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CAREER DEVELOPMENT FOR AN ANTISUBMARINE WARFARE OFFICER SPECIAL--ETC(U)
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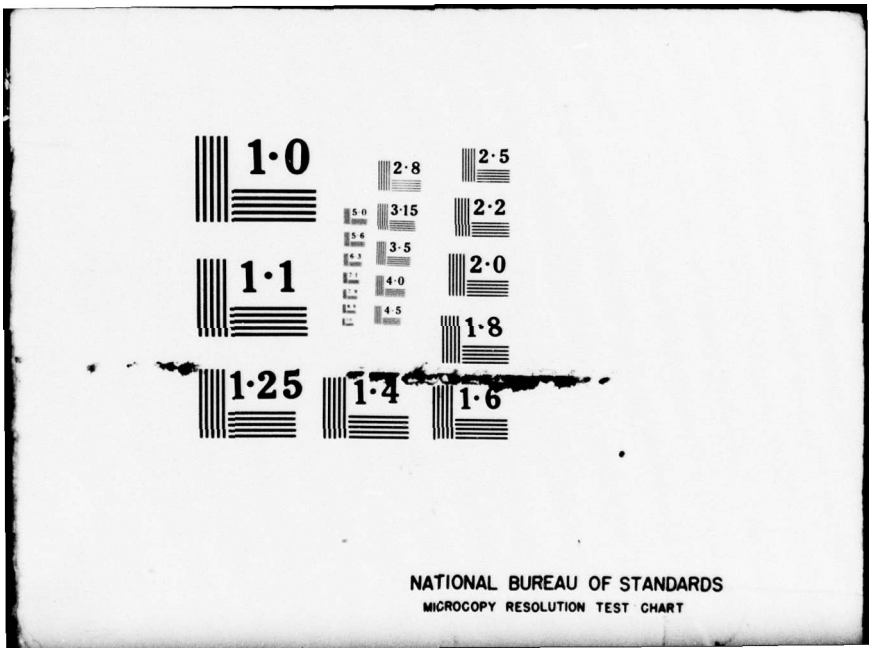
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Monterey, California

THESIS

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by

(10) Abraham Joel/Lassman

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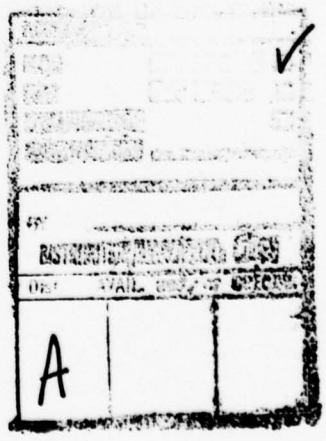

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Career Development for an Antisubmarine Warfare Officer Specialist

by

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Lieutenant, United States Navy
B.S., United States Naval Academy, 1971

Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

Antisubmarine Warfare technology has made significant advances since World War II. However, this thesis is based on the assumption that training for ASW Surface Officers has not kept pace with this rapid technological growth. This thesis proposes that the career pattern for surface officers desiring in-depth ASW training be modified to improve this situation while allowing surface officers to maintain a viable career pattern in the Surface Warfare community. Such a career pattern seems to be feasible.

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I. INTRODUCTION

This thesis deals with the relation between surface officer career patterns and surface force antisubmarine warfare proficiency. The antisubmarine warfare officer Additional Qualification Designator (AQD) program and a Career Plan for SOSUS-experienced ASW officers are two examples of career related activities which should increase ASW proficiency. The purpose of this thesis is to suggest additional ways of complementing these kinds of ASW career programs.

Further research, in addition to that which is presented here, would be beneficial. In particular, research should be done in assessing present day ASW planning and tactics. This could be done, in part, by compiling statements and evaluations concerning the present ASW situation in the Fleet from as many Destroyer Commanding Officers and ASW Officers as possible, and by reviewing present ASW training techniques. This additional research should not necessarily be limited to the areas mentioned above, since its purpose would be to provide an adequate data base for the continuation of the general theme of this thesis.

Traditionally, the Surface Warfare Officer has been a Jack-of-all-Trades, Master-of-None. Antisubmarine Warfare technology and operations have become sufficiently complex that without specialization, today's ASW officer will find it difficult to perform effectively. A career pattern

specifically designed for an officer wishing to pursue ASW in depth would be one solution to alleviating this problem. Such a career pattern should not remove an officer from the basic Surface Warfare Officer career pattern, but it should be one which would both enhance the officer's surface warfare capability and improve the Navy's ASW capability.

In the first part of this thesis, a definition of the ASW problem, both past and present, is given. The thesis then pursues the psychological effect that an ASW specialist career pattern might have on prospective ASW officers. For example, an established career and goal pattern might serve to motivate young officers to raise their performance levels. Higher levels of training would lead to more knowledgeable officers and officers who would feel more competent in carrying out their duties. As a result, this would increase their involvement in their work. Mackie (1972), in his article "The ASW Officer 'Jack-of-all-Trades, Master of None'", written for the U. S. Naval Institute Proceedings, emphasized these points. Supporting comments were gathered from the book "Careers in Organization", by Hall (1976), and from the technical paper, "A Portion of the Sixth NSIA Report on ASW", distributed by Honeywell (1970).

In the last part of the thesis, an ASW officer specialist career pattern will be proposed. To reiterate, this career pattern will be an extension of the existing SWO career pattern and, in addition, it should not hamper an officer in his quest for Command. Also, changes and

improvements in present training procedures will be recommended in order to meet future Anti-Subarmine Warfare requirements.

II. NATURE OF THE PROBLEM

As commented by Wright (1973) in an article written for the U. S. Naval Institute Proceedings, Anti-Submarine Warfare in recent years has become a highly technical, sophisticated operation. ASW hardware currently in use and proposed for future use will continue to increase in complexity. Sonars, such as the AN/SQS-26 and the AN/SQS-53 (an improved SQS-26) have added new dimensions to the are of Anti-Submaring Warfare. Long range active and passive sonar operations have fast become the rule vice the exception. The versatile Light Airborne Multi-Purpose System (LAMPS) helicopter and its associated equipment have significantly upgraded surface ship ASW capability. The technological advances made in ASW have been staggering, to say the least. A question which can be asked is: What has happened in regard to training and career development for ASW officers during this same period? During this period of significant technological improvement there has been less corresponding improvement in surface officers' Anti-Submarine Warfare capabilities through improved officer training. Many procedures and tactics

introduced fifteen to twenty years ago are still being taught today at the Fleet Anti-Submarine Warfare Officer schools. The training period at the schools has been extended by only two weeks, from six weeks to eight weeks, since World War II. At sea training time and submarine services for many ships have been sharply reduced and as a result, the training an officer received at the Anti-Submarine Warfare Officers school might well have been the most comprehensive ASW training he received as a junior officer. (A portion of the Sixth NSIA Report on ASW (1970)).

