target x The probability of the weapon/s sinking the target.

The crucial importance of this approach was clearly demonstrated by the two large filing cabinets crammed with the reports of USN submarine vs. submarine exercises in the last ten years which could not be used in the statistical analysis because each exercise was individual and the variables were legion.

The Commodore of the Development Group, Mike Moore, invited me in to his office, and proceeded to tell me about opportunities for travel in the United States. After he had covered Washington, the Grand Canyon, and Hawaii, he said he suggested I take on the job of Assistant Operations Officer and go to see these wonderful places. Realizing that this post, currently filled by a Chief Petty Officer, was removed from the main thrust of the DevGru task, I decided upon a polite but unequivocal response. I said that as a RN submarine commanding officer I had been honoured to be appointed to a post in the forefront of tactical development. If my Commodore had decided that this post was no longer available, I requested that he inform the RN and I would be reappointed. Commodore Moore thanked me and I left his office with a feeling of distinct unease about the security of my immediate future. I could only continue to learn my way into the job which I believed I had. Fortunately there was much to be done, and little time for conjecture.

He did not mention the subject to me again until two years later. He explained to me that he held the view that my position within the TAG was a key one and that the experience gained would be of much greater value to the USN if it were held by an US Officer. He allowed that his view was not supported by those higher up in the command chain. I was happy to know that my relief's position was not to be in jeopardy.

Meanwhile the Head of the Tactical Analysis Group gave me the responsibility of Tactical Planning and Reconstruction Officer. The first part of the task involved planning exercises in the Big Daddy Evaluation Series and writing the operation orders. Each exercise had as its aim the evaluation of a particular part or parts of the ASW Weapon System Effectiveness equation. The idea was for a new exercise to take place at six week intervals. We had two 594s, TINOSA and DACE, in our squadron, as well as a call on others in

the Atlantic Submarine Force. Our own squadron also included older nuclear and diesel submarines which provided the opposition. Their aim was to simulate Soviet submarines, our likely wartime targets, with the assistance of the technical section of the Development Group. The exercises were as realistic as possible and conducted in areas environmentally similar to those in which we would engage the enemy in wartime.

The reconstruction part of my task was more mundane but of equal importance. The matching of the records and track charts had to be done manually, the reconstruction activity was overloaded and the complexity of planned exercises showed a large deficit. As the analyzed results were required as soon as possible a radical solution was required. I was given a team of over a dozen ensigns in the early stages of submarine training, had the task of training them and supervising their work in the reconstruction room. They were not thrilled at being used in painstaking repetitive work very different from their expectations.

Among the many exercises was the Mark 37 torpedo hit shot program. Analysis of previous Big Daddy exercises had revealed a weakness. Normal safety considerations dictated that, as all the exercises were free play, torpedoes had to be fired with a depth separation from the target. We were already concerned for the Mk37's performance against high speed targets and became further concerned that the torpedoes, fired against periscope depth targets under normal exercise constraints, were not subject to the realistic challenge of sorting out the target amongst the clutter of returns from waves. We suspected that the results to date were over optimistic. The problem was to design an exercise in which all the submarines would be able to fire torpedoes without warning to impact on any legitimate target. As may be imagined my operation order came under a great deal of close scrutiny. Just as the Commodore was due to seek approval from the Deputy Commander Submarine Forces Atlantic events took a dramatic turn.

Commander Don Whitmire, Head of the TAG, was admitted to hospital after a suspected heart attack and the Commodore asked me to accompany him to Headquarters and to present the case for the exercise. The Admiral and his staff subjected us to a grilling but the project was approved.

A few days later Donald Boone Whitmire's heart attack was re-diagnosed a gall stone problem and he returned driving a new Cadillac sporting a DBW1 plate. It was soon christened the Damned Big Wagon!

