

AD-A283 945



**NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA**



THESIS

**DTIC
ELECTE
SEP 02 1994
S G D**

**STORMY WATERS:
TECHNOLOGY, SEA CONTROL AND REGIONAL WARFARE**

by

David Allan Schnell

June 1994

Thesis Advisor:

Dr. Paul Stockton

Co-Advisor:

Capt. Wayne P. Hughes, Jr.

Approved for Public release; distribution is unlimited

DTIC QUALITY INSPECTED 1

94-28508



16528

94 9 01 099

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 16 June 1994		3. REPORT TYPE AND DATES COVERED Masters Thesis
4. TITLE AND SUBTITLE Stormy Waters: Technology, Sea Control and Regional Warfare			5. FUNDING NUMBERS	
6. AUTHOR(S) David A. Schnell				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE A	
13. ABSTRACT (Maximum 200 words) An important aspect of the current strategic calculus is the diffusion of technology and proliferation of advanced weaponry, particularly naval weapon systems. This is of particular concern for the United States' Navy, historically the first on-scene and the likely target of any initial challenge to our presence. The Navy's new warfighting doctrine, "...From the Sea" focuses the Navy on these challenges. However, it has not been complimented by the necessary recapitalization and procurement to make it truly operational. To bridge the gap between the doctrinal concepts of "...From the Sea" and current capabilities, the Navy must improve its ability to exercise sea control and dominate the littoral battlespace. This will require tough procurement choices and significant investments in mine warfare, advanced military aircraft and state-of-the-art C4I systems. It may also be necessary for the Navy to postpone certain improvements or abandon certain missions in order to refocus and selectively modernize elements of the fleet.				
14. SUBJECT TERMS U.S. Navy, Technology Proliferation, Sea Control, "...From the Sea," Naval Doctrine			15. NUMBER OF PAGES 165	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

Approved for public release; distribution is unlimited

**Stormy Waters:
Technology, Sea Control and Regional Warfare**

by

David Allan Schnell
Lieutenant, United States Navy
B.A. State University of New York at Potsdam, 1983

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF ARTS IN NATIONAL SECURITY AFFAIRS

from the

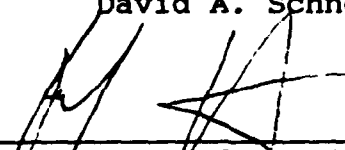
NAVAL POSTGRADUATE SCHOOL
June 1994

Author:

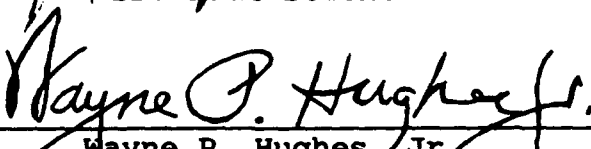


David A. Schnell

Approved By:



Dr. Paul Stockton



Wayne P. Hughes, Jr.
Captain, (USN Ret.)



Dr. Thomas C. Bruneau, Chairman
Department of National Security Affairs

ABSTRACT

An important aspect of the current strategic calculus is the diffusion of technology and proliferation of advanced weaponry, particularly naval weapon systems. This is of particular concern for the United States' Navy, historically the first on-scene and the likely target of any initial challenge to our presence. The Navy's new warfighting doctrine, "...From the Sea" focuses the Navy on these challenges. However, it has not been complimented by the necessary recapitalization and procurement to make it truly operational. To bridge the gap between the doctrinal concepts of "...From the Sea" and current capabilities, the Navy must improve its ability to exercise sea control and dominate the littoral battlespace. This will require tough procurement choices and significant investments in mine warfare, advanced military aircraft and state-of-the-art C4I systems. It may also be necessary for the Navy to postpone certain improvements or abandon certain missions in order to refocus and selectively modernize elements of the fleet.

iii

Accession For	
NTIS CRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
II.	HISTORICAL OVERVIEW.....	4
	A. TECHNOLOGY AND NAVAL WARFARE.....	5
	B. TECHNOLOGY, THREATS AND NAVAL DOCTRINE.....	27
	C. SUMMARY.....	32
III.	"...FROM THE SEA".....	34
	A. DIPLOMACY, PRESENCE AND CRISIS RESPONSE.....	37
	B. "...FROM THE SEA".....	47
	C. DEFEATING "...FROM THE SEA".....	58
	D. SUMMARY.....	66
IV.	THE THREAT.....	69
	A. SENSOR TECHNOLOGIES.....	70
	B. CONVENTIONAL NAVAL WEAPONS.....	77
	C. WEAPONS OF MASS DESTRUCTION.....	99
	D. SUMMARY.....	108
V.	OPERATIONALIZING "...FROM THE SEA".....	111
	A. A LITTORAL WARFARE PLAN.....	113
	B. CONCEPTS, OPERATIONS AND TRAINING.....	116
	C. PROCUREMENT.....	123
	D. SUMMARY.....	142
VI.	CONCLUSIONS.....	145
	BIBLIOGRAPHY.....	149
	INITIAL DISTRIBUTION LIST.....	160

