Is the Navy’s Future Virtual Reality?

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14. SUBJECT TERMS (KEY WORDS ON WHICH TO PERFORM SEARCH)

ABSTRACT (MAXIMUM 200 WORDS)
The U.S. Navy must look to using simulation to train ships and crews during the Inter Deployment Training Cycle. Due to recent limitations on underway time and decreased access to training ranges, simulation will become a cornerstone of the training regimen for surface ships.

18. SECURITY CLASSIFICATION OF REPORT

UNCLASSIFIED

19. SECURITY CLASSIFICATION OF ABSTRACT

UNCLASSIFIED

20. LIMITATION OF ABSTRACT

N/A

UNCLASSIFIED

16. PRICE CODE: N/A

15. NUMBER OF PAGES: 28

12A. DISTRIBUTION/AVAILABILITY STATEMENT

NO RESTRICTIONS

12B. DISTRIBUTION CODE

N/A

11A. DISTRIBUTION/AVAILABILITY STATEMENT

NO RESTRICTIONS

11B. DISTRIBUTION CODE

N/A

11. SUPPLEMENTARY NOTES

NONE

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

NONE

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

SAME AS #7.

8. PERFORMING ORGANIZATION REPORT NUMBER

NONE

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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6. AUTHOR(S)

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5. FUNDING NUMBERS

N/A

4. TITLE AND SUBTITLE

Is the Navy’s Future Virtual Reality?

2. REPORT DATE

3. REPORT TYPE AND DATES COVERED

1. AGENCY USE ONLY (LEAVE BLANK)

344.

8. PERFORMING ORGANIZATION REPORT NUMBER

NONE

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

SAME AS #7.

10. SPONSORING/MONITORING AGENCY REPORT NUMBER:

NONE

11. SUPPLEMENTARY NOTES

NONE

12A. DISTRIBUTION/AVAILABILITY STATEMENT

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12B. DISTRIBUTION CODE

N/A

13. NUMBER OF PAGES

2

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3. REPORT TYPE AND DATES COVERED

1. AGENCY USE ONLY (LEAVE BLANK)
FUTURE WAR PAPER

TITLE: Is the Navy’s Future Virtual Reality

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF OPERATIONAL STUDIES

AUTHOR: LCDR M. K. Wagner, United States Navy

AY 2009-10

Mentor: Dr. Bradley Meyer

Approved: Dr. Bradley Meyer

Date: 23 May 2010
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Executive Summary

Title: Is the Navy’s Future Virtual Reality?

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Thesis: Simulation must be used to effectively train ships in Air, Surface, and Undersea Warfare during the Inter Deployment Training Cycle

Discussion:

Recent quality of life initiatives and budget constraints have reduced the amount of dedicated underway training time that is allotted to a surface ship during the Inter Deployment Training Cycle. Due to this limitation with regards to underway time, conducting simulated exercises during all phases of the Inter Deployment Training Cycle while ships are in port will need to become the standard for the U.S. Navy’s surface combatants.

The U.S. Navy has the appropriate organizations in place to effectively train surface ships, however, these organizations could be better used to provide greater benefit. The Afloat Training Organization specifically needs to be looked at for areas of improvement in personnel assignments

Conclusion:

Simulation is an effective way to train ships and personnel within the U.S. Navy. Modern technology is able to provide quality scenarios of variable complexity to be used to increase the proficiency of training teams and watch standers aboard ships at all levels during the Inter Deployment Training Cycle. The key is for Fleet and Type commanders to put the appropriate emphasis on in port training to ensure compliance by ships during the training cycle.

The Navy would benefit from developing a more stringent process for assigning personnel to the Afloat Training Organization. This could be as simple as a Commanding Officer’s recommendation, or as complex as the screening process used to select potential recruiters. Training our warships is touted as our highest priority, shouldn’t the people who are assigned as trainers be of the highest caliber as well? Orders to the Afloat Training Organization may not look like the “choice assignment” to some of our most qualified personnel. One recommendation would be to offer some type of special assignment pay as an incentive to draw the best people to the organization.