The hit shot programme was a great success. It highlighted specific torpedo problems and resulted in the instigation of a rapidly and robustly funded improvement programme, including the acceleration of the Mark 48 torpedo program by two years. By this time the whole approach of DevGru TWO to evaluating the ASW capability of the SSN594 Class was exciting great interest, the Commodore plus selected (understandably American) members of the TAG were summoned to Washington to present the results to the Secretary of State for Defense, Robert McNamara. About a week later a team of PhD's descended on the DevGru to verify all that had been presented. The Reconstruction Room became the scene of even more intense activity. Narratives, track charts and every sort of record were resurrected from storage, checked and counterchecked. We did not wait long to be told that the inspection had been successful.

The aftermath in the corridors of power was probably the acceptance of the SSN as the major ASW vehicle and approval for the SSN637 Class building program. In the DevGru the impact which the presentation had made in the Pentagon manifested itself in the number of surface, air and scientific groups which came to hear how we carried out the evaluation program, with a view to instituting something similar.

There was still much to be done so that when my relief, Alan Turville, arrived in March 1967 I felt happy that he had a challenging, immensely enjoyable and, as far as these things can be known, secure appointment. For my part I felt, and still do now in 2002, that there was no other appointment I would have preferred at that stage in my career. I hope my contribution was of value. The United States Navy recognized it in the form of commendations from The Commodore of the Submarine Development Group and The Commander of the Submarine Force, United States Atlantic Fleet. I was also privileged to be included in the Secretary of the Navy's Meritorious Unit Citation awarded to the DevGru for its work in the period I served there. I was authorized by the United States Department of Defense, but forbidden by RN rules, to wear the Ribbon thereof. C'est la vie!

Annex B.3

By Captain M.H. Everett, RN Exchange Officer, SubDevGruTWO, 1969-1971

I took over from Alan Turville as the Reconstruction Officer within the TAG, responsible for providing data for the FADAP programme using teams of ensigns on temporary assignment. I also broke new ground by becoming the project officer for the SUBASWEX using USS SKATE as the high speed target.

By the end of 1969 security restrictions were hindering my ability to contribute effectively. I therefore wrote to Commander British Navy Staff (Washington) through the US Chain of Command requesting that I be granted clearances I had held in the UK. VAdm Wilkinson (COMSUBLANT) held my request for about two months until the right moment to approach Adm Clarey (VCNO) for approval. When that had been obtained, fortunately after I had been able to spend time refitting my 24 foot Dolphin yacht, my employment changed dramatically.

I became the project officer for the new Submarine Escort programme with virtual freedom to get it off the ground. There was much scepticism and the Brit was the right man to put in charge on the grounds that success would rub off on the DevGru but failure would be down to the Limey! I appointed an ensign as my staff officer who rode with me.

The first exercise was conducted with a DD from Orlando by myself and a Chief Radioman using an SSN operating in geographic grid squares against another SSN. 48 hours of permanent watchkeeping! This was judged to be a success and was followed by a much larger exercise involving USS WASP (ASW Carrier) Group and again two SSNs. I set it up and held the TAG Director's hand in the Operations Room. The exercise had to terminate 36 hours early when the Admiral came to me and admitted his aircraft could not maintain the promised level of operations!

The third exercise ran from Norfolk with a DLG, a few destroyers, and SSNs. All these exercises used fixed geographical grid squares for moving SSNs. During this exercise I transferred to an SSN for two days and passage back to Charleston.

Throughout I had the opportunity to visit SSNs alongside, particularly PARGO, STURGEON and TREPANG. In PARGO's case I know I helped the CO to retain his command!

During my underemployment I used SSBN off crews to develop approach tactics for their Mk 37 torpedoes. This was most enjoyable and the development methods used were adopted by the Mk 48 project officer (with whom I had 'no official contact').

The two years were a unique opportunity to engage with the USN in a meaningful way, contributed to any success that I had later in STDG/STWG and subsequently in CTF345 and CUWA. This was entirely due to the trust built up and the real friends I made which opened many doors later.