I. INTRODUCTION

Since 1990, the United States' military has struggled to adapt its Cold War systems to the changes in the world's strategic landscape and the future threats which are emerging. For the U.S. Navy, this has produced "...From the Sea," a document which seeks to define a combined vision for the Navy and Marine Corps.¹ Unfortunately, the world has been complicated by the diffusion of high technology and the proliferation of advanced weapon systems. This will present challenges for the U.S. Navy as it seeks to perform its traditional missions of presence, crisis response and power projection.

The purpose of this thesis is to examine the U.S. Navy's new doctrine "...From the Sea" and determine what impact this spread of technology will have on the Navy's future operations. My hypothesis is that "...From the Sea" is exactly the type of doctrine that the Navy needs to meet the challenges of the future. However, our procurement strategies don't match the rhetoric; we still appear to be locked into a Cold War mentality which focuses on enhancing our already

¹The full title of this document is "...From the Sea: Preparing the Naval Service for the Twenty-First Century," (Washington, DC: Department of the Navy, 1992).

formidable power projection capabilities rather than on improving our ability to control the battlespace of the littorals. Given the increasingly sophisticated military threat in the Third World and the nature of the operations which "...From the Sea" espouses, we may arrive on-scene with the wrong tools and at an initial tactical disadvantage.

The industrial revolution and the machine age produced a series of technologies which have dramatically and profoundly influenced warfare at sea. However, only when technological advances are combined with organizational and doctrinal changes, are they capable of revolutionizing warfare at sea. The "Military-Technical Revolution" which appears to be on the horizon holds the promise of providing even greater revolutionary changes in naval strategy, doctrine and tactics. Chapter II presents a historical overview of the influence that technology has had on modern naval warfare and doctrine.

Chapter III examines the applicability of "...From the Sea" and gunboat diplomacy in a world where technology diffusion and the proliferation of advanced weaponry has given many Third World navies the ability to challenge the U.S. Navy. Examining "...From the Sea" from an adversary's point of view can help us understand the nature of the threat which naval and expeditionary forces may face in the littoral regions of the world.

The current international setting is complicated by the

diffusion of technology and the proliferation of sophisticated weapon systems and sensors. Our adversaries are acquiring small, lightweight weapons, advanced technologies and access to real-time targeting and intelligence sources. Naval forces must be prepared to face high-technology, combined-arms threats in every region of the world. Chapter IV addresses the threat that sophisticated sensor technologies, advanced conventional weapon systems and weapons of mass destruction may pose for U.S. Naval forces conducting the missions which "...From the Sea" envisions.

If doctrinal development is not accompanied by a concurrent period of equipment development and procurement, there will be an unacceptable delay between the acquisition of the new technology and the realization of the operational capability.² Shifting our procurement strategies, training emphasis and concept of operations towards the realities of littoral warfare is critical to the future success of the U.S. Navy. Chapter V seeks to operationalize "...From the Sea" by making recommendations which will improve the ability of the United States Navy to exercise sea control and battlespace dominance in the littoral regions of the world. Conclusions and a bibliography are presented at the end of the thesis.

²James A. Donovan (USMC, Ret.), "New Concepts and New Doctrine," Marine Corps Gazette 76 (June 1992): 42.

II. HISTORICAL OVERVIEW

If the lessons of history teach us anything, it is that we don't need to face a first-class fleet to find ourselves in a first-class fight.³

The history of naval warfare has been characterized by certain watersheds which have altered the way that war is waged at sea. Like land warfare, technical advances in the field of naval warfare have been aimed at neutralizing or defeating an opponent's advantage. Once neutralized, the immediate tactical advantage could then be exploited before an adversary was able to counter it.

In the past, technological advances in naval warfare have been primarily aimed at empowering the large, capital ships of the world's great navies. Today, advances in weapons technology have given smaller ships, aircraft and submarines the ability to compete along the littorals and challenge the United States Navy if they choose. As these lesser states' ability and readiness to challenge the U.S. Navy increases, maintaining our technological edge becomes both critical and more difficult to achieve.

³Michael Poirier, (Lieutenant Commander, USN), "Sea Control and Regional Warfare." U.S. Naval Institute Proceedings 119 (July 1993): 65.