The current training cycle is adequate to provide effective training that keeps our ships at their highest proficiency levels. The implementation of the Inter Deployment Training Cycle must be managed so that ships are afforded the opportunity to train while in port. The numerous other requirements and tasks that a ship faces while moored to a pier must be kept to a minimum while simulated exercises are conducted.
Introduction:

Training of U.S. Naval Surface Forces has evolved steadily with technological advances in the last two decades, however, these technological advances in shipboard simulators are not being used to their full potential. Recent quality of life initiatives and budget constraints have limited the number of days a ship can be underway during the training cycle to 28 per quarter, with this constraint, Commanding Officers will need to rely on shipboard simulation to conduct effective training for their crews during in port periods. The length and format of the training cycle that is currently used by the navy is adequate to keep ships at their highest proficiency and readiness. The navy has the appropriate organizations in place to effectively train surface ships, however, these organizations could be better used to provide greater benefit. The Afloat Training Organization specifically needs to be looked at for areas of improvement in personnel assignments. Due to the limitations that have been placed on surface ships with regards to underway time, conducting simulated exercises during all phases of the Inter Deployment Training Cycle while ships are in port will need to become the standard for the U.S. Navy’s surface combatants.

The focus of this paper is to show that the evolution of training is proceeding in the right direction and that using simulation for training future Naval Surface Forces is important to maintaining the high state of readiness required of surface ships. This paper centers on Ticonderoga class cruisers and Arleigh Burke class destroyers using the three major warfare areas (Air Warfare, Surface Warfare, and Undersea Warfare ) that are currently required for the Navy’s surface combatant force. The training cycle that is currently used by surface ships is sufficient and shows that current limitations to the cycle are not a hindrance to training.
The U.S. Naval Surface Force is in the business of providing warships ready for tasking to the commander. In order for these assets to arrive on time and ready for tasking, they must first be trained in a myriad of different events to ensure proficiency within all warfare areas. Naval training requirements are designed to ensure that each ship meets a minimum set of standards for a variety of different areas that include navigation, seamanship, damage control, engineering, flight operations, basic command and control, weapons employment, and each of the three primary warfare areas that will be focused on.

Training methods (simulators or traditional live training events) provide proficiency (percentage of maximum performance achievable on any task) that depends among other things on task characteristics and complexity. Moreover, proficiency measures performance and increases with the number of repetitions. The first time a task is performed, that performance is liable to be minimal. The first training repetition increases proficiency rapidly. With additional training sessions, the rate of improvement decreases, but the level of proficiency continues to increase until a maximum is reached. It is these tasks that require repetition that are the best candidates for simulation. If a task or exercise can be simulated and personnel are trained proficiently prior to the task or exercise being conducted underway there is a potential for both a great cost savings to the Navy, and a prioritized use of valuable underway time.

The “normal” training cycle for a surface ship is divided into three areas; beginning, intermediate, and advanced. This cycle normally lasts up to eighteen months and culminates with a ship conducting a six month deployment. Up until the mid 1990’s a ship would return from
deployment and go into a shipyard for upgrades and overhaul, once completed the ship was placed in the beginning phase of the training cycle and would incur a six to eight week “refresher training” which consisted of a team of subject matter experts known as the Fleet Training Group, descending upon the ship to train the crew up to a basic level. Once the ship passed this basic level of training it progressed to the intermediate phase which allowed the ship to conduct operations on its own. During this phase the ship is required to complete numerous exercises in all warfare areas in order to increase its proficiency. When a ship graduates to the advanced phase it is then considered capable of conducting multi-ship operations which include participation with the entire battle group. During this phase the ship conducts high level integrated exercises that are designed for the ship to hone its skills at operating within the force at a variety of positions desired by the battle group commander.

During the mid 1990’s the Fleet Training Group was changed to the Afloat Training Group. This change reduced the number of subject matter experts assigned to training commands and put more emphasis on the ships’ own subject matter experts. In short, the ships are now required to develop their own training teams from ships company and the training commands send people to the ship in order to “train the trainers.” This change in training philosophy benefits a surface ship in two ways; first it makes the ships’ subject matter experts more proficient as they are now required to train the crew. And second, it causes more cross training to be conducted within the ships crew due to less people being available for various positions.