In summary the Submarine Exchange Officer Programme has been a great success and significantly contributed to better relationships with the USN.

Annex B.4

By Rear Admiral E.S.J. Larken DSO, RN Exchange Officer, SubDevGruTWO, 1971 - 1973

I took over from Mike Everett as one of four Tactical Development Officers. Head of the TAG was the impressive analyst, Commander Len Stoehr. My task was to take the lead in the Integrated Escort Program (IEP) as the USN Submarine Escort Program was re-designated about this time. During my second year I was also assigned the lead in the development of the Submarine ASW Search Manual.

Career patterns in the USN made the direction of a multi-asset program a daunting task. Mike had been a FF XO, and his success on starting the program opened a new era of confidence in the RN Exchange Officers. My own specialist 'skimmer' credential was as a General Service 'N' with relevant hands-on experience derived from the unsuccessful RN SSN/FF 'tethered' tactics using 2001 active sonar.

Within weeks I was seconded to the staff of Rear Admiral P R Crutchfield, ComCruDesFlotTWO, flying his flag in USSAMERICA, to run a major exercise from Norfolk VA to the Atlantic Fleet Weapons Range (AFWR) off Puerto Rico. Two SSNs (FLYING FISH and BERGAL - both from SubDevGruTWO) were to protect the CVA against an assorted opposition of SSNs and SSKs. The IEP had by now graduated to a system of moving geographic areas which did, however, depend upon everyone knowing position within one mile. I quickly learned that was not the case in many surface ships and certainly not USS AMERICA! This resulted in some interesting situations and vigorous interventions by the RN Exchange Submarine Controller.

The Submarine ASW Search Manual was based upon the need to pull together and carry forward submarine search practice. The foundation work was the Big Daddy program. Harnessing the impressive intellects and analytic capabilities of the civilian contingent, we drafted a manual of weighty content, whereby the searching submarine was obliged to engage in a form filling, deductive process computing propagation loss to optimize search - exceedingly difficult if not totally impossible under operational condition. Happily just ahead in time was the introduction of the early Hewlett Packard desk-top computers which were to turn this pioneering work into practical tools.

The low-point in the RN Exchange Officer's usefulness due to security constraints, which Mike had broken through, had been completely left behind. I was privileged with access to everything required on a sensible need-to-know basis. I also broke new ground in being invited to ride USS BILLFISH, a new 637 Class SSN, for several days towards the end of my exchange appointment. Another element of progress during this time was a thickening of the relationship with the Third Submarine Squadron at Faslane, including an exchange of visits between the Squadron Commanders (Captains Jack Fagan and Martin Wemyss). This coincided with the beginning of an extended period during which the USN was exceedingly generous to the RN with its cutting-edge submarine ASW technology, to mutual benefit in terms of RN intrinsic tactical abilities and original thinking with some of the kit and techniques.

My time with SubDevGruTWO proved invaluable some five years later when I took up appointment as Captain SM3, which included responsibility for the Submarine Tactical and Weapons Group (STWG) under the then Commander (later Rear Admiral) Paul Hoddinott. We were able to refresh my still-warm earlier contacts and persuade the RN to fund some high-quality civilian support to STWG, enhancing the RN's credentials as a worthy partner in submarine ASW development.

The IEP generally flourished. It became more complex, duly incorporating more and more sponsors, together with their cultural baggage and, with a measure of maturity, some corresponding symptoms of inertia compared to the heady early days. Business was a whirl of briefings, presentations, ecumenical brain-storming and procedure writing, and exercises - with all the travel associated. Rear Admiral Shepherd (ComASWGruTWO), flying his flag in the aging USS WASP based in Newport RI, became a leading seagoing trialist. The key element remained communications between surface ships and SSNs.