Improvements must begin at the assignment level. A sampling of officers presently serving in destroyer-type ASW officer billets showed that eighty seven percent had had no sea experience prior to entering the ASWO school. These young officers were thrown into a world of standard conning procedures and ship characteristics, in addition to the ASW training, with no practical experience whatsoever. There is such a great deal of information to be absorbed, and all within a short two month period. Instructors at the Fleet Anti-Submarine Warfare Officers School in San Diego, California, have indicated that their present training program is in the process of being extended to accommodate more trainer time, but will be extended only by three weeks. This cannot be regarded as a significant improvement. After completion of this short ASW training, the officer reports aboard a ship and is immediately put into a position where

he may have to match wits with a submarine officer who has received very intensive training prior to reporting aboard. Prior to commencing their first sea tours, submarine officers attend a six-month Submarine Officers Basic Course, followed by a ten-week weapons system trainer. Those officers slated for duty aboard nuclear submarines attend Nuclear Power School and Nuclear Prototype School for a period of one year. (Unrestricted Line Officer Career Planning Guidebook, NAVPERS 15197). This situation can be likened to the amateur against the professional. The surface ASW officer is a product of a system which seems to have been designed to make him anything but an expert.

Appendix A gives a complete listing of all the subjects covered at the Pacific Fleet Anti-Submarine Warfare Officerts' School and the number of classroom hours and trainer hours allotted to each subject. An examination of Appendix A suggests that the times allotted allow only a scratching of the surface in many subject areas. The characteristics of all ASW weapons must be covered in three and one half hours (3.5). In nine (9) hours of class time spent discussing submarines, an ASW Officer is expected to learn operational characteristics, basic tactics, Soviet submarine capabilities and limitations, Soviet submarine sensors and weapons, and U. S. Submarine capabilities, limitations, sensors and weapons. The study of ASW aircraft is limited to two (2) hours of class time. Only twenty two (22) hours of class time is spent studying the complex AN/SQS-26 sonar system. Four hours are spent in the

trainer and if classes are large, some students may not receive even this much trainer time. One can conclude from this information that the Fleet ASW Officer course is comprehensive in scope but in no way does it give enough time to allow for more than a superficial understanding of these topics. This comment is supported by Mackie (1972) and the NSIA Report on ASW (1970).

The following comments concerning procedures in the Royal Navy and the Canadian Navy were gleaned from personal interviews with representative officers of the two services.

The Royal Navy, in contrast to U. S. practices, requires an officer to have between four and six years of experience prior to beginning his ASW specialization. The officer spends one year as a cadet ensign, then one year involved in general at-sea training. After a six month ashore training period, the officer returns to sea for a junior officer tour, usually of two to three years duration. In the past, the Royal Navy's ASW specialist was known as the Torpedo Anti-Submarine Officer (TAS), but recently the duties of the ASW specialist have been taken over by the Principle Warfare Officer (PWO). Prior to being selected for PWO training, an officer must be a qualified Officer-of-the-Watch (OOW). PWO training lasts for nine months and includes technical training on ASW systems and practical experience, as well as AAW and Communications.

Similarly, Canadian Officers must spend one year at sea in a training squadron during which time they receive their OOW qualification. After reporting aboard a fleet ship, they

are assigned to a department in which they remain for most of their junior officer tours. If the assignment is to weapons/operations, the officer attends a four month ASW procedural course where he receives training on attack planes and ship maneuvers during ASW operations. Returning to the ship, the officer assists in the Combat Information Center (CIC) during all ASW situations. After completion of this tour, an officer may then be selected to attend department head school as a weapons/operations specialist. This course is from thirteen to fifteen months long. Since the Canadian's AAW capabilities are limited, the majority of this instruction is spent on ASW and surface action. In the ASW portion, heavy emphasis is placed on intelligence, equipment functions, oceanography and tactics.

Two points stand out in these comparisons: (1) Before any specialization begins, Royal Navy and Canadian officers must have previous at-sea experience and an OOW qualification and (2) Once assigned to the weapons/operations department, an officer remains in that area and receives extensive ASW training.

Research for this thesis in the area of ASW officer school training included the interviewing of officers presently serving as ASW Officers on board Destroyer-type ships. Appendix C lists the various questions asked and gives a summary of the comments received. Time and ships' operations were limiting factors in regard to the number of officers available for interviews. Therefore, the following comments are not necessarily a representative sampling of the majority of ASW

Officers presently in the Fleet. Many of the views voiced by the different officers were similar in content: (1) The scope of the training they received was adequate, but many subjects were not given the proper amount of time for any in depth appreciation. (2) A substantial portion of the information presented was aimed at WW II ASW tactics and many modern developments and equipments were ignored or discussed only in passing. (3) Not enough time was spent on the advantages and potential of passive ASW. (4) A very limited amount of time was spent on ASW weapons and their proper employment. (5) Trainer time on modern sonars was deemed inadequate. As complex as these systems are becoming, it would seem logical that more emphasis be placed on their operation and performance characteristics. (6) Training for multi-ship operations and coordinated ASW between surface, air, and subsurface units was very limited. This last comment demands further discussion. The age of the "single" Destroyer ASW mission is over and the age of coordinated operations has arrived. Longer range active sonars, increased passive capabilities and non-acoustic sensing techniques have made it nearly impossible for a Destroyer, by itself, to perform effective ASW (Wright, 1973).

In defense of the Fleet ASW Officers' School, many ships have not taken advantage of the training opportunities offered by the school. This problem was brought out in interviews with ASW instructors at the Fleet ASW Officer School in San Diego and ASW officers presently serving aboard Destroyers. This seeming lack of interest begins right at the Command

level. Instances have occurred where neither the Commanding Officer nor the Executive Officer has attended a ship's scheduled trainer session, even though there is a requirement for at least one of them to be present. In addition, ships have sent the wrong people, not enough people, and in many cases, inexperienced people to participate in the trainers. The net result is improper utilization of trainer time.