Both of these approaches satisfied the many personnel, presence, and mission requirements of the Cold War era; however, new global threats have recently challenged these traditional methods of operation. To achieve a more responsive and more readily deployable fleet, the Fleet Response plan, adopted in 2003, institutionalized a new readiness approach
intended to allow the Navy to deploy a high number of assets quickly. Prior to implementation of
the Fleet Response Plan, ships normally did not commence basic training until the completion of
a depot maintenance availability. Under the Fleet Response Plan, ships returning from
deployment enter basic training almost immediately, and basic training is more flexibly
conducted both before and after a ship’s depot-level maintenance. The desired result is for non-
deployed ships to achieve a high level of readiness earlier and to maintain high readiness longer
so that they can deploy on short notice.³

Under the Fleet Response Plan, the time between ship deployments, called the Inter
Deployment Training Cycle, lasts approximately 18 months. The Basic Phase lasts
approximately six months and is the responsibility of the type commander and the ship’s
commanding officer. It concentrates on unit-level training emphasizing mobility (navigation,
seamanship, damage control, engineering, and flight operations), basic command and control,
weapons employment, and warfare specialties.⁴ This is where the Navy can benefit most from
using simulation to identify and train the best people for individual watch stations within the
major warfare areas. By using simulation, the ship can cross-train numerous people for each
watch station, thereby reducing the possibility of error during valuable live exercises.

The numbered fleet commanders have the responsibility for training during the
Intermediate and Advanced phases. The Intermediate Phase lasts approximately three months
and concentrates on warfare team training and initial multi-unit operations. During this phase,
ships begin to develop warfare skills in coordination with other units while continuing to
maintain unit level proficiency.⁵ By continuing to use more complex simulated exercises during
in port periods, a ship will be able to increase the proficiency of its watch standers without
jeopardizing underway time. The Intermediate Phase involves one or more combined (i.e., multi-
unit) exercises. The last two months of the Inter deployment Training Cycle is the advanced phase of training, which continues to develop and refine integrated battle group warfare skills and command and control procedures. The objective of this phase is to ensure that all units in the force are prepared to support the battle group commander’s specific mission requirements. A joint exercise involving multiple surface, air, and subsurface units is the culmination of the advanced phase.

**Major Warfare Areas:**

Air Warfare, formerly known as Anti-Air Warfare is often thought of as the most prestigious of the warfare areas. During the cold war era, the primary threat to a battle group was a large scale air attack from the Soviet Union. Ships were designed and trained to specifically defeat this type of attack that would be made up of principally Air to Surface and Surface to Surface missiles. The Air Warfare Commander duties were normally assigned to the senior Ticonderoga Class cruiser within a strike group, but can be tasked to an Arleigh Burke class destroyer as well. This warfare area deals with any type of air threat to the ship or assigned task group. Every ship’s commanding officer is responsible for the safety of his or her own ship, but the Air Warfare Commander is additionally responsible for the safety of the entire strike group or assigned high value unit from an air threat. This area requires a highly skilled and trained crew as it is used not only to defend the ship and strike group but must also control any assigned Combat Air Patrol aircraft within its area of responsibility. Air Warfare exercises are prime examples of where using simulation during in port periods can produce great benefits by training numerous personnel to proficiency prior to using valuable underway time and expensive resources for live exercises.
Surface Warfare is the countering of a threat to the ship or task group from any type of surface vessel. Due to the evolution of aircraft and submarines in the latter half of the 20th century, the importance of countering the surface threat has diminished in comparison. In recent years the focus has not been on the traditional enemy navy ship but on a more non-traditional asymmetric type threat. Some countries have developed a “swarm tactic” that uses many small, fast, highly agile boats equipped with guns, missiles, and rocket propelled grenades to attack a warship during a straits transit or some other period of restricted maneuverability. There have been great strides in technology advancement in the surface warfare area. Development of the High Explosive Electronically Timed and Kinetic Energy Electronically Timed rounds for the 5 inch gun systems, the Close In Weapon System Block 1B using a surface mode, and the Ship Protection System are prime examples of systems that can specifically counter this threat.

There is, however, a difficulty in training for this asymmetric threat. It is difficult and expensive to provide a live scenario that includes a high number of small, fast moving craft converging on a single ship or task group. Simulation would be especially beneficial in providing training for this threat. The key is training the crew in the tactics, techniques, and procedures for countering the threat. It would be advantageous to the Navy if the Surface Warfare Development Group, the organization that develops the TTP’s, were somehow incorporated into the Afloat Training Group to ensure the latest tactics are being practiced.

