

REPORT DOCUMENTATION PAGE*Form Approved*
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY)

03-05-2010

2. REPORT TYPE

FINAL

3. DATES COVERED (From - To)**4. TITLE AND SUBTITLE**

Sea Devils, Submersibles, and Underwater IEDs: Asymmetric Undersea Threats to Assured Access in an Operational Environment

5a. CONTRACT NUMBER**5b. GRANT NUMBER****5c. PROGRAM ELEMENT NUMBER****6. AUTHOR(S)**

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5d. PROJECT NUMBER**5e. TASK NUMBER****5f. WORK UNIT NUMBER**

Paper Advisor (if Any): CDR Neil Thompson and Prof. Steve Forand

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)Office of the Provost
Naval War College
686 Cushing Road
Newport, RI 02841-1207**8. PERFORMING ORGANIZATION REPORT NUMBER****9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)****10. SPONSOR/MONITOR'S ACRONYM(S)****11. SPONSOR/MONITOR'S REPORT NUMBER(S)****12. DISTRIBUTION / AVAILABILITY STATEMENT**

Distribution Statement A: Approved for public release; Distribution is unlimited.

13. SUPPLEMENTARY NOTES: A paper submitted to the faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.

14. ABSTRACT

Current U.S. military strategy requires assured maritime access to achieve national policy objectives. Because of our conventional superiority in the maritime domain, adversaries will seek asymmetric advantages to contest this access. Asymmetric undersea threats - such as sea mines, improvised explosive devices, combat swimmers and swimmer delivery vehicles, semi-submersibles, and mini-submarines - can disrupt assured maritime access. Operational commanders must recognize the existing danger posed by such threats, and mitigate risk through the integration of joint, multinational, and interagency forces and capabilities. This paper discusses asymmetric undersea threats and their advantages to an adversary seeking to challenge assured maritime access. Next, the paper addresses current obstacles faced by U.S. joint forces when encountering these threats. Finally, it makes recommendations on how an operational commander can mitigate the risk posed by asymmetric undersea threats.

15. SUBJECT TERMS

Asymmetric Warfare, Undersea Warfare, Assured Maritime Access, Asymmetric Undersea Threats

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Chairman, JMO Dept
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED	c. THIS PAGE UNCLASSIFIED			19b. TELEPHONE NUMBER (include area code) 401-841-3556

Standard Form 298 (Rev. 8-98)

**NAVAL WAR COLLEGE
Newport, R.I.**

**SEA DEVILS, SUBMERSIBLES AND UNDERWATER IEDs:
ASYMMETRIC UNDERSEA THREATS TO ASSURED ACCESS IN AN
OPERATIONAL ENVIRONMENT**

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

03 May 2010

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Abstract

Current U.S. military strategy requires assured maritime access to achieve national policy objectives. Because of our conventional superiority in the maritime domain, adversaries will seek asymmetric advantages to contest this access. Asymmetric undersea threats – such as sea mines, improvised explosive devices, combat swimmers and swimmer delivery vehicles, semi-submersibles, and mini-submarines – can disrupt assured maritime access. Operational commanders must recognize the existing danger posed by such threats, and mitigate risk through the integration of joint, multinational, and interagency forces and capabilities. This paper discusses asymmetric undersea threats and their advantages to an adversary seeking to challenge assured maritime access. Next, the paper addresses current obstacles faced by U.S. joint forces when encountering these threats. Finally, it makes recommendations on how an operational commander can mitigate the risk posed by asymmetric undersea threats.