Technology has dramatically altered the character of naval warfare in the last two centuries. In the mid-to-late nineteenth century, steam propulsion, steel hull construction and advanced gunnery techniques radically changed the nature of naval warships. Before the Navy could grasp the doctrinal implications of these new technologies, they were overturned by the submarine and the airplane which expanded the realm of naval warfare below and above the ocean's surface. Nuclear weapons and the advent of accurate guided missiles further altered the calculus of naval warfare.

This chapter presents a historical overview of the role that technology has had on modern naval warfare and how naval doctrine has been shaped by these advances. The focus is on "modern" naval warfare, that period which began with the invention of steam propulsion, effectively ending three thousand years of sailed warships. It also analyzes the difficulties with which new technologies are incorporated into existing military systems and the sometimes innovative and radical changes in doctrine and tactics which have accompanied certain technological advances.

A. TECHNOLOGY AND NAVAL WARFARE

On October 21, 1805 the last great sea battle between wooden-hulled, sail-rigged ships-of-the-line took place off the southwest coast of Spain at Trafalgar. Admiral Lord Nelson probably could not have imagined the changes that naval

warfare would undergo in the next two hundred years. Since then, many inventions and innovative tactics have changed the character of naval warfare. The industrial revolution and the machine age produced a series of technologies which have dramatically and profoundly influenced warfare at sea. The "Military-Technical Revolution" holds the promise of providing revolutionary changes which will affect the naval strategy, doctrine and tactics in ways that we cannot yet imagine.

Naval warfare began the day that man first took to the seas. The Phoenicians and the Greeks developed the first true warship, the trireme, in the 8th century B.C. It was powered by up to three banks of oars and featured a large ram as its primary means of disabling an opponent's vessel. Until the sixteenth century, ships were constrained by their seaworthiness, the number of men they could carry and the amount of supplies they could hold. They were primarily used to transport soldiers to the battle on land. Occasionally, fleets crossed each other's path and a naval "engagement" would ensue.⁴ These battles, if they could be called that, were fought close to shore and were usually very bloody and short.

As access to technology has increased and weapons have proliferated, lesser navies gained the ability to challenge

⁴Jan S. Breemer, "Naval Strategy is Dead," U.S. Naval Institute Proceedings 120 (February 1994): 49.

numerically and technologically superior fleets. During the Peloponnesian Wars, small boats manned by archers were used by the Syracusans to get to the rowers who powered the larger Athenian galleys. Syracusan galleys would have been no match for the Athenian vessels in a head-to-head confrontation but their innovative small boat tactics were successful. Similarly, the torpedo boat tactics of the Japanese Navy during the Russo-Japanese War allowed them to successfully engage and the larger Russian warships.

The great revolutions in modern naval warfare are well-described by Bernard Brodie in his famous work, Sea Power in the Machine Age, (Princeton: Princeton University Press, 1941). The steam warship, iron-hull construction, armor and great ordnance, submarine warfare and naval aircraft were revolutionary inventions which fundamentally altered naval warfare.⁵ Nuclear weapons and guided missiles have changed naval warfare even more since Brodie's book was published. These technological advances not only affected naval tactics and doctrine, they altered the global balance of power and determined which nation would dominate at sea.

1. The Steam Warship

James Watts' invention of the steam engine in 1763 was successfully mated to a wooden warship by John Rumsey in 1775.

⁵Bernard Brodie, Sea Power in the Machine Age (Princeton: Princeton University Press, 1941), 10.

However, it was not until Robert Fulton's armored paddle steamer Demologos was launched in 1814 that naval commanders were finally freed from their dependence on the wind. No other invention has so profoundly shaped warfare at sea than the invention of the steam engine.

Prior to the invention of the steam engine, naval tactics had always been dictated by the winds one encountered prior to engaging the enemy. Being on the windward side of your opponent was nearly always a tactical advantage. It allowed one to come down on a vessel to leeward; permitted an inferior ship to avoid a superior enemy; expedited a hasty retreat; and allowed for easier handling of deck guns. The advantage of the weather gage was one which was usually achieved quite by accident but one which dominated the tactics and doctrine of naval warfare until the mid-nineteenth century.

As is often the case when a new technology first arrives on the scene, the great naval powers of the time, Great Britain and France, were slow to embrace steam-powered warships and incorporate them into their strategy, tactics and doctrine. Bureaucratic favoritism and reluctance caused the military and civilian authorities in both nations to move cautiously towards embracing this revolution in propulsion for naval warships. Both were slow to realize the full potential and the that this new technology held. The possibilities that

steam warships held were not fully appreciated and it was difficult for most to envision anything replacing the large, heavily gunned, sailing ships-of-the-line which had dominated naval warfare for four hundred years.