Undersea Warfare, more commonly known as submarine warfare has also evolved dramatically since the middle of the 20th century. With the introduction of the nuclear powered submarine in the 1950’s, submarine warfare was changed forever, these new submarines were faster, could operate deeper and for extended periods of time. The nuclear submarine threat during the cold war era was significant and was a primary focus of the U.S. Navy during this
period. Also, the presence of Russian submarines provided numerous opportunities to practice that training during deployments. The end of the Cold War and the collapse of the Russian submarine force led to a reduction in the priority of Undersea Warfare training. The focus for Undersea Warfare training has shifted from the threat of nuclear powered, deep-water submarines to diesel-powered submarines in shallow water. Advances in stealth techniques for diesel-powered submarines plus the detection difficulties in a littoral environment have made the Undersea Warfare mission even more difficult.6

This increasing difficulty is compounded by the lack of real-world training opportunities. The U.S. Navy has no adequate shallow-water training areas, and Undersea Warfare teams have few opportunities to practice against diesel submarines. Foreign submarines are rarely available as potential training targets and, even when they participate in joint and combined exercises, their operations are often restricted or orchestrated.7 Therefore, although Undersea Warfare is part of training during the Inter Deployment Training Cycle, there is little opportunity to practice that training in a purely “live” environment, especially when deployed.8

New submarine designs, such as the Virginia class SSN, have been introduced into the fleet recently and were developed to perform a myriad of missions including shallow water ops. Using these new, quieter submarines for live training would be very beneficial to Undersea Warfare teams. Developing simulated training scenarios would be relatively easy to accomplish since we hold the sound data for these platforms and these simulated exercises would provide great benefit to watch stander proficiency and could be conducted during in port periods.
Use of Simulation:

Navy surface force training has traditionally involved a combination of shore-based and underway training. Any Surface Warfare Officer will attest that there is nothing better than putting live ordinance on top of a live target (this author is one of them). Recently, however, a combination of economic, operational, and political changes has prompted the Navy to consider shifting the balance toward more shore-based training. The high cost of underway training, the increased operational tempo, reduced access to training ranges, and other factors have decreased the attractiveness of underway training. At the same time, technological advances in simulator technology have made it possible to provide high-quality, shore-based training in many mission areas.9

Classroom training, however, requires the maintenance of an extensive shore-based training infrastructure and the actual training value is limited by the fidelity of the training equipment. Due to upgrade and conversion schedules aboard ship, shore-based trainers typically include equipment and sensor models that only approximate what the combat system team will find on real ships in a real combat environment. This is due to the nature of the shore-based facility; shore facilities must serve as trainers for many ship classes, and shore-based trainer mockups tend to lag the state of the actual combat system equipment by several years.10

Tightening budget constraints and increasing access restrictions have reduced the U.S. Navy’s ability to conduct tactical training at the unit level. At the same time that live training events have become more difficult to accomplish, significant technological advances have improved the productivity and realism in the modeling, simulation, and distributed training areas. However, the balance among live, simulated, and schoolhouse training events has not significantly changed since the 1970s.11 Shipboard simulation can be used to conduct quality
training during all stages of the Inter Deployment Training Cycle. The effectiveness of that training depends, however, on the quality of the personnel that are performing the training aboard ships.

The Right People:

As mentioned above, Air Warfare is often thought of as the most prestigious of the warfare areas. What implanted this way of thinking was the fact that the training organization (Aegis Training and Readiness Center) that would provide Air Warfare team training to the ships was made up of some of the most highly qualified individuals throughout the Navy. This organization would “handpick” its trainers and the selection process to get orders to that organization was very thorough. A few years ago the Aegis Training and Readiness Center was combined with the Center for Surface Combat Systems which is part of the Afloat Training Group and the selection process for Air Warfare trainers no longer exists.

The Afloat Training Group does not have an adequate selection process for its assigned personnel. Due to this fact anyone who is eligible for orders can be assigned to the organization as a ship trainer. There is a qualification process to be a shipboard leader within the training organization, but it is not as thorough as it could be. By changing the selection process to this organization the U.S. Navy could improve the quality of trainers that are assigned which would then lead to better training being provided to ships.
Conclusion:

Simulation is an effective way to train ships and personnel within the U.S. Navy. Modern technology is able to provide quality scenarios of variable complexity to be used to increase the proficiency of training teams and watch standers aboard ships at all levels during the Inter Deployment Training Cycle. The key is for Fleet and Type commanders to put the appropriate emphasis on in port training to ensure compliance by ships during the training cycle.

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Endnotes


2 Ibid. Pg 52.


5 Ibid. Pg 166.


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