Introduction

Two massive explosions rocked the USS *Westchester County* LST (Landing Ship Tank) as she sat anchored on the My Tho River, Vietnam, on November 1, 1968. Vietcong (VC) combat swimmers had successfully placed limpet mines along her hull creating two massive holes. At the time, the *Westchester County* was serving as a floating home for nearly two hundred sailors and soldiers. Several ammunition ships were alongside, as well as numerous salvage vessels, repair barges, and assault craft of the U.S. Navy. Only swift and effective damage control efforts following the explosions prevented a massive chain reaction explosion from high order ammunition. Twenty-three U.S. personnel died in the attack – the U.S. Navy’s single largest loss of life during the Vietnam War – and the *Westchester County* returned to Yokosuka, Japan, for repairs.

This example illustrates the potential consequences of an asymmetric undersea attack. In the contemporary strategic environment, adversaries will inevitably attempt to utilize asymmetric means to challenge U.S. conventional superiority. As the United States continues to rely on assured maritime access to achieve our national policy objectives, this asymmetric threat is sure to manifest itself in the maritime domain. Following the attack on the USS *Cole* in 2000, the United States dramatically increased its emphasis on countering the asymmetric maritime surface threat.¹ However, an operational commander should also recognize the existing danger to assured maritime access posed by asymmetric undersea threats and mitigate the risk through integration of joint, multinational, and interagency forces and capabilities.

¹ Captain Thomas C. Sass (Naval War College), interview by the author, 12 April 2010.

Background

Current Joint Publications, including JP 1-02 the *DOD Dictionary of Military and Associated Terms*, do not include a definition of asymmetric warfare. Though there is no clear doctrinal definition, the term ‘asymmetric warfare’ typically describes a conflict in which significant differences exist in the military strength, forces, or capabilities of the belligerents. However, the importance of the term suggests more than a simple disparity between adversaries. Steven Lambakis, senior analyst in space power and policy studies, discusses the pertinent elements of asymmetric warfare: “...asymmetry typically describes an enemy that thinks or acts differently from America...Such weapons leverage vulnerabilities we either overlook or tolerate...And these asymmetric approaches can generate dramatic outcomes for a weaker power.”² Operational commanders must consider the threat of asymmetric warfare against the backdrop of a U.S. maritime strategy based on expeditionary operations.

Current U.S. national strategy dictates a requirement for assured maritime access to project and sustain power ashore. Access to foreign bases is a critical component of this strategy. However, access to foreign bases is a potential vulnerability for U.S. expeditionary operations. Indian Brigadier General V.K. Nair made the following comments following the Gulf War regarding forward base access: “... [This] is by far the trickiest part of the American operational problem. This is the proverbial ‘Achilles Heel.’ India needs to study the vulnerabilities and create covert bodies to develop plans and execute operations to degrade these facilities in the run up to and commencement of hostilities. Scope exists for low cost options to significantly reduce the combat potential of forces operating from these facilities.”³ This highlights the notion that potential adversaries may rely on asymmetric warfare when

² Lambakis, “Reconsidering Asymmetric Warfare,” 102.

³ Krepinevich, Watts, and Work, *Meeting the Anti-Access and Area-Denial Challenge*, 4.

confronting the U.S. military. One such option is the development and employment of weapons and methods that attack from under the sea.

The undersea environment offers an adversary the advantage of stealth and surprise. Because of the difficulty in detecting threats underwater, this is perhaps the ‘last sanctuary’ for adversary forces to operate against the United States.⁴ Additionally, the difficulty in striking maritime vessels with a force-on-force engagement has focused the development of asymmetric methods.⁵ These methods include sea mines, improvised explosive devices, combat swimmers and swimmer delivery vehicles, semi-submersibles, and mini-submarines. In addition, maintaining maritime access is more complex when operating within narrow or enclosed seas. Milan Vego emphasizes the advantages of asymmetric methods in narrow seas: “The small size of the area [of narrow seas], short distances, shallow waters, and presence of a large number of offshore islands...leads to an ability to dispute control with the stronger fleet. The lack of large surface combatants could be compensated for by coastal and midget submarines, missile-armed corvettes and fast attack craft, and mines.”⁶ These methods have several characteristics that demonstrate their longevity and appeal – multiple effects, cost-effectiveness, and adaptability.