2. Iron-Hulled Warships

The next great development in warfare at sea was the introduction of iron as a primary material in ship construction. An iron-hull offered four distinct advantage over their wooden brethren: 1) it allowed for the construction of much larger vessels, 2) it enabled a vessel to carry much heavier armor, 3) it made for a more stable gun platform and 4) the cellular construction of iron ships made them much more capable of surviving damage.⁶ With their powerplants now protected by armor and their screws beneath the water, a ship's captain could now pursue and aggressively engage the enemy without reluctance.

Iron vessels had been used as canal boats and barges in Great Britain since 1787. In 1836, John Laird proposed building a warship out of iron but his idea was rejected by the British Admiralty. The first use of armor on a sea-going warship was in the French frigate *La Gloire*, commissioned in 1859. She was a wooden-hulled, sail and steam-powered, screw-propelled frigate and featured five inches of armor to protect

⁶Ibid., 157.

her wooden sides. She was capable of 13 knots, weighed 5,630 tons and was outfitted with 16 guns. The British quickly followed suit with HMS Warrior, an armored frigate of some 9,137 tons and a naval arms race to build iron-hulled fleets was on.

However, it was the Americans, not the British or French, who foresaw the advantages of armor plating and were the first to exploit the new technology. This was due to the immediacy of the American Civil War. During the war, both the Union and the Confederacy built armored warships to battle each other along the eastern seaboard. The most famous of these encounters occurred at Hampton Roads, Virginia on March 9, 1862. The CSS Virginia duelled with the North's Monitor in the first engagement between armored warships. Although the battle was indecisive, it was considered a strategic victory for the South since it threatened to delay the North's plan to invade the Yorktown peninsula.

3. Armor and Great Ordnance

The push and pull between the technologies of armor and ordnance would shape the course of naval warfare well into the turn of the century. Advances in armor plating were quickly countered by better and more powerful ordnance designed to defeat the armor. The cycle repeated itself several times until gun technology finally overtook existing armor. By 1865 the armor-clad warship had shown that it was

not invincible at all; in fact it was slow, not very maneuverable and if superior firepower could be brought to bear against it, defeatable.

The introduction of the French Paixhans gun in 1822 added another dimension to the naval arms races of the times, more powerful and increasingly accurate naval guns. But change does not occur overnight and it was not until the American Civil War that the competition between armor and gunnery really took off. The Dahlgren guns of the North were a significant improvement over previous weapons but they were hardly decisive instruments of war when used in battle.

The development in naval ordnance was like most advances in naval warfare in that it was not due to a technological breakthrough but rather a series of interconnected advances which combined to bring about a revolution in warfighting: modern naval gunnery. The first of these was Friedrich Krupp's introduction in 1851 of strong and lightweight gun tubes made of mild steel instead of cast-iron. When these guns were rifled and loaded with Joseph Whitworth's armor piercing projectiles, the result was a significant increase in accuracy and more than a threefold increase in range. Much greater muzzle velocities, and therefore penetrating ability, came about as a result of the invention of slow-burning powder in 1880.

In the course of thirty years, naval guns increased in maximum size from standard 68 pounders which weighed a mere five tons, to the British 16.25 inch behemoths which weighed a staggering 111 tons each. Armor had a difficult time keeping up with the rapid advances in ordnance, but keep pace it did. When HMS Warrior was built in 1861, she boasted a solid five inches of armor plate. Twenty years later, HMS Inflexible was outfitted with twenty-four inches protecting her vital turrets amidships, enough to protect her from any gun. In the next decade, however, advances in ordnance would end the tit-for-tat cancellation of tactical advantage with ordnance finally coming to dominate. With this, the era of the battleships had arrived.

The first battleship was the HMS Devastation (1871). She is categorized as the first true battleship because she was the first warship to dispense with any traditional sail rigging and also the first to effectively incorporate a turret system for her guns. Despite these advances, accuracy remained an elusive goal for naval gunners and severely limited the effective range of the battleship's guns. The problem of accurate naval gunfire would not be solved for forty years until workable fire control systems were developed in 1912 by Captains Scott and Simms for the British Dreadnought class of battleships .

The introduction of the battleship spurred a naval arms race that saw most nations with maritime interests acquiring this latest advanced warship. As the numbers of nations possessing warships increased, the great navies built larger and more capable battleships to maintain their dominance of the world's sea lanes. In 1850 a typical capital ship was a wooden-hulled ship-of-the-line of 3000 tons, boasting 100 ten inch guns with a range of 400 yards. By 1890 a capital ship had developed into a 13,000 ton battleship capable of 18 knots. She was armed with six fourteen inch guns which had an effective range of ten miles.⁷ Yet, the fear of losing prized battleships and cruisers drove the British and Germans to protect their fleets by keeping them in port throughout World War I.