Annex B.5

By Captain Don Mitchell, RN Exchange Officer, SubDevGruTWO, 1973 - 1975

Having enjoyed the company of USN riders during COURAGEOUS operations, upon appointment to SubDevGruTWO I requested an opportunity to ride a US SSN. I had no idea that I was breaking new ground but was delighted to be invited to ride TREPANG conducting trials at AUTECH. En-route to join at Port Canaveral, Florida, an opportunity was made to visit the DevGru at Groton, mainly for domestic purposes. There I learned that my request and its approval had broken an existing ban on SSN sea riding and the incumbent, Jeremy Larken, had recently gained some sea time thereby.

Sadly the rented riverside house that had served as home to successive exchange officers had been sold from under Jeremy and he moved briefly to another, in High Street Mystic, that I then took over. In addition to many friends and furniture, I inherited from Jeremy an almost complete Submarine ASW Search Manual project and on-going responsibility for the SSN Integrated Escort Program.

Completing the Submarine ASW Search Manual proved an ideal learning curve. The USN officers in the Tactical Analysis Group were all post-graduate Ops. Analysis trained diesel submariners whereas I had had but two weeks on an OA course at Bristol University upon appointment. The capability of the sonar systems in USN submarines, including the towed array, was far ahead of those I had known as XO of COURAGEOUS but, as the only submarine command and SSN experienced officer in the TAG, I had some advantages too. I had generous support from staff civilians including a typist, whose machine simply refused to produce English; a mathematician loaned by the Office of Naval Research; and also from Analysis and Technology Inc. that had not long been established in Stonington by Maurice Fox and employed several sonar wizards. The manual's classification of SECRET NOFORN (No Foreign Dissemination) upon completion, provided much amusement and wider understanding.

The SSN Integrated Escort Program allowed me, as an observer, to ride a US frigate fitted with the latest in underwater communications kit as it attempted to control a 637 class SSN in the screen of a carrier. The weather was appalling, the carrier did its own thing, the surface escorts couldn't keep up and soon cared little where they, the carrier, or the SSN were and underwater comms had failed. The simple lesson I learned was that stationing an SSN relative to an undisciplined and unrestrained carrier was courting disaster. With the agreement of the Commodore (Guy Shaffer) and COMSUBLANT I approached COMSecondFleet with a proposal to change the rules to make the whole business genuinely geographic. From this initial approach the SSN Direct Support concept was created. The appropriate books were completely re-written, new terminology was coined, and the Submarine Element Coordinator (SEC) concept devised. The SEC, in the Task Group Commander's flagship, had to ensure ASW coordination. Tests were conducted in simulation and at sea. One specific test involved the USS AMERICA CVBG with USS MOUNT WHITNEY (2nd Fleet Flagship) in company and two 637 class SSNs in the Blue role being challenged by successive Orange SSNs as the force made a relatively high speed transit from Norfolk VA to the Iceland - Faeroes Gap. I rode AMERICA in the SEC role and enjoyed the proof of success in the subsequent analysis.

Another "success" was the initiation of an active sonar development program in cooperation with RN STDG. At the initial meeting in Groton, I represented DevGru while the USN Exchange Officer from Faslane represented STDG. The idea was to use RN 2001 active sonar experience to assist the USN BQQ-5 active search mode development and vice-versa but also to create closer co-operation between SubDevGru and STDG. I passed this project on to my successor, Richard Farnfield, q.v. Annex B.6.

Sadly I never did manage another US SSN sea ride during that appointment and made only occasional visits to SSNs alongside. Few of the other TAG members, officers and civilians, ever visited the boats either though most socialized with the sea-goers in the Officers' Club and at home.

Overall, the tour of exchange duty was immensely enjoyable in both professional and personal terms and my thanks are given to those with whom I served and among whom my family lived. The benefits continued throughout my subsequent career and into retirement with trans-Atlantic calls, mail and visits.