Multiple Effects

Asymmetric weapons can produce several operational and/or strategic effects with a successful attack. In addition to the potential physical damage, asymmetric undersea weapons pose a psychological threat. The great master of war Clausewitz recognized the importance of psychological and moral forces during war, “Fighting, in turn, is a trial of moral and physical forces through the medium of the latter. Naturally moral strength must not be excluded, for

⁴ Hasslinger, “Undersea Warfare: The Hidden Threat.”

⁵ Brown, “Sails of the Unexpected – UK Trains for Asymmetric Threat,” 1.

⁶ Milan Vego, *On Naval Warfare*, 90.

psychological forces exert a decisive influence on the elements involved in war.”⁷ The Improvised Explosive Device (IED) is a relevant example of a modern-day asymmetric weapon used to produce multiple effects. The primary threat to coalition forces operating in Iraq and Afghanistan, these homemade devices can inflict dramatic physical damage while simultaneously creating fear and anxiety. The heightened state of anxiety is due to the emergence of “360° Warfare,” which notes the disappearance of a traditional linear battlefield and the threat of an attack occurring from any direction.⁸ This analysis is also applicable to a maritime environment. Maritime weapons can attack on multiple axes – from land, air, surface, and underwater – and, like land-based IEDs, present a 360° challenge. The multi-directional threat intensifies the psychological impact of asymmetric undersea threats.

To exploit this asymmetrical advantage in an undersea environment, the Italian Navy perfected the use of combat swimmers and human torpedoes prior to World War II. The Decima MAS employed an asymmetrical threat to challenge British maritime dominance in the Mediterranean. The ‘Sea Devils’ utilized two-man combat swimmer teams riding human torpedoes to attach limpet mines against several British ships anchored at Port Alexandria, Egypt, in December 1941. The attack resulted in the loss of the two most valuable British warships in the Mediterranean, the battleships *Queen Elizabeth* and *Valiant*, as well as a merchant oiler. Though the British captured all six Italian combat swimmers, the attack caused considerable physical damage and generated a profound psychological effect on the British fleet. A midshipman aboard the *Queen Elizabeth* made this statement following the attack: “all of us thought that the Italian navy was hopeless, inefficient, and even cowardly...However, we soon

⁷ Carl von Clausewitz, *On War*, 127.

⁸ Bokel, “IEDs in Asymmetric Warfare,” 35.

revised our opinions about their heroism and ingenuity.”⁹ In addition to considerable physical damage and the psychological impact, the Decima MAS raid on Alexandria was highly cost-effective.

Cost-effective

Another element of asymmetric undersea threats ensuring their prevalent use is a disproportionately high payoff; they have low development and employment costs, but can inflict potentially large amounts of damage.¹⁰ For example, sea mines range from less than one hundred dollars to a relatively inexpensive thirty thousand dollars for an advanced, multi-influence mine.¹¹ Additionally, production costs can remain low because of their durability; mines can remain effective for decades after being constructed. In early March 2010, observers discovered a German World War II parachute mine in Portland Harbor near Dorset, England.¹² Deployed over seventy years ago, the two thousand pound mine still retained an active charge and required neutralization by bomb disposal experts. In 1987, while operating in the Persian Gulf, the U.S. frigate *Samuel B. Roberts* struck a World War I-era contact mine. This \$1,500 mine blasted a hole in the *Roberts*’ hull, resulting in \$96 million dollars in damage.¹³ Thus, every dollar spent building that mine ultimately cost the United States \$64,000 in repairs. In addition to being cost-effective, asymmetric undersea threats are also simple to construct.

An adversary seeking an asymmetric advantage to exploit U.S. vulnerabilities can easily develop a credible undersea weapon.¹⁴ These simple to construct weapons range from crude

⁹ Greene and Massignani, *The Black Prince and the Sea Devils*, 26.