By World War II, battleships were the largest, most complex machines that mankind had ever built. The firepower that could be brought to bear by a single battleship made that of an entire fleet of warships from the mid-nineteenth century pale in comparison. It would take two subsequent technological developments to offset the tactical advantage that the battleship gave to the world's great fleets: the

⁷Kenneth Macksey, Technology in War: The Impact of Science on Weapon Development and Modern Battle (New York: Prentice Hall Press, 1986), 78.

expansion of warfare to the depths of the oceans and the introduction of naval aircraft.

4. Undersea Warfare

History has shown that military inventions providing new means of attack or enhancing the strength of the defense are likely in the long run to be more or less adequately countered, albeit with great changes resulting in the forms and methods of war. But, if such inventions can be sprung by surprise during the course of the war, as the submarine for all practical purposes actually was, the advantage accruing from its use may very well decide the course of the conflict.*

Just as the introduction of larger and more powerful guns had stimulated the development of protective measures for warships, advances in armor spurred the search for a means to defeat this protection. The answer was to attack the soft underbelly of the battleship using submarines, mines and torpedoes. All three had been in existence for decades, but it wasn't until the First World War that the technologies reached the point in their development where they could be employed in battle against capital ships.

The advent of the submarine was the first revolutionary expansion of the physical realm in which naval warfare was conducted. Few who witnessed Sergeant Ezra Lee's inglorious first piloting of Bushnell's hand-propelled submarine, the Turtle in 1776, could have imagined the implications that it would have on warfare at sea. By 1800,

*Brodie, 308.

Robert Fulton had built his iron-clad submarine, the Nautilus, and the technologies of submarine construction and anti-submarine warfare were inaugurated.

Due to their short range, submarines were initially viewed as primarily defensive weapons which would be employed to conduct covert reconnaissance or at best, harassing attacks against an opponent. In the early 1900s, the French were shifting away from a defensive strategy towards one which emphasized the offense, and they therefore did not pursue an active submarine acquisition program. The British were engaged in a large naval arms race with the Germans but it was with capital ships, not submarines. Like most naval powers, the Germans placed little faith in a weapon which they felt was unproven in combat.

Again, it was the American Civil War which proved to be the turning point for a new weapon system, in this case the submarine. The first submarine to fire a torpedo at an opponent, the Union's Alligator was designed specifically to go after the Confederate ironclad, Virginia. On February 17, 1864 it was the Confederacy which scored the first success when CSS Hunley attacked and sunk the Union cruiser Housatonic in Charleston harbor.

No one foresaw the impact that the submarine and torpedo would have on the First World War. Yet almost from its onset it became apparent that these weapons would forever

change the ways that navies operate. At the height of the U-Boat war, 130,000 tons of Allied shipping was sunk every week. All told, 11 million tons would fall prey to the U-boats which would number 140 at their peak in 1917.⁹

The submarine, more than any other warship, maintains the initiative and freedom of action necessary to win at sea. It is an example of an inexpensive boat built in large numbers which uses stealth and a very capable weapon to attack. When aggressively employed, it is not only a very cost-effective weapon, it has very nearly been the decisive factor in the war at sea. In the 1950s, the launching of the ballistic missile submarine, USS George Washington, mated two technologies which would have vast repercussions for global security: nuclear-powered submarines and ballistic missiles capable of delivering nuclear weapons against an opponent.

Although it arrived too late for the war, the development of the first sonar (ASDIC) by a joint French and British team in 1918, signified the beginning of modern anti-submarine warfare. This invention lead many in the Royal Navy to believe that the submarine was no longer a threat. The night-surface attacks and wolfpack tactics that Admiral Donitz's U-Boats developed brought the British to a rude awakening. By the time the allies had relearned the lessons

⁹Ibid., 332.

of World War I, the U-Boats had nearly severed Britain's supply lines.¹⁰

While the submarine was the most visible and fearsome undersea weapon, other less technologically sophisticated weapons also had a tremendous impact on undersea warfare in the last century-and-a-half. The first practical naval mine was demonstrated by Samuel Colt whose stationary "torpedo" successfully blew up a 500 ton brigantine in 1843. The first use of mines as a defensive weapon occurred in 1849 at Kiel when a minefield was laid by the Prussians to forestall the Danish fleet.¹¹

Mines represented a "crude, cheaper form of technology [which] had already imposed severe restrictions on an only slightly older, [more] sophisticated and expensive weapon systems."¹² The Germans invented the delayed action mine in 1917 and the British invented the magnetic influence mine in 1918. These were examples of counter-technologies which were developed in response to advances in mine detection and sweeping.