Annex B.6

By Captain R.H. Farnfield, RN Exchange Officer SubDevGruTWO, 1975 - 1977

I arrived with my family in Connecticut in March 1975 where I took over from Commander Don Mitchell. We moved into the house in Mystic, some 8 miles from the Submarine Base, that Don had occupied. However, with four young children the accommodation was too tight and, after a few months, we moved to a larger house in Mystic which I subsequently passed on to my successor, Tony Steiner.

My main area of responsibility was developing the role of the SSN in Direct Support of surface ships. This involved me in the planning and subsequent analysis of several exercises - both USN and NATO - and also sea-riding. During my time at the DevGru I spent some 60 days at sea with the Submarine Element Coordinator in several different surface ships, of which the most memorable was 21 days onboard USS JOHN F. KENNEDY (CV 67). I was also involved in the development of Active Sonar search tactics for SSNs and was again fortunate to go to sea to observe the effectiveness of these tactics, spending 5 days at sea in each of USS WILLIAM H. BATES (SSN 680) and USS RICHARD B. RUSSELL (SSN 687). The trip onboard RUSSELL was particularly interesting as it was on the AUTEK range together with USS SPADEFISH (SSN 668) as part of the Mk 37 torpedo programme. Both submarines were authorized to fire at each other and, during 14 runs, 27 weapons were fired but only 3 hit. This emphasized the limitations of the aging torpedo and highlighted the problems of achieving a successful attack whilst avoiding providing a target opportunity to one's opponent.

During my time at the DevGru we had at least five operational SSNs assigned, all in their first commission. Several of them were fitted with new or trial equipment to be tested in controlled conditions and then modified as necessary before being fitted to other submarines. I visited them all in harbour, including USS LOS ANGELES (SSN 688), the first of a new SSN class, within days of her commissioning.

I travelled widely on the US east coast; visiting the Naval War College at Newport, Rhode Island, the staffs of COMSUBLANT and ComSecondFleet at Norfolk, Virginia, the submarine squadron at Charleston, South Carolina as well as the Pentagon. Commodore Bob Austin and his successor Bob Fountain were both extremely helpful especially when problems of security - the dreaded NOFORN - cropped up. I remember Bob Austin for his constant attempts to have twice as many slides in a presentation as time would allow, and the problems that Commander Dave Christie, a great friend and fellow staff officer who subsequently became the USN exchange officer in STWG at Faslane, had in trying to keep the presentation to time.

Memories include a fantastic celebration on 4th July 1976 - the 200th Independence Day - with parades, fireworks, etc; lunchtime tennis with other staff members at the Officers' Club; the Queen's Birthday Party which, like those of our predecessors, was extremely successful; having my accommodation at the Norfolk Officers' Club changed from the female officers' wing when someone realized that, in my case, RN stood for Royal Navy rather than Registered Nurse; watching Tomcats being launched from the JFK at night with after-burners glowing like fireballs; and the sheer size of the newly commissioned USS LOS ANGELES.

Looking back, I realize how fortunate I was as an exchange officer in a unique organization whose reputation was extremely high throughout the USN. I had two very happy years.

Annex B.7

By Commander Anthony St.J. Steiner OBE, RN Exchange Officer SubDevGruTWO / SubDevRon TWELVE, 1977 - 1979

I joined SubDevGruTWO in February 1977 and was met at the airport by Cdr "Van" Van Laningham, the Deputy Director, who drove us (wife & 2 kids) to Mystic. We stayed at local motel for two weeks whilst getting a turnover from our predecessors, the Farnfields. We then moved to our home in Orchard Lane, Mystic.

The children were educated at Pine Point, a private school in Stonington, which allowed them to maintain and improve on the education they had started in the UK. It proved to be most successful and was certainly not detrimental to them when they eventually returned to the UK.