The goal of a ship whose primary mission is antisubmarine warfare is to conduct ASW operations in a professional and efficient manner. Lack of knowledge and experience will severely hamper the attainment of this goal. Brandenburg (1964) has observed that this was as much a problem in 1964 as it is now:

> "In the average ASW Destroyer today, the Commanding Officer has only a vague idea of the tactical capabilities and limitations of his ASW weapons. He has a passing acquaintance with oceanography, but is at a loss to discuss its implications regarding sonar performance much beyond the level of depth. He knows there are tactical procedures for coordinating his ship's operations with those of ASW aircraft, but he is not sure which ones apply to which type aircraft. He knows that ASW aircraft sometimes employ sonobuoys, but he does not know the characteristics of the more common types, nor at what distances his ship's noise is likely to interfere with them. He is aware that enemy submarines probably have electronic intercept equipment, but is uncertain as to the range at which an enemy submarine could detect his ship's electronic emissions. He knows neither the launch geometry required by his ASW torpedoes nor their acquisition ranges. He knows that ASW helicopters have dipping sonars, but is not familiar with their capabilities relative to his own ship's sonar; and so it goes -- on and on and on."

Thirteen years have passed since Mr. Brandenburg wrote this article and even though improvements have been made,

Commanding Officers may still not possess sufficient ASW skills to fully comprehend the staggering volume of data available and make the correct decisions when decisions are required. Much of the burden has been placed on the young officer who has just graduated from two months of ASW Officer's School and who has probably never been to sea before. These problems were brought out during interviews with ASWO Officers serving in the San Diego area. The more data being made available about the oceans and the more sophisticated equipment being introduced into the fleet makes it more apparent that ASW is no longer reducible to a few simple thumb rules and a handful of tactics.

The ASW Officers' problem has been compounded even further regarding his association with the men in his division. Brandenburg again states:

> "If he is to demand top performance from his hardware and crew, he must know just what constitutes top performance. He must know what kinds of data his sensors can provide, and with what reliability. He must know the realistic limits and abilities of his weapons. He must know how to weigh sensor information and to infer tactical intelligence from it. He must know just when to bring his weapons into action for maximum effect. He must understand in detail the enemy's capabilities and limitations, his strengths and weaknesses, his tactical history, and probably courses of action."

If the ASW Officer is knowledgeable in the many facets of ASW, he then gains the respect of his men and increases his competence as a supervisor. But serious consequences can result it the ASW Officer is deficient in terms of his background and knowledge. (Mackie (1972); Brandenburg (1964)).

The ASW Officer is responsible for assessing data and recommending courses of action to be taken based on that data. If he receives improper information, data that is less than accurate or intermittent, and is unable to fully grasp the situation because of his lack of training and limited experience, he may be unable to initiate a tactical response which will be correct and appropriate for the problem with which he has been confronted.

The ideal working condition exists where knowledgeable, well-trained men are working together harmoniously and where these men are properly utilizing the ASW equipment for which they have been trained. If the equipment does not function properly, old parts are replaced with new and the system is continually calibrated to ensure it is giving accurate and reliable information. The same type of concern has not always been given to the men who must use the equipment.

A statement in the article, "A Portion of the Sixth NSIA Report on ASW" (1970), sums up the entire ASW problem very adequately:

> "The human subsystem remains the most vital component of any ASW system. Yet the human subsystem has never been accorded the same developmental emphasis as the hardware subsystems. The hardware is carefully engineered, specialized, and perfected to a high degree in an effort to effect maximum performance, reliability and efficiency. The human subsystem, in contrast, is treated as a general purpose module, theoretically capable of functioning with high and equal efficiency in any hardware environment. The combination of a highly specialized hardware subsystem and a general-purpose human subsystem results in an ASW system with performance limited not by hardware capabilities, but by the human understanding of those capabilities."

III. PSYCHOLOGICAL EFFECTS OF A CAREER PATTERN

It would seem rather doubtful that any enthusiasm could be generated in the ASW community if there remains an absence of stability of assignment and lack of carefully developed career opportunities. It is difficult for an individual to develop pride in his work if his particular job does not seem to be given much importance by his seniors. Also, if there is a lack of stability of assignment or a well developed career plan where an officer can have the opportunity to advance based on his performance, then there results a lack of motivation.

Career people have tended to see their jobs and career involvements in relation to the way these things affect them personally. Career development can be broken down into two basic categories: (1) A career as a means for advancement, and (2) a career as a profession or status passage. Therefore, an established career and goal pattern would be extremely beneficial in inspiring a junior officer to perform with increased professionalism. A sampling of junior officers presently serving as ASW Officers in the San Diego area revealed that 63% of those officers sampled stated they were in favor of a career pattern for ASW specialists and would pursue such a career if it were made available.

Professional people have tended to do better work and have displayed greater enthusiasm if they considered their jobs to be interesting and purposeful. But those who have been thrown

into positions which were not completely to their liking have had greater tendencies to perform below their capabilities. In the sampling of officers previously mentioned, half of them had had no desire to become ASW Officers. After sufficient exposure to all facets of the surface warfare area, a junior officer should be given an opportunity to state a billet preference and serve in that position if possible. Officers who become ASW Officers must be those who want to pursue that particular field, not those who are in the position because the Commanding Officer told them that they were the only ones available to take over the job.

Hall (1976) in his book, "Careers in Organizations", has devised a career development cycle which he felt was applicable to anyone involved in pursuing a chosen career. This cycle is shown in Figure 1.

The position of ASW Officer must not be regarded as simply another job enroute to numerous other unrelated jobs. The importance of ASW must be instilled in young officers early in their careers. Then, once involved in an ASW career development plan, greater effort needs to be exerted to ensure that the ASW Officer's self-esteem and job satisfaction are kept at a high level. Failure to do so could result in a situation where an officer simply wants to avoid failure and therefore, does what he needs to do to get by, rather than aspire to improve and grow.

An unfortunate situation which has existed in recent years has been the lack of exposure to real world problems and