Mines were both used extensively during the two World Wars. During World War I, the Allies laid 172,000 mines and

¹⁰Poirier, 65.

¹¹Brodie, 269.

¹²Ibid., 60.

the Germans placed 43,600 around their harbors and in British waters.¹³ Over 25,000 mines were laid in and around Japan's coastal waters during World War II in an effort to blockade Japanese ports without using surface forces. Two million tons of Japanese shipping, one quarter of the merchant marine, was sunk by these mines, effectively sweeping Japanese merchant shipping from the oceans.¹⁴ The Gulf War of 1991 further demonstrated just how effective these relatively unsophisticated weapons can be against a superior naval force.

The first truly successful torpedoes were designed in 1864 by an American, Robert Whitehead using Austrian Giovanni Luppis' techniques. By adding a compressed air propulsion unit to the charge of a mine, Whitehead was able to transform a defensive weapon, the mine, into an offensive weapon, the torpedo. When mated to a variety of delivery platforms, the torpedo became an effective means to take offensive action against an enemy's warships and commercial shipping. Unlike many other technological developments, the possibilities of the torpedo were recognized almost as soon as its potency was established.

¹³Ibid., 327.

¹⁴Charles W. Koburger, Jr., Narrow Seas, Small Navies and Fat Merchantmen: Naval Strategies for the 1990s (New York: Praeger, 1990), 89.

Delivering this new weapon against an enemy ship became the focus of naval research in the early twentieth century. Traditional wisdom had always been that ships of the same class fought each other, ie., to fight a battleship one needed a battleship. The invention of the torpedo-boat changed this premise; it was designed specifically to attack the enemy's largest warship. The British were the first to build vessels strictly designed to deliver this new weapon. The HMS Lightning was the first torpedo boat and signified the start of many nations' quest to obtain the capable little craft. By 1888 the Russian fleet already had 115 sea-going torpedo boats capable of 22 knots.

The first limited use of torpedo boats in warfare occurred in the Prussian-Danish War of 1848-50 but it would be 1904, during the Russo-Japanese War, before the first large-scale torpedo boat attacks would be successfully launched against warships. At Port Arthur, Japanese torpedo attacks sunk a Russian cruiser and two battleships. Later in the war, the decisive battle in the Straits of Tsushima resulted in eight Russian battleships being sunk by superior gunfire and deadly attacks by fast torpedo boats.

The torpedo boat demonstrated that a crude and relatively cheap combatant could inflict severe damage on large warships which were only slightly older and much more expensive and sophisticated. Today, torpedo and missile boats

remain the backbone for most of the navies of the developing world.

The development of the submarine, naval mine and the torpedo knocked the traditional theories of sea control off kilter. Submarines were difficult to find, they fought alone and they had to be defeated one at a time.¹⁵ They also transformed control of the seas into a truly multi-dimensional endeavor. Mines and torpedoes struck with little warning and they were difficult, if not impossible, to detect and counter. Naval strategy and doctrine had traditionally focused on maneuver and the decisive battle at sea; it now had to consider campaigns of attrition.

5. Naval Aviation

As we have seen, the tactical possibilities of a new weapon are rarely appreciated by the military establishment. Such was certainly the case of naval aviation. The French were the first military to recognize the potentials that flight brought to the battlefield. Francois de Rozier's balloon had given the French the tactical advantage of airspace in 1783 and they successfully employed it for the first time at the Battle of Fleurus in 1794.

The United States Navy, was responsible for shepherding the next breakthrough in aviation toward a defined

¹⁵Breemer, 50.

military application. In 1903, Orville and Wilbur Wright had perfected the first lightweight, internal combustion engine which burned liquid fuel and was capable of being mounted on an airframe. The U.S. Navy nurtured the airplane along and developed the first plans for its deployment in battle. The first military airplane was ordered in 1907 and delivered two years later by the Wright brothers. Less than two years later the United States Navy had successfully launched an airplane from a modified warship and in 1912 Theodore Ellyson made the first shipboard landing.

In that same year the first torpedo was dropped from the air by the Italians giving the airplane a decidedly offensive mission. Originally conceived as a useful tool for conducting scouting and gunfire spotting, the airplane had in eight short years expanded the area that fleets could observe each other and given them a new means by which to attack each other. It was the first weapon which crossed the boundary between land and the sea. It also opened up the prospect of a nation challenging for control of the seas without having a navy of its own.