¹⁰ Sutton, “Maritime Irregular Warfare: A Long Range View,” 84.

¹¹ Truver, “Mines and Underwater IEDs in U.S. Ports and Waterways,” 108.

¹² BBC News, “German Mine to be Blown Up in Weymouth Bay.”

¹³ Truver, “Mines and Underwater IEDs in U.S. Ports and Waterways,” 110.

¹⁴ *Ibid*, 108.

floating or underwater improvised explosive devices (UWIED) to semi-submersibles and mini-submarines. An April 2004 incident on Lake Pontchartrain, Louisiana, illustrates just how effortlessly an UWIED is constructed.¹⁵ A tugboat captain reported a floating bag to the U.S. Coast Guard. Examination of the device revealed an UWIED consisting of several pounds of explosive stuffed into plastic pipes. Trash bags wrapped around the device provided buoyancy, with a timer attached for detonation. While small in scale, this device demonstrates the relative simplicity of an UWIED. Though it is unlikely that such a threat would completely deny maritime access, UWIEDs could disrupt sustainment efforts. The next logical step for an adversary wishing to challenge U.S. maritime access would be to construct bigger, more destructive weapons. The ability to employ these devices in large quantities along waterways, harbors, or sea lines of communication demonstrates the inherent adaptability of asymmetric undersea weapons.

Adaptability

A third characteristic of asymmetric undersea weapons is their adaptability.¹⁶ As Sun Tzu reminds us, “Now an army may be likened to water, for just as flowing water avoids the heights and hastens to the lowlands, so an army avoids strength and strikes weakness. And as water shapes its flow in accordance with the ground, so an army manages its victory in accordance with the situation of the enemy. And as water has no constant form, there are in war no constant conditions. Thus, one able to gain the victory by modifying his tactics in accordance with the enemy situation may be said to be divine.”¹⁷ A user may easily tailor asymmetric weapons development and subsequent use to the unique characteristics of a particular situation.

¹⁵ Ibid, 112.

¹⁶ Sutton, “Maritime Irregular Warfare: A Long Range View,” 79.

¹⁷ Sun Tzu, *The Art of War*, 101.

This allows flexible employment regarding target type and geographical considerations. Because of these features, adaptability is a contributing factor to the prevalent, historical use of asymmetrical weapons.¹⁸

The Confederate Navy demonstrated this flexibility when they sank the ironclad *USS Cairo* in 1862 along the Yazoo River. Because of the ineffectiveness of the spar torpedo, which required attachment to an attacking ship, the Confederacy began a process of development to modify the weapon for independent use.¹⁹ The result was an electrically command detonated torpedo (today known as a sea mine) that sank the *Cairo* in a matter of minutes. This sinking was the catalyst for further Confederate production and use of mines to mitigate the North's control of the seas. By 1864 mines threatening Union warships had become so abundant that they inspired Farragut's famous line, "Damn the torpedoes, full speed ahead!"²⁰

The flexibility and effectiveness of asymmetric weapons holds wide appeal for armed groups. The most notable example of an undersea threat comes from the Liberation Tigers of Tamil Eelam (LTTE), who developed a maritime element in their quest for secession from Sri Lanka. During the 1980s and 1990s, the Sea Tigers conducted numerous attacks against Sri Lankan combatants and other maritime vessels using mines, underwater improvised explosive devices (UWIED) and other methods. The most common technique required "a frogman to self-detonate submersible charges that are attached to a ship's hull or suspended from its propeller shaft."²¹ This adaptive response to the superior Sri Lankan navy demonstrates the flexibility of asymmetric undersea weapons. Because of this adaptability, coupled with their multiple effects and cost-effectiveness, asymmetric undersea threats are widely used throughout the world.

¹⁸ Sutton, "Maritime Irregular Warfare: A Long Range View," 79.

¹⁹ Hoehling, *Damn the Torpedoes! Naval Incidents of the Civil War*, 79.