CAREER DEVELOPMENT CYCLE

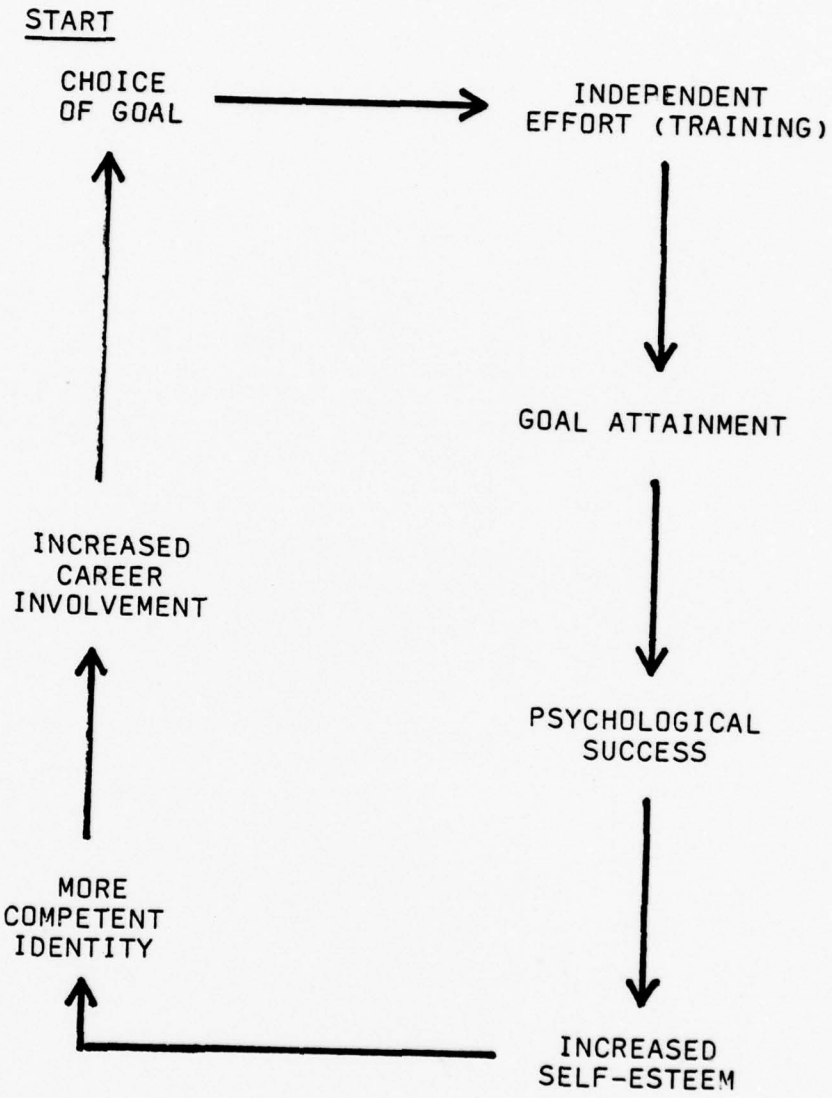


FIGURE 1

training. This has presented a very real morale problem in the ASW Officer community because these officers have been unable to apply the training and knowledge which they have acquired directly to their work. In the ASW Officer survey taken in San Diego, the majority of the officers indicated they had not been given enough at-sea training to adequately test applications which they had been taught in ASWO School. As a result, many ASW Officers did not feel competent nor comfortable in their work. On-the-job training is such a useful tool that serious consequences could result if this training continues to be limited. The officers interviewed felt that they had little time left over to involve themselves in ASW after their division officer duties and collateral duty requirements had been satisfied. The average time the officers spent actively involved in ASW aboard their ships was approximately ten percent.

IV. A PROPOSED ASW SPECIALIST CAREER PATTERN

There has never been any clear evidence of a career plan which has led to the development of an ASW specialist in the surface warfare community. This has resulted in a dangerous gap in the knowledge and experience of Destroyer ASW officers as compared with ASW aviators and ASW submariners.

In the summer of 1972, the Operational Technical Managerial System (OTMS) was established. The purpose of this system was to ensure that the unrestricted line officer be given the opportunity to increase both his technical/managerial expertise

and his operational expertise. An officer could become a proven subspecialist with a high degree of competence and experience in a subspecialty field. It was recognized also that an officer could become a proven subspecialist by knowledge gained through repeated exposure to a given field, as well as postgraduate education.

The need for Naval Officers to possess the knowledge and experience to deal with a more sophisticated Navy has become apparent and many subspecialty areas have been identified. Included in the OTMS is the proven subspecialist in Anti-submarine Warfare, indicating, at least on paper, that ASW has been regarded as an area important enough to require specialization. Appendix B is an excerpt from OPNAVINST 1211.6E dated 10 April 1975, which lists the subspecialty fields currently recognized by the Navy.

A sampling of ninety (90) 1110 surface warfare officers who had held surface command was taken in order to determine subspecialty development. The type ships the officers had commanded included FF's, DD's, DDG's, and DE/DEG's, and thus were ships which should have been actively involved in ASW. Not one of the ninety commanding officers sampled possessed a subspecialty code in Anti-Submarine Warfare. The largest concentration of officers were proven subspecialists in Weapons Systems Technology, with the subspecialty codes of the other officers ranging from General and Transportation Management to Chemistry and Physics. Five (5) commanding officers had not attained any type of subspecialty coding.

A breakdown of the various subspecialty codes and number of officers in each coding is as follows:

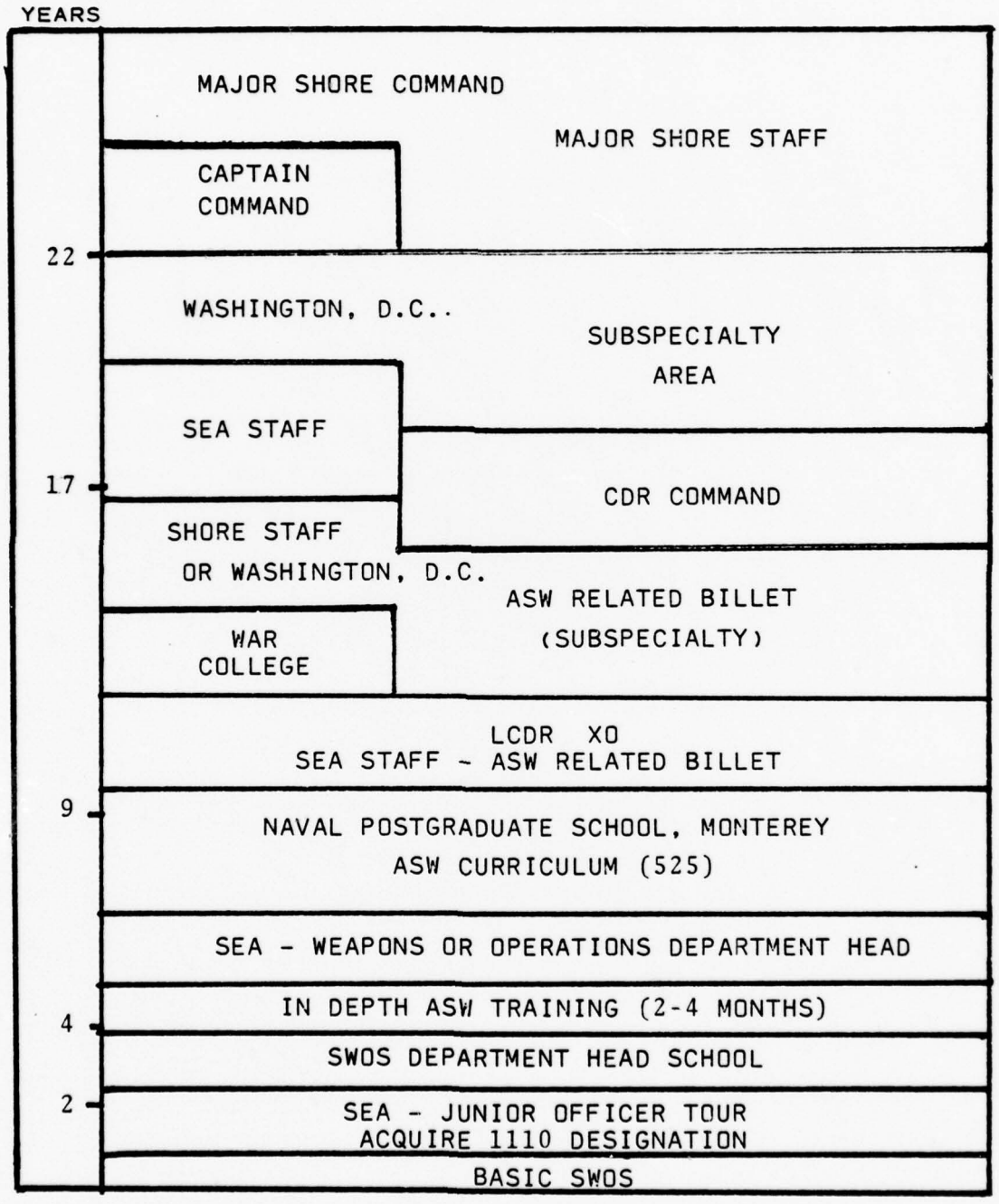
XX30	2	
XX35	1	
XX39	3	
XX42	6	
XX49	2	
XX53	9	
XX54	8	
XX55	4	
XX56	7	
XX61	43	(41%)
XX62	2	
XX63	7	
XX67	3	
NONE	5	

Two statements can be made concerning this sampling: (1) Commanding Officers have been able to specialize and concentrate their efforts in a particular field, yet obviously were not hampered in becoming Commanding Officers, and (2) the complete lack of any ASW subspecialists in the sample indicated that Anti-submarine Warfare has not received the command attention it justly deserves.

Officers must now be given the opportunity to expand their ASW knowledge and experience. This would be done by establishing a career which would allow them to receive in-depth ASW training as well as being able to serve in interrelated ASW billets both ashore and afloat. Figure 2 is a proposed career pattern for a Surface Warfare Officer desiring to become a proven subspecialist in ASW.

The major deviation from the standard Surface Warfare Officer career pattern is the two to four month in-depth ASW training following SWOS Department Head School. This training

CAREER PATTERN FOR ASW EXPERIENCED SURFACE WARFARE OFFICERS WITH INITIAL SEA TOUR



would be a continuation of previous ASW training with subjects being covered in greater detail due to the additional time allotted for study. Upon completion of this school and Department Head School, an officer would then be placed in billets in which he could best utilize his ASW expertise for the benefit of the Navy. "PERS 403B Billet Designators with ASW Utilization", dated Ø4-29-77, listed the following ASW related billets available for LCDR's, CDR's, and CAPT's who possess SECNAV Officer Billet Codes (SNOBC) of XX44 (ASW subspecialty):

A. LCDR

COMTHIRDFLT	Ops Analyst
NAVPGSCOL	Ass't ASW Curr. Officer
CINCLANTFLT	Surf Surv Officer
COMOPTEVFOR	Sonar Ops Test/Eval Ass't
FLT ASW TRALANT/PAC	ASW Instructors
CARGRU	Ass't ASW Env
COMSURFWARDEVGRU	Staff
SWOSCOLCOM	TAO Instructor

B. CDR

NAVFAC	Commanding Officer
WARCOL	Department Head
CARGRU	Surf Ops ASW
COMSURFLANT/PAC	Staff (ASW)
FLT ASW TRALANT/PAC	Department Head

C. CAPT

NAVFAC	Commanding Officer
WARCOL	Professor
OPNAV	OP 955F, OP 955B, OP 353

It is obvious that there is potential for officers to remain in ASW related billets as their careers progress. Junior officers would still be required to become familiar with all aspects of the engineering system aboard ship. The requirements for completing the Engineering PQS program, either in the gas turbine plant or the steam plant, and receiving a Surface Warfare Junior Engineering Officer of the Watch (JEOOW) designation would be maintained.

V. CONCLUSIONS AND RECOMMENDATIONS

ASW systems have grown to such a complex state that the proper utilization of these systems and the proficiency of all those involved in ASW, demands the establishment and continuation of an ASW specialist program. The "well-rounded" officer concept should be a thing of the past. The need for specialization has long been recognized by the Navy in the aviation and submarine communities. Increased sophistication requires a similar level of specialization in the surface ASW community.

The establishment of an ASW Officer career plan would be the catalyst needed to propel surface ASW to a position equal in proficiency to aviation and subsurface ASW. Training now available to an ASW Officer lacks the time and Command attention needed to ensure that an officer become a proficient ASW specialist. This training requires considerable improvement and attention to modern ASW systems and tactics presently in

use. An improved, in-depth training program and greater Command attention can only lead to ASW Officers who feel more competent and knowledgeable in the field of ASW and as a result, willing to become more involved and raise their levels of expertise to even higher degrees. Brandenburg (1964) states very effectively the need for the necessary changes in the surface ASW picture:

> "The only way to cope with the situation is to grow right along with the data year by hear, as it accumulates; learning, sifting, discarding, collecting, collating, understanding on a day-to-day basis, remaining constantly abreast of the state of the art. Anti-Submarine Warfare is ever changing. Yet much depends today upon knowing which weapons and tactics worked well in the past and which did not and why. Likewise, much depends on being able to correlate the experience and knowledge of the past with the information and hypotheses of today in order to understand the weapons and tactics of tomorrow."

It is recommended that considerably more attention now be given to the revitalization of an Anti-Submarine Warfare Specialist Career Pattern. The career plan should include extended training time both at the Fleet Anti-Submarine Warfare Officers Schools and on board ship, plus a progression of interrelated ASW billets available to the ASW specialist in order for him to accumulate the vast amount of detailed knowledge available.