My position in SubDevGruTWO was the Coordinated Tactics Officer, with particular emphasis on the threat posed to surface ships (strike fleet, convoys, etc) and submarines by Soviet diesel and nuclear submarines. To this end I participated in several exercises where US SSNs were directed by a Submarine Control Cell on behalf of the Submarine Element Controller (SEC) located in a surface unit in the vanguard of a defensive screen of escorts. This led to the development of better methods of communicating with deep SSNs by the use of explosive devices and active buoys dropped by maritime patrol aircraft, as well as more traditional systems. Suitable tactics for the deployment of SSNs acting in Direct Support of surface forces (SSN(DS)), aided by maritime patrol aircraft and organic helicopters, were also developed from the experiences gained. I spent considerable time helping to plan these exercises and write appropriate instructions, as well as visiting ships and air stations for discussions and pre-sail briefings. On completion of exercises I assisted in preparing and attending the post-exercise washups. Afterwards I was involved in completing the analysis of various events, using the Tactical Analysis Group (TAG), and in preparing the exercise reports.

'How to find the diesel SSK' was a primary task, and the services of various 'beltway bandits' were contracted to investigate new methodology, working closely with Submarine Tactical Development Group (STDG) in the UK. Ideas were trialled at sea, but no real improvements or breakthroughs were made except in the advance screening process and in coordination of operations by surface, subsurface (including SOSUS) and air units.

I rode several surface escorts as part of the SEC including USS MOINESTER (FF1097), the lead Tactical Towed Array Sonar System (TACTASS) unit. I went to sea in BATON ROUGE (SSN689) and RICHARD RUSSELL (SSN687) as a passenger to gain first hand experience of operating procedures but sadly I never rode an SSN acting the SSN(DS) role. I was welcomed aboard SSNs when they were alongside for pre-sail briefings and social occasions, and my wife and children became the first foreign 'dependants' to go to sea in a USS SSN, albeit during a family day.

SubDevGruTWO became SubDevRonTWELVE in May 1977 which, incidentally, removed the confusion caused by SubDevGruTWO being co-located with Submarine Group TWO, the local Base Commander. SubDevGruONE had long been based on the West Coast and was the centre for submarine rescue operations, primarily using Deep Submergence Rescue Vehicles (DSRVs) with SSN and surface mother ships. It had responsibility for deploying the DSRVs by air to strategic points, including the UK, where they could be piggy-backed on, and operated from, RN SSBN. In addition to maintaining SubDevGru TWO's tasking, SubDevRonTWELVE became the focal point for SSN First of Class tactical trials and evaluations, and for continuing trials on new fit tactical equipment. Routine deployments by its units to various distant areas and oceans allowed practical evaluation and analysis from real life encounters.

I completed my tour in September 1979 and handed over to Rupert Best, having thoroughly enjoyed my tour of duty and made many friends, Navy and civilian, with whom I still keep in contact and visit occasionally. We were made to feel "one of the family" and I feel most privileged to have lived and worked with them.

Annex B.8

By Captain Dan Conley, RN Exchange Officer, SubDevRonTWELVE, 1981 -1983

On joining the DEVRON I was soon off to sea on a familiarisation trip in USS RICHARD RUSSELL. Rides in SSNs had become the norm for Exchange Officers albeit visits back-aft were ruled out. The RUSSELL sea trip could have turned out to be a long one as a Soviet Victor SSN intruder was reported in the New London operating areas; however RUSSELL was out of luck, making no detection. My induction also included two weeks' instruction in the Sub-School, joining up with an XO-desig course; learning about 688 Class sonar and fire-control systems.

My job initially focused upon SSN Coordinated Tactics and an early major task involved the analysis of a TOMAHAWK (anti-shipping variant) targeting exercise using ESM data from two SSNs. However, the focus soon moved to independent tactics and I was designated Deputy Independent Tactics Officer. The Soviet submarine threat was becoming increasingly sophisticated requiring tactics to complete the approach and attack exclusively using narrowband data. A second major thrust was to develop tactics to contend with the unalerted short range submarine detection. Much of the work I conducted was shared with STWG under the aegis of the Joint Tactical Development Programme.