²⁰ Ibid.

²¹ Chalk, "Tigers Evolve – The Liberation Tigers of Tamil Eelam's Developing Suicide Attack Methods," 4.

Threat Recognition

Asymmetric undersea threats are widely proliferated throughout the world because of their inherent advantages (multiple effects, cost-effectiveness, and adaptability). Countries as well as armed groups have developed an ability to employ mines, IEDs, combat swimmers, and submersibles. Over fifty countries have a sea mine capability and there are approximately 275,000 mines worldwide.²² Nearly forty countries maintain a combat swimmer and delivery vehicle capability.²³ Many countries employ a combination of mini-submarines, hovercraft, and semi-submersibles for combat swimmer delivery to threaten maritime targets. For example, high-speed semi-submersibles are capable of reaching 50 knots en-route to a target. Such vessels can then deliver multiple combat swimmers on target by traveling submerged at speeds approaching 5 knots.

The asymmetric undersea threat is not limited to developed countries with institutional militaries. Using the afore-mentioned LTTE Sea Tigers as a benchmark, numerous armed groups have developed maritime capabilities. Unclassified reports from Jane's Intelligence Group list two-dozen groups that have accomplished maritime attacks over the past few decades, along with an additional twenty active groups that have the *capability* to conduct maritime attacks.²⁴ Among these groups are Al Qaeda, Hezbollah, Hamas, and the Moro Islamic Liberation Front. Though not all groups currently possess an undersea capability, they may develop the means to carry out such attacks in the future. Such groups require monitoring through intelligence collection efforts.

Because of the prolific existence of asymmetric undersea weapons, operational commanders must acknowledge the threat. Intelligence collection and critical factor analysis are

²² Vego, "Mine Warfare: Are We Prepared for the Worst," 69.

²³ Gunaratna, "The Asymmetric Threat From Maritime Terrorism," 1-6.

²⁴ Ibid, 5-6.

essential components in developing situational awareness. Joint Intelligence Preparation of the Operational Environment (JIPOE) should consider the development of asymmetric undersea weapons and employment techniques, and “should be focused on determining the potential adversary’s willingness, intent, and capability to conduct such attacks during any conflict.”²⁵ Preparation of the operational undersea environment must emphasize the capabilities of such adversaries, vice relying on demonstrated attacks or perceived intent. Other considerations include:²⁶

- Maritime Domain Awareness of operationally relevant waterways to establish normal patterns of life/activity.
- Underwater terrain and oceanography near likely sea ports of debarkation and surrounding waters.
- Weather and climate conditions.
- Regular and updated bottom contour mapping to enable change detection for defeating sea mines and underwater IEDs.

Collection efforts should be continuous throughout the planning process and mission execution. The Joint Collection Management Board (JCMB) should develop Priority Intelligence Requirements (PIRs) along with an adequate collection plan to provide specific intelligence relative to the asymmetric undersea threat. This should be a multi-national, joint, and interagency process to ensure unity of effort through shared information and common databases. Maintaining adequate threat awareness will also aid in critical factor analysis.

Analysis of U.S. critical factors serves as a fundamental planning concept to ensure risk mitigation during major operations. For example, identification of U.S. combat power as the

²⁵ Christian and Manke, *Asymmetry in Maritime Access and Undersea Anti-Access*, 23.

²⁶ Truver, “Mines and Underwater IEDs in U.S. Ports and Waterways,” 118.

friendly Center of Gravity leads to analysis of joint functions such as intelligence, sustainment, and protection as critical capabilities. In the contemporary operational environment, supporting critical requirements and resultant critical vulnerabilities often relate to sea lines of communication, strategic sealift assets, and sea ports of debarkation. Operational sustainment is essential in deploying and maintaining U.S. combat power, and therefore requires protection from an asymmetric undersea threat. Therefore, a “brutally honest assessment of potential targeted vulnerabilities is required.”²⁷ This will provide operational planners with the necessary situational awareness and, when coupled with relevant and continuous intelligence, will ensure adequate consideration of an asymmetric undersea threat.