The Fleet ASW Officer School in San Diego states as its mission for the ASWO course:

> "The basic mission of this course is to provide competent Anti-Submarine Weapons Officers who are capable of employing sonar and associated ASW weapons systems in all phases of anti-submarine warfare; training an effective sonar and anti-submarine weapons organization; and administering the maintenance programs of ASW Equipment".

This goal has not been fully realized and will continue to fall short if changes are not immediately made in the present training program. Appendix C is the questionnaire given to various ASW officers in the San Diego area. It dealt in part with the adequacies or inadequacies of the present ASW training program for officers. Included in the questionnaire was a question requesting ideas on improving the training situation. The following changes and improvements were recommended by the officers sampled: (1) Ensure trainer time is spent on modern sonar equipment vice obsolete equipment. (2) There should be a greater coverage of equipment capabilities and limitations. (3) Much more time should be spent in the trainers on the sonar equipment installed on the different ships to which the officers will be going. (4) Greater emphasis should be placed on the importance and capabilities of passive ASW operations. (5) There should be considerably more cross-training with the air and subsurface communities. (6) Either an annual or semi-annual ASWO refresher course should be established where ASWO can come together to discuss problems encountered and receive information and training on new equipment and tactics. These recommendations and changes can only become effective if the depth of instruction improves and if a group of interrelated billets be made available to ensure that the ASW specialist is continually exposed to the ASW problem.

APPENDIX A

COURSE OUTLINE FOR FLEET ASWO SCHOOL, SAN DIEGO

		Classroom Hrs.	Lab/Trainer Hrs.
I.	COURSE ADMINISTRATIVE PROCEDURES Introduction to Course Administrative Check In Course Critique Administrative Check Out Graduation	8	
II.	ASW OCEANOGRAPHY Introduction to Oceanography Sound Propagation Sound Propagation Path Decibel/Sonar Equation Range Prediction for Planning Passive Range Prediction Regional Oceanography and Advanced Concepts	21	
III.	INTRODUCTION TO ACOUSTIC SURFACE ASW SENSOR SYSTEMS Concepts of Acoustic Sensors Basic Sonar System Sonar Operating Procedures Operational Characteristics of AN/SQS-23 Operational Characteristics of AN/SQS-26/53 Operational Characteristics of AN/SQQ-23 Operational Characteristics of AN/SQS-35/38 Acoustic Processors Towed Array Sonar Systems	17	9
IV.	UNDERWATER BATTERY FIRE CONTROL SYSTEMS (UBFCS) MK 114/111 Fire Control Systems MK 116 Fire Control System MK 309 Firing Panel	8	2
V.	ASW WEAPONS MK 46 Mod 1 Torpedo MK 44 Mod 1 Torpedo ASROC Missile	3.5	
VI.	ASW LAUNCHERS MK 16 ASROC Launching Group Missile Launching System MK 10 MK 32 Surface Vessel Torpedo Tubes (SVTT)	5	1

	Classroom Hrs.	Lab/Trainer Hrs.
VII. SUBMARINES	9	
Operational Characteristics of Submarines		
Basic Submarine Tactics		
Soviet Submarine Capabilities and Limitations		
Soviet Submarine Sensors and Weapons		
U.S. Submarine Capabilities, Limitations, Sensors and Weapons		
VIII. ASW DOCTRINE	32	1
ASW Organization and Internal Communication		
ASW Plotting		
Command Classification		
Attack Maneuvering		
Urgent and Deliberate Attacks		
Trainer Brief		
Basic Maneuvering		
Weapon System Selection Procedures		
Material and Tactical Countermeasures		
Torpedo Evasion		
Defense in Depth		
External Communications		
Surface Attack Units (SAU)		
Attack, Support, and Search Methods and Plans		
Dual Ship Operation (Tactical #1) Basic Maneuvering and Screen Formation		
Sonar System Employment		
Acoustic Warfare		
Allied ASW Weapons and Sensors		
ASW in Inshore Waters		
Dual Ship Operation (Tactical #2) SAU		
Formation and Approach to DATUM		
Dual Ship Operation (Tactical #3) SAU		
Formation and Approach to DATUM		
Dual Ship Operation (Attack #1) DATUM Approach and Contact Phase (Staff SAUC)		
Dual Ship Operation (Attack #2) DATUM Approach and Contact Phase (Student SAUC)		
Coordinated Operation (Tactical #1) Surface Ship and ASW Aircraft Against Diesel Submarine		
Coordinated Operation (Tactical #2) Surface Ship and ASW Aircraft Against Nuclear Submarine		
Coordinated Operation (Tactical #3) Passive/Active Operation with ASW Aircraft		
Coordinated Operation (Attack #1) Single Ship and and ASW Aircraft		
Coordinated Operation (Attack #2) Dual Ship and and ASW Aircraft		
RTDC Attack and Escape Maneuvers		

		Classroom Hrs.	Lab/Trainer Hrs.
IX.	UNDERWATER BATTERY ATTACK PROCEDURES		
	ASROC Attacks from Underwater Battery		
	ASROC Attack #1 (Single Shot)		
	ASROC Attack #2 (Dual ATP-28) with Multiple Echo		
	ASROC Attack #3 (Dual (Shoot-Listen-Shoot) with Multiple Echo		
	ASROC Attack #4 (Test)		
	Surface Vessel Torpedo Tube (SVTT) Attacks from UB Stack Attacks		
	SVTT Attack #1 (Single Shot with 0^{o} Gyro)		
	SVTT Attack #2 (Dual ATP-28) with TCM)		
	SVTT Attack #3 (Dual (Shoot-Listen-Shoot) with TCM		
X.	CASUALTY PROCEDURES	6.5	
	ASROC and SVTT Attack #1 with Casualties		
	ASROC and SVTT Attack #2 with Casualties		
	UB Performance Test		
XI.	ASW AIRCRAFT	2	6
	Fixed Wing ASW Aircraft		
	The LAMPS System		
	ASW Dipping Helos		
XII.	TRAINING	7	
	Officer/Enlisted Training Requirements		
	Refresher Training		
	Battle Readiness Competition		
	Inspections and Visits		
XIII.	MATERIAL MAINTENANCE MANAGEMENT	11	2
	Noise Problems, Noise Reduction and Surveys		
	ASW System Alignment		
	ASW System Readiness Checks		
	Material Maintenance Management		
	Electrical Safety		
XIV.	ASW EXERCISE	6	1
	ASW Exercise Considerations		
	Submarine Safety		
	ASW Exercise Weapons		
	Operational Logs, Records and Reports		
	Acoustic Intelligence Collection		
	Pre-Deployment Requirements		