I planned and conducted a total of six ASW exercises. This involved riding the 637 class SSNs WHALE (638) and RUSSELL (687), and the 688 Class PHILADELPHIA (690), DALLAS (700) and ATLANTA (712). A three-day short range tactics evaluation exercise was conducted at AUTECH and resulted in tactics which were adopted by both navies. The remainder of the exercises were devoted to narrowband work, and a bi-product was a Target Motion Analysis programme developed by Dr Bill Browning - JASA - which became embedded in the AIO systems of both navies' submarines.

I experienced a unique engineering casualty in one SSN. All the submarine's water reserves, including the feed water for the secondary plant, became totally contaminated. Three days of dieseling on the surface were required whilst new water was made and the systems cleaned. Water was available for drinking but, in the tropics with the Fairbanks diesel roaring away under the wardroom, life was uncomfortable. However, the plant was re-commissioned successfully and the embarrassment of a tow avoided.

During sea-time in ATLANTA a ceremony was conducted in the crew's messdeck where I was inducted as an honorary USN submariner - which largely involved donning a blue "poopy suit".

The short range work also involved me in Minimum Trail Range (MTR) evaluations and some of this work was undertaken with the help of the PCO course in the Sub-School attack trainers. It also involved me taking the lead in putting together a SSN vs SSBN exercise in the Marginal Ice Zone. A British voice talking to COMSUBLANT Ops Staff regarding an exercise involving a US SSBN caused a bit of a ripple. I never did see the results.

For much of the Falklands War I was sea-riding WHALE - not the best place to be when one's own Navy is at war but the CO, Emil Morrow, did his best to keep me informed.

Overall a great two years where I really felt solid advances were achieved in the SSN tactics of both navies.

Annex B.9

By Lieutenant Commander Iain Breckenridge, RN Exchange Officer SubDevRonTwelve, 2001 - 2003

On the job front the broad remit remains unchanged, i.e., get stuck into as much as you can within the bounds of access. I work on periscope procedures (ours now adopted by the US but they tend to 'nuke' things, making simple procedures incredibly complex); Ice ops; TLAM; Mk 48 ADCAP and Spearfish torpedoes; UK-US tacdevs (bilateral agreements with other nations, who provide SSK opposition, prevent me from becoming involved in these exercises); and littoral operations. There's plenty to keep me busy.

On the social scene, I live slightly outside Mystic in Stonington borough about 2 miles east of Mystic central along Route 1. The property, though generous in size and facilities, is unfortunately not in the picturesque town but the area is quite wonderful, as is the ability to explore further afield

Annex B.10

By Lieutenant Commander Ryan Ramsey, RN Exchange Officer CSDS 12, 2005 - 2007

My predecessor altered the position slightly to include training Squadron 2, 4 and 12 submarines at sea in preparation for deployments.

I carried this on for the first eighteen months within CSDS 12 as well as being seconded to the Center for Submarine Counter Terrorism Operations (CSCO) and riding the US Submarine Command Courses. CSCO was a really interesting project, where I liaised outside of the traditional circles to promote and advance submarine operations in support of counter terrorism. I only conducted one piece of TACDEV during this time which was ODIN III (NO/US SSK exercise), however during the last six months the focus changed. I concentrated on TACDEV and was project officer for ICEX 07 and updating a variety of publications prior to my departure.

My overall view of the USN has been positive since I have been here. I have seen them struggle to stop the Advanced Processor Build process spiraling out of control as technical agencies continue to advance technology without letting the personnel catch up. For the style of organization that CSDS 12 is, it is impressive that it can create effect at every level and exert influence to drive the submarine force in the right direction in a variety of warfare issues.

On a personal note, my family and I lived in Niantic, between the Thames and the Connecticut River, as there were no houses for a long term lease in Mystic (my predecessor had the same problem). The property was small compared to previous houses, but we had a great time living there and our experience in the US will be one reflected on as balanced between work, family life and family travel.