Limited Resources

During contemporary U.S. operations, limited assets and competing demands complicate efforts to mitigate asymmetrical threats.²⁸ To neutralize an asymmetric undersea threat to achieve assured maritime access U.S. forces must monitor large areas for extended periods. Often, the United States and allies have too few assets to combat the threat in a timely manner. This could lead to possible disruptions and delays of the sea borne logistics needed to sustain major operations ashore. For example, in 2003 the Iraqis mined the port of Umm Qasr prior to OPERATION IRAQI FREEDOM. It took coalition forces nine days to clear the nine hundred square miles in the port and its approaching channels.²⁹ The time intensive endeavor of combating asymmetric undersea threats becomes more difficult due to competing worldwide

²⁷ Christian and Manke, *Asymmetry in Maritime Access and Undersea Anti-Access*, 19.

²⁸ Raymond J. Christian and Robert C. Manke (Naval Undersea Warfare Center), interview by the author, 14 April 2010.

²⁹ Truver, “Mines and Underwater IEDs in U.S. Ports and Waterways,” 121.

priorities.³⁰ A traditional focus on conventional and nuclear submarines has garnered a majority of the funding, development, sourcing, and training for U.S. military forces tasked to control the underwater medium; little remains for the asymmetric threat. Further highlighting the limitations of U.S. mine countermeasures (MCM) forces, the effort to clear Umm Qasr required a combination of U.S., British, and Australian forces.

The multi-national mine clearing effort at Umm Qasr illustrates the increasing dependency the United States places on partner nations. Therefore, the United States should strive to develop partner nations' capacity through efforts such as Theater Security Cooperation Plans and Foreign Internal Defense programs. These measures should concentrate on developing partner nation capabilities to enhance U.S. forces operational intelligence, protection, and fires. Operational intelligence leverages a partner nation's ability to remain cognizant of local and regional asymmetric threats. The result is increased awareness of the development of adversaries' maritime capabilities that may include an undersea threat.³¹

Operational protection for U.S. forces is enhanced by a partner nation's capacity to provide integrated, multi-dimensional (air, land, sea, undersea) harbor defense plans and target hardening. This allows U.S. forces to employ joint service resources alongside partner nation forces and capabilities to effectively detect and defeat asymmetric undersea threats that penetrate a port or its surrounding approaches. In addition, enhancing port infrastructure by building and maintaining multiple deep-water ports will support flexible logistics.³² Finally, operational fires can isolate and neutralize an asymmetric threat before entering the water. Partner nations can augment this capability not only by providing enhanced threat awareness through local

³⁰ Raymond J. Christian and Robert C. Manke (Naval Undersea Warfare Center), interview by the author, 14 April 2010.

³¹ Christian and Manke, *Asymmetry in Maritime Access and Undersea Anti-Access*, 23.

³² Larson et al., *Assuring Access in Key Strategic Regions*, 126.

intelligence, but also by conducting pre-emptive strikes on adversaries likely to employ an asymmetric undersea threat. This increased partner nation capacity would lessen the burden on operational commanders when facing an asymmetric undersea threat to assured maritime access.³³

Narrowly Focused Doctrine

Current U.S. doctrine does not contain an integrated joint service approach to prepare for an asymmetric undersea threat. While joint publications note the need for port security and sealift protection, they do not specifically address an asymmetric undersea threat. This reflects inadequate prioritization of the threat and can lead to oversight during the joint planning process. Applicable doctrine to the undersea threat is service specific and neglects the advantages a joint approach offers. For example, Naval Coastal Warfare forces conduct port and harbor security. Naval Warfare Publication 3-10 discusses the mission of Naval Coastal Warfare (NCW) forces, which utilize Naval Coastal Warfare Squadrons (NCWRON), Mobile Inshore Undersea Warfare Units (MIUWU), and Inshore Boat Units (IBU) to provide harbor protection capabilities. However, these forces are limited assets with very narrow mission functions. The United States must broaden its approach and adopt a doctrinally accepted joint concept emphasizing coordination to ensure unity of effort.