		Classroom Hrs.	Lab/Trainer Hrs.
XV.	ORDNANCE SAFETY AND WEAPON MANAGEMENT Ordnance Safety and Security Magazine Sprinkler Systems Torpedo Handling Weapon Logistics Logs, Records and Reports ASROC Heating and Cooling System	8	6
XVI.	AUXILLIARY EQUIPMENT Expendable Bathythermograph (XBT) Torpedo Countermeasure Equipment Fathometers Sonar Communication Sets	6	
XVII.	AN/SQS-23 SONAR SYSTEM Principles of Operation and Functions of the AN/SQS-23 Sonar System AN/SQS-23 Sonar System: Modification and Field Changes AN/SQS-23 Sonar System Maintenance AN/SQS-23 Sonar System Operation AN/SQS-23 Sonar Range Prediction AN/SQS-23 Sonar System Employment Considerations AN/SQS-23 Unit Exam and Review	16	
XVIII.	AN/SQS-26/53 SONAR SYSTEM AN/SQS-26/53 Transmitter Sub-System AN/SQS-26/53 Receiver, Display and Control Subsystem AN/SQS-26/53 Power Supply Subsystem AN/SQS-26/53 Test, Training, Monitoring Subsystem AN/SQS-26/53 Cooling Subsystem AN/SQS-26/53 Domes/Transducers AN/SQS-26 Configuration Changes AN/SQS-26 Maintenance AN/SQS-26 Operations AN/SQS-26 Classification AN/SQS-26 Operation Lab AN/SQS-26 Trainer AN/SQS-26 Range Prediction AN/SQS-26 Sonar Employment AN/SQS-26 Unit Examination and Review	22	4½

		Classroom Hrs.	Lab/Trainer Hrs.
XIX.	AN/SQQ-23 (PAIR) SONAR SYSTEM	16	13½
	AN/SQQ-23 *Transmit Subsystem*		
	AN/SQQ-23 Receiver, Display, and Control Subsystem		
	AN/SQQ-23 Test, Training, Monitoring Subsystem		
	AN/SQQ-23 Cooling Subsystem		
	AN/SQQ-23 Domes/Transducer		
	AN/SQQ-23 Configuration Changes and Modification		
	AN/SQQ-23 Maintenance		
	AN/SQQ-23 Operation		
	AN/SQQ-23 Classification		
	AN/SQQ-23 Operation Lab		
	AN/SQQ-23 Trainer		
	AN/SQQ-23 Range Prediction		
	AN/SQQ-23 Sonar Employment		
	AN/SQQ-23 Unit Examination and Review		
XX.	AN/SQS-35(V) SONAR SYSTEM	14.5	9½
	AN/SQS-35(V) Sonar System, Principle *of Operation*		
	AN/SQS-35(V) Maintenance		
	AN/SQS-35(V) Hoist Subsystem		
	AN/SQS-35(V) Hoist Maintenance		
	AN/SQS-35(V) Operation		
	AN/SQS-35(V) Classification		
	AN/SQS-35(V) Lab		
	AN/SQS-35(V) Trainer		
	AN/SQS-35(V) Range Prediction		
	AN/SQS-35(V) Sonar Employment		
	AN/SQS-35(V) Unit Exam and Review		
XXI.	AN/SQS-38 SONAR SYSTEM	7	8
	AN/SQS-38 Sonar System Principle of Operation		
	AN/SQS-38 Maintenance		
	AN/SQS-38 Operation		
	AN/SQS-38 Classification		
	AN/SQS-38 Lab		
	AN/SQS-38 Trainer		
	AN/SQS-38 Range Prediction		
	AN/SQS-38 Sonar Employment		
	AN/SQS-38 Unit Exam and Review		

		Classroom Hrs.	Lab/Trainer Hrs.
XXII.	INTEGRATED ACOUSTIC COMMUNICATION SYSTEM (IACS) Introduction to the Integrated Acoustic Communication System (IACS) ORP Suite IACS Functional Description IACS Performance Prediction IACS Message IACS Employment IACS Unit Examination and Review	7	
XXIII.	TOWED ARRAY SONARS Towed Array Equipment Characteristics Modes of Operation Array Operation Equipment Operation and Monitoring Search and Contact Procedures Towed Array Maintenance Towed Array Sonars Unit Examination and Review	13	4
XXIV.	ACOUSTIC PROCESSORS AN/BQR-20A System Description AN/SQS-54B System Description AN/SQR-17 System Description Acoustic Processors: Maintenance Acoustic Processors: Employment Acoustic Processors: Trainer Acoustic Processor Unit Examination and Review	5	3
XXV.	LOFARGRAM ANALYSIS Introduction to LOFAR Fundamental Frequencies and Harmonics Sound Sources Tactical Information from LOFARgram Analysis LOFARgram Examination	20	
XXVI.	BASIC ASW PASSIVE PLOTTING TECHNIQUES AND PLOTS Introduction to Target Motion Analysis Passive Plotting Organization and Basic Passive Plots Time Bearing Plot Line of Sight Diagram and Bearing Rate Computer Coffey Plot Geographic Plot Time Range Plot Lynch Plot Practical Use of Passive Plots ASW Passive Plotting Performance Test	7.5	4

	Lab/Trainer Hrs.
XXVII. TRAINER TIME	142

TABLE II

EDUCATION AND SKILL FIELDS
AND
SUBSPECIALTY CONSULTANTS

CODE	Education and Skill Field	Primary Consultant	Consultant
	Public Affairs		
XX10	Public Affairs	CHINFO	
	International Affairs		
XX20	Political Science (Note 1)	CNO (Op-06)	
XX21	Mid East, Africa, or South Asia	CNO (Op-06)	
XX22	Far East, Southeast Asia, or Pacific Ocean	CNO (Op-06)	
XX23	Western Hemisphere	CNO (Op-06)	
XX24	Europe	CNO (Op-06)	
XX25	Intl Organizations and Negotiations	CNO (Op-06)	
XX26	Strategic Planning (General)	CNO (Op-06)	
XX27	Strategic Planning (Nuclear)	CNO (Op-06)	
XX28	Joint and Strategic Intelligence	CNO (Op-009)	COMNAVINTCOM
XX29	Naval Intelligence Scientific and Technical	CNO (Op-009)	COMNAVINTCOM
	Management		
XX30	Management (General) (Note 1)	CHNAVMAT	
XX31	Financial Management	CNO (Op-92)	DNAVCOMPT, COMNAVSUP, COMNAVFACENGCOM CHNAVMAT
XX32	Material Management	CHNAVMAT	COMNAVSUP, CNO (Op-04)
XX33	Industrial Engineering	COMNAVSEA	CHNAVMAT, CNO (Op-01C)
XX34	Logistics Management	CHNAVMAT	COMNAVSUP, CNO (Op-04)
XX35	Transportation Mgmt (MSC)	COMSC	CNO (Op-04)
XX36	Manpower and Personnel Management	CHNAVPERS (Pers-2)	CNO (Op-01C),CNRC
XX37	Education and Training Management	CNO (Op-099B)	
XX38	Human Resource Management	CHNAVPERS (Pers 6)	CNR