Annex C

The Social Scene

The opportunity must not pass without a mention of the wider and social scene around the RN officers. For as long as anyone can remember they have chosen to live in Mystic, an old shipbuilding community on the banks of the Mystic River, ten miles east of New London and Groton on the Thames in Connecticut.

The Thames River has the Submarine Base and submarine building facility (Electric Boat) in the town of Groton on the eastern side and the Coastguard Academy in the town of New London on the west side. For many years a submarine tender (USS HUNLEY) berthed at a pier in New London supporting a squadron of attack submarines (SUBRON10). The Submarine Base was home to the Submarine School, two squadrons of attack submarines (SUBRON2 and SUBDEVGRU2/RON12), and the crews of two squadrons of Polaris Ballistic Missile submarines (SSBN) deployed to the Holy Loch in the Clyde and Rota, near Cadiz in Spain in the 60s/70s. The I-95 major road between New York and points north-east lifts high over the Thames while the much older railway swing bridge down river opens to submarines. Some have passed submerged!

The Mystic River is very different. It is spanned by an old road-width lift bridge at the narrows in the centre of the village. The bridge is lifted at regular intervals to allow the passage of yachts and the steamboat Sabino (25 tons gross, built 1908 in Maine) running day excursions from the Mystic Seaport Museum. The Museum is also home to the 1841 square rigged whaler Charles W. Morgan, L.A. Dunton, a Grand Banks schooner of 1921, very many smaller historic vessels, buildings and associated exhibitions.

The community in and around Mystic adopted the RN Exchange Officers as their own. Leaders in this adoption were Bill and Eileen Ames who lived on the waterfront just a few houses from the Brit's place. The Ames, the Simpsons, the Sprouls, and many others, made us hugely welcome, hosted the "hail and farewell", loaned furniture, took us afloat, provided cottages for summer and skiing, etc. Others befriended us in turn. Even as we moved house from 1973 onwards these special people of Mystic continued their warmth and closeness. Many of us return to Mystic to stay among friends and they come to us in the UK.

To many of us the Episcopal Church in Mystic gave warm welcome and spiritual comfort through the year.

Some of us brought school age children, others stood the pain of children in boarding schools in the UK. With an allowance from the British Naval Staff in Washington, Pine Point School in Stonington provided interesting schooling for the young ones while various pre-school groups challenged the even younger at our expense. The MoD paid for just two commercial flights per year for the UK school boarders to join us, naturally we paid for the third holiday and cried as they went back. One child was born "on exchange"!

Focussing on the mid-70s, the sterling crisis in the summer of 1972, and a devaluation of the pound, caused financial constraints that affected us. The transfer of funds from the UK was severely limited. The Pound stood at \$2.47 in early 1973 and continued to slide. In real terms many items were available at par, so were seemingly very cheap, not least domestic machinery, but didn't travel easily to the UK. Everything had to fit into air freight boxes within size and weight limits for rail/truck transport to RAF facilities in the UK and Washington, and 115V 60Hz or 220V 60Hz 2phase toys do not like 230V 50Hz 3phase supplies. Oil fuel for the central heating and a cord of oak, sufficient to keep the house fire alight for the winter, seemed expensive. Snow days, with schools shut, main roads ploughed and occasional ice storms made winter life interesting. In high summer fans and fly screened windows, not aircon, kept us coolish.

A monthly duty free booze ration could be obtained from Washington, trucked at extra cost, and provided the basis for much home entertaining, not least the Queen's Birthday Party. Started by Robin King in 1961 when an A boat from Halifax was visiting, and held in the back garden at home, the party ran from around 3pm until late. Friends contributed food dishes, as coordinated by Mrs. Brit. The 150-200 guests included submarine base fellows and wives, local worthies and friends. Many more clamoured for invitation. From 1974 the Mystic Highland Pipe Band beat retreat in fine style and fun was had by all.

We had a great life among the good people of Mystic and managed to see some of the rest of States too.