Coordination will enable the synchronization of counter-threat methods both ashore and in the maritime environment. This enables an operational commander to optimize available resources to mitigate an adversary's capability. The operational commander should consider creating a coordination cell with the explicit task of focusing on potential asymmetric threats in the maritime environment. Formed within the J-2 directorate, a Counter-Asymmetric Undersea

³³ Ibid.

Threat Cell (CAUTC) should include representatives from the intelligence, operations, logistics, and plans directorates as well as liaison officers from applicable agencies and partner nations.

The cell should reside at the Joint Intelligence Operations Center (JIOC) to enable rapid integration at the Joint Task Force level during contingency and crisis operations. Regular coordination with the Joint Interagency Coordination Group (JIACG) will provide synchronized security cooperation planning specific to an asymmetric undersea threat. Establishment and maintenance of a CAUTC would also enable the designation of Priority Intelligence Requirements (PIR) regarding such threats.

A CAUTC would ensure that planners adequately consider the asymmetric undersea threat during both conceptual and functional planning, as well as reassessment during mission execution. This includes the incorporation of both defensive and offensive actions. An operational commander must be prepared to pursue offensive actions to eliminate an asymmetric undersea threat. If politically feasible and within the scope of international law, this includes the neutralization of an adversary's threat using pre-emptive strikes. Defensively, NCW assets should integrate with partner nation and Other Government Agencies (OGA) to ensure unity of effort towards surveillance, detection, and defeat of a threat. As discussed earlier, partner nations can provide capabilities that enhance operational intelligence, protection, and fires. OGAs can assist in the collection, processing, exploitation, and dissemination of intelligence concerning the threat. By emphasizing these coordination measures, the CAUTC would ensure unity of effort towards mitigating an asymmetric undersea threat.

Role of Technology

Some argue that the threat posed by maritime asymmetry in the underwater dimension is unlikely in the typical 21st century operational environment. Developments in technology and surveillance sensors have greatly improved a joint force's ability to detect underwater threats. The emergence of Unmanned Undersea Vehicles (UUV) provides the capability to conduct persistent intelligence, surveillance, and reconnaissance (ISR) to detect and defeat an asymmetric undersea threat. For example, the 2004 *U.S. Navy UUV Master Plan* lists several missions that could defeat an undersea threat³⁴:

- Tactical intelligence below the surface
- Harbor monitoring close to shore
- Deploy long-range surveillance sensors
- Bottom mapping and object detection
- Mine countermeasures

UUVs will provide an operational commander a capability to mitigate asymmetric undersea threats utilizing advanced technology. These sensors can detect and neutralize a potential asymmetric undersea threat before it has the opportunity to attack.

Despite this robust list of capabilities, there is a danger in assuming that UUVs are a panacea for combating undersea threats. The UUV Master Plan claims that “one can conceive of scenarios where UUVs sense, track, identify, target, and destroy an enemy – all autonomously and tie in with the full net-centric battlespace.”³⁵ This perception is myopic and does not respect the adaptability and innovation demonstrated by adversaries employing asymmetric weapons. While providing enhanced surveillance and detection capabilities, UUVs must remain part of a

³⁴ U.S. Department of the Navy, *The Navy Unmanned Undersea Vehicle (UUV) Master Plan*, 9-15.