CODE	Education and Skill Field	Primary Consultant	Consultant
XX39	Systems Acquisition Management	CHNAVMAT	
	Applied Science and Technology		
XX40	Applied Science and Technology (Note 1)	CNR	
XX41	Applied Mathematics	CNR	CNO (Op-96)
XX42	Operations Analysis	CNO (Op-96)	CNR
XX43	Quantitative Economics	CNO (Op-92)	DNAVCOMPT
XX44	Antisubmarine Warfare	CNO (Op-095)	CNO (Op-02,03,05), COMNAVELEX
XX45	Antiair Warfare	CNO (Op-095)	CNO (Op-03), COMNAVELEX
XX46	Electronic Warfare	CNO (Op-095)	CNO (Op-02,03,05), COMNAVELEX
XX47	Geophysics	CNO (Op-094)	OCEANAV, COMNAVWEASERV,CNR
XX48	Meteorology	COMNAVWEASERV	CNO (Op-094), OCEANAV,CNR
XX49	Oceanography and Hydrography	OCEANAV	CNO (Op-094), COMNAVWEASERV,CNR
	Naval Systems Engineering		
XX50	Naval Systems Engineering (Note 1)	COMNAVSEA	CNO (Op-02,03,05), CHNAVMAT,COMNAVELEX
XX51	Naval Construction and Engineering	COMNAVSEA	CNO (Op-02,03,05), CHNAVMAT,COMNAVELEX
XX52	Nuclear Engineering	COMNAVSEA	CNO (Op-02,03,05), COMNAVFACENGCOM
XX53	Nuclear Propulsion Plant Operations	COMNAVSEA	CNO (Op-02,03), CHNAVMAT
XX54	Naval Engineering	COMNAVSEA	CHNAVMAT
XX55	Electronic Engineering	COMNAVELEX	CNO (Op-095), COMNAVSEA, CHNAVMAT, CNR, COMNAVTELCOM
XX56	Underwater Acoustics	COMNAVSEA	CHNAVMAT,CNR, COMNAVELEX, CNO (Op-095)
	Weapons Systems Engineering		
XX60	Weapons Systems Engineering (Note 1)	COMNAVSEA	CHNAVMAT
XX61	Weapons Systems Technology	COMNAVSEA	CHNAVMAT
XX62	Chemistry	COMNAVSEA	CHNAVMAT,CNR

CODE	Education and Skill Field	Primary Consultant	Consultant
XX63	Physics	COMNAVSEA	CHNAVMAT,CNR
XX64	Weapons Electronics	COMNAVSEA	CHNAVMAT,CNR
XX65	Electro-Optics & Lasers	COMNAVSEA	CHNAVMAT,CNR
XX66	Nuclear Physics	COMNAVSEA	CHNAVMAT,CNR, CNO (Op-985)
XX67	Nuclear Effects	COMNAVSEA	CHNAVMAT, CNR
XX68	Strategic Weapons (FBM)	DIRSSP	CNO (Op-02)
XX69	Strategic Navigation (FBM)	DIRSSP	CNO (Op-02)
	Aeronautical Systems Engineering		
XX70	Aeronautical Systems Engineering (Note 1)	COMNAVAIR	CHNAVMAT, CNR, CNO (Op-05), COMNAVELEX
XX71	Aeronautical Engineering	COMNAVAIR	CNO (Op-05), CHNAVMAT, CNR
XX72	Avionics	COMNAVAIR	CNO (Op-05), CHNAVMAT, COMNAVELEX, CNR
XX73	Flight Performance (Test Pilot School)	COMNAVAIR	CNO (Op-05), CHNAVMAT
	Communications		
XX80	Communications (General) (Note 1)	CNO (Op-941)	CNO (Op-094)
XX81	Communications Engineering	CNO (Op-941)	CNO (Op-094), COMNAVELEX
XX82	Communications Systems Technology	CNO (Op-941)	CNO (Op-094)
	Computer Technology		
XX90	Computer Technology (General) (Note 1)	CNO (Op-91)	CNO (Op-34, 941), COMNAVTELCOM, CHNAVMAT, CNR, COMNAVELEX
XX91	Computer Science (General)	CNO (Op-91)	
XX92	Computer Science (Combat Direction Systems)	CNO (Op-91)	
XX93	Computer Science (Command Support Systems)	CNO (Op-91)	
XX94	Computer Science (Resource Control)	CNO (Op-91)	
XX95	Computer Systems (General)	CNO (Op-91)	
XX96	Computer Systems (Combat Direction Systems)	CNO (Op-91)	
XX97	Computer Systems (Command Support Systems)	CNO (Op-91)	
XX98	Computer Systems (Resource Control)	CNO (Op-91)	

APPENDIX C

ASW OFFICER QUESTIONNAIRE

PLEASE COMMENT ON THE ADEQUACY OF THE TRAINING YOU RECEIVED AT THE FLEET ASWO SCHOOL:

1. Ignored modern developments and equipment
2. Information aimed at WW II ASW tactics.
3. No passive ASW studied.
4. Destroyer only type ops studied -- no coordinated ops.
5. Scope of training adequate but many subjects not given proper amount of time for in-depth appreciation.
6. "Trainer" time limited.
7. Limited time spent on ASW weapons.
8. Training for multi-ship or coordinated ASW very limited.

WHAT IMPROVEMENTS, IF ANY, WOULD YOU MAKE TO THIS TRAINING?

1. More cross-training with air and sub-surface communities.
2. Greater emphasis on passive ops.
3. Greater coverage of equipment capabilities and limitations.
4. Greater time in trainers.
5. More trainer time on modern equipment vice obsolete equipment.
6. ASWO refresher course, either annually or semi-annually.

HOW MUCH OF YOUR TIME ON BOARD SHIP IS SPENT ON ASW?

Approximately 10% overall.

IF THERE WERE A CAREER PATTERN FOR AN ASWO SPECIALIST WOULD YOU PURSUE SUCH A CAREER?

Would pursue: 63%

Had no desire: 37%

WAS IT YOUR DESIRE TO BECOME AN ASW OFFICER?

YES: 50%

NO: 50%

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