Yet despite its obvious potential and the U.S. Navy's stewardship, the airplane did not immediately revolutionize naval warfare and make the capital ships of the time obsolete. The debate between those that favored the battleship and those who saw the great promise that aviation possessed was fierce

and is so often the case in modern naval warfare, tactics lagged well behind technology.

Tactically, aircraft had always been hindered by poor endurance, insufficient range and limited carrying capability. In 1915 the British had experimented with seaplanes dropping bombs against German and Turkish ships in the Dardanelles. During the First World War, Germany made several unsuccessful attempts to bomb allied shipping. Beginning in 1919, the United States Marine Corps began to explore the possibilities of mating a bomb to an airplane. By attacking from a near vertical dive, the Marines were able to lessen the effects of wind drift on a bomb drop and to defeat the heavy side armor which protected the battleship's turrets and valuable midships.

However, dive bombing remained at best, an inefficient way of delivering ordnance on target. While the techniques that the Marines developed were important developments for naval aviation, dropping a bomb on a moving warship was inherently difficult and inaccurate. During the interwar period, several experiments were conducted with torpedoes launched from aircraft against warships. It would be 1931 before the Japanese perfected the techniques necessary to accurately drop a torpedo from the air and 1941 before the Mitsubishi A6M Zero and the Type 31 torpedo completed the first torpedo-bomber package for the Japanese. During World

War II, a torpedo dropped from a very shallow dive angle proved to be the weapon and tactic of choice for offensive air operations against warships.

World War II and the advent of the aircraft carrier would transform the airplane into a dominant force at sea. Surprisingly, it was a slow, heavy biplane which conducted the first successful carrier-launched torpedo attack against surface ships during World War II. On November 11, 1940 twelve British Swordfish biplanes were launched from an aircraft carrier and successfully dropped eleven torpedoes on three Italian battleships in Tarento, scoring six hits. Five years later, the nature of naval warfare had been overturned.

By the end of the war, carrier-based aviation was the dominant weapon at sea. The success of the aircraft carrier to attack out to 200 miles during the famous sea battles of World War II (Philippine Sea, Midway, Coral Sea) signified the end of the battleship's tenure as the capital ship of the world's great navies. Modern air superiority and power projection concepts were developed during the carrier battles of the war in the Pacific and the eventual attacks against land targets in Japan. Once proven in battle, it became clear that the aircraft carrier had permanently altered the tactics and doctrine of naval warfare.

The aircraft carrier has since permitted American influence to be projected from the sea with an increasingly

powerful and accurate amount of firepower. Carriers represent a technological advantage that cannot be countered by most nations. However, they may be deterred by the threat or use of weapons which raise the costs of war to unacceptable levels for the United States. Today, a vast array of defensive measures is necessary to defend the carrier against submarines, mines, aircraft and shore-launched missiles. It remains to be seen whether the aircraft carrier will remain the cornerstone of the United States Navy in the next century but at this point there is no clear alternative.

6. Nuclear Weapons

The end of World War II and the dawn of the Cold War brought about a reevaluation of strategy, tactics and doctrine within the U.S. Navy. Since the Soviet Union had no Navy to speak of, it seemed relatively immune to naval pressure and it possessed the atomic bomb. The Navy's response was to devise a strategy which combined the atomic bomb, the aircraft carrier and naval aircraft and focused them on strategic nodes within the Soviet Union. This new strategy still had a maritime flavor, nuclear strike targets were largely composed of ports, shipyards and repair facilities.¹⁶

Over the years, the Navy's role in the national security equation has been reassessed on several occasions.

¹⁶Ibid., 51.

In the 1950s, the strategic land attack mission was delegated to the U.S. Air Force. As the Soviet Navy developed into a legitimate fighting force in the 1960s, sea control once again became the Navy's primary area of concern. In the 1980s, the Navy's Maritime Strategy emphasized forward operations and offensive carrier strikes against the Soviet Navy and its bases in an effort to contribute to the war on the central front. Naval aviation was reoriented once again towards power projection and airspace dominance. Defense and survival became important considerations for U.S. Naval planners.

The conflicts which the United States Navy may be called on to become involved in over the next twenty years depart from this view of naval warfare. The opponents which the Navy will face may now be equipped with much the same weapons and technologies which have been the exclusive advantage of the great navies. Our ability to influence events in the littoral regions may be restricted by even the smallest navies. In fact, our ability to even approach coastal waters, let alone blockade and control them, may be impaired by the threat or limited use of weapons of mass destruction. History certainly contains many untoward examples of a superior opponent being held at bay by an inferior adversary who possesses the means to mask or subvert the superior's strategic and tactical advantage.