³⁵ *Ibid*, xvii.

coordinated effort to mitigate asymmetric undersea threats.³⁶ History has proven that adversaries will adapt asymmetric threats to compensate for conventional or technological gaps in capabilities. Consider one of the world's most advanced and capable warships, the USS *Cole*. Despite the *Cole's* vast array of technologically advanced sensors, it could not prevent an attack by terrorists armed with explosives in a small boat. Similarly, adversaries will continue to seek ways to avoid our maritime strengths; this is the essence of asymmetrical warfare. The United States must remain vigilant and be prepared to adjust to emerging asymmetric undersea threats. Therefore, UUVs will not alleviate the need to build partner nation capacity, maintain current threat awareness, and ensure joint, interagency, and multi-national coordination.

Analytical Conclusions

Asymmetric warfare has existed since humans went to war; the idea of “exploiting the adversary's weaknesses while avoiding his strengths” is nothing new.³⁷ With few near-peer rivals in the maritime domain, adversaries will continue to utilize asymmetric methods to confront U.S. conventional superiority and challenge assured maritime access. This access is critical to carry out a national military strategy that relies on expeditionary operations to achieve national policy objectives. As a result, asymmetric undersea threats can deny U.S. joint forces the maritime access needed to conduct military operations in support of national strategy and policies. Sea mines, improvised explosive devices, combat swimmers and swimmer delivery vehicles, semi-submersibles, and mini-submarines deliver multiple effects, are cost-effective, and remain adaptable within an operational environment. Therefore, operational commanders must recognize existing maritime asymmetric threats and their potential impact.

³⁶ Captain Thomas C. Sass (Naval War College), interview by the author, 12 April 2010.

³⁷ Josh Corless, “Hunting Goliath in the Age of Asymmetric Warfare,” 1.

Recommendations

The operational commander must recognize the existing danger to assured maritime access posed by asymmetric undersea threats and mitigate the risk by integrating joint, multinational, and interagency forces and capabilities. To accomplish this, an operational commander should consider the following:

- Threat Recognition. Joint Intelligence Preparation of the Operational Environment (JIPOE) should focus on adversaries' capabilities and geographic awareness.³⁸

Information should be readily available to appropriate joint services, OGAs, and partner nations through common use databases to ensure unity of effort. Collection management has to evolve to ensure timely and relevant intelligence concerning the threat.

Operational intelligence and a realistic assessment of U.S. critical factors are necessary to mitigate the asymmetric undersea threat.

- Partner nation capacity building. In order to lessen the resource demand on U.S. forces, efforts should include building partner nation capacity.³⁹ Theater Security Cooperation Plans and Foreign Internal Defense programs should strive to develop a partner nation's capability to enhance U.S. operational intelligence, protection, and fires. Elements include building local and regional threat awareness through relevant intelligence collection efforts; enhancing harbor protection measures and developing port infrastructure; and maintaining a limited capability to conduct pre-emptive strikes to neutralize a threat before it is used.

³⁸ Truver, "Mines and Underwater IEDs in U.S. Ports and Waterways," 118.

³⁹ Larson et al., *Assuring Access in Key Strategic Regions*, 126.

- Joint service coordination. Coordination provides an operational commander the ability to synchronize operations both on land and on the water to mitigate the threat. The establishment of a Counter-Asymmetric Undersea Threat Cell (CAUTC) offers an effective method to coordinate and synchronize these efforts. Representatives from joint intelligence, operations, logistics, and plans directorates, along with interagency and multi-national liaison officers will ensure that visibility of asymmetric undersea threats continues throughout the planning and execution of major operations.

The criticality of maintaining assured access is central to projecting U.S. power ashore.

Former Chief-of-Naval Operations Admiral Jay Johnson: "...the next century will see those foes striving to target concentrations of troops and materiel ashore and attack our forces at sea and in the air. This is more than a sea-denial threat or a Navy problem. It is an area-denial threat whose defeat or negation will become the *single most crucial element in projecting and sustaining U.S. military power where it is needed.*"⁴⁰ [emphasis added]

⁴⁰ Jay Johnson, "Anytime, Anywhere: A Navy for the 21st Century," 48-50.

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