7. The Missile Age

In October of 1967, two Egyptian fast attack craft fired four surface-to-surface missiles at the 2500 ton Israeli destroyer Eilat, sinking her in a matter of seconds. Naval warfare had entered a new age, one in which the guided missile and its small mobile launch platforms, missile boats and aircraft, would come to dominate the tactics of warfare at sea.

The first recorded use of missiles at sea occurred in 1780 when Hyder Ali of Mysore fired rockets at anchored British warships in India.¹⁷ The propulsion and guidance technologies which the Germans developed in World war II for their V-1 and V-2 flying bombs was refined and perfected during the Cold War to become the dominant naval weapon today.

By the early 1970s, the Israeli Navy had adopted the guided missile as its primary naval weapon. Unlike Egypt and Syria, however, it had also developed a cohesive combat doctrine which incorporated the Israeli Air Force and its electronic warfare (EW) capabilities. During the Yom Kippur War, two naval battles were fought, one near Latakia and the other off Damietta, at the mouth of the Nile. Thirteen Israeli missile boats, armed with Gabriel radar-guided missiles with a range of 13 miles, took on 14 Egyptian and

¹⁷Macksey, 9.

Syrian boats equipped with Styx missiles which were good out to 30 miles. Despite a two-fold advantage in missile range, the Arabs were decisively routed by the Israelis who managed to sink eight of the Arab boats without incurring a single loss of their own. Of the 56 Styx missiles fired at the Israelis, none scored a successful hit.¹⁸

The Falklands Islands War in 1982 was a prototype of the nature of littoral warfare which "...From the Sea" envisions. During the war, eleven of the twenty-seven British warships dispatched to the area were damaged or sunk by Argentinian pilots firing French-made Exocet missiles and dropping bombs. Although the British fleet was not defeated, it suffered severely, especially when defending the amphibious landing at San Carlos.

B. TECHNOLOGY, THREATS AND NAVAL DOCTRINE

In the narrow seas, modern technology-especially that concerning shore-based air power, fast attack craft, submarines, missiles and mines-can achieve sea denial without requiring superior naval forces.¹⁹

Two kinds of revolutionary change have historically altered the ways that navies think about their roles and functions. In his monograph, "The End of Naval Strategy: Revolutionary Change and the Future of American Naval Power (Strategic Review, vol. 22 Spring 1994: 40-53), Dr. Jan S.

¹⁸Koburger, 65.

¹⁹Ibid., xv.

Breemer points to technological innovation and a change in the external security environment as the triggers which change the direction and focus of a nation's naval doctrine. Technological innovations tend to cause a "bottoms up" response which seeks to make minor adjustments to doctrine and tactics in order to accommodate the new technology. When the external security environment changes, a "top-down" revolution occurs.

Historically, military organizations have been hesitant to adopt new technologies for a variety of reasons. Barry Posen points out several in his work, The Sources of Military Doctrine: France, Britain and Germany Between the World Wars (Ithaca: Cornell University Press, 1984). One problem is the adaptation of new technologies to an existing military doctrine. Posen also notes that it is difficult to realize the potentials of a new technology until it is tested in battle; innovation increases operation uncertainty within an organization and is therefore resisted; and it is difficult to change military doctrine as a result of an untested technological innovation.

The first great technological advance in modern naval warfare, the steam engine, encountered all of Posen's phenomena. Originally, steamships were viewed as being valuable only for scouting and harassment. A small steam-powered ship could penetrate in close to a heavily armed

sailing ship, inflict damaging fire and retreat from action without due regard for the wind. Yet the idea of steam-powered ships replacing sailing ships, with their large batteries, as the capital ships of the time, was not a position which enjoyed widespread acceptance. Once accepted by the world's great navies, developing the tactics to effectively utilize the new ships was the subject of much debate and little consensus.

Despite the opposition, it became clear that steam was the power source of the future for naval warships. As steam-powered warships grew in size and in the amount of weaponry that they were able to bring to battle, the value of the sailing ship waned. The attributes of speed and maneuverability replaced size and firepower as being the defining qualities of a naval warship. Seamanship, long viewed as the decisive factor in battle, took on less significance with the age of the steam warship. The tenets of warfare under sail were reevaluated and new doctrine and tactics had to be formulated to account for the new technology.

Naval doctrine has also traditionally been based on the application of historical experience to the existing threats and conditions. Since the mid-nineteenth century, the U.S. Navy has consistently faced an identifiable adversary that threatened to challenge our mastery of the seas. Our force

structure, training and doctrine were all designed to contend with this threat to the external security environment. The Royal Navy, the Imperial Japanese Navy, the Imperial German Navy and the Soviet Navy all presented well defined threats to our national interests.²⁰

Seapower, in the traditional sense, is the ability to influence events on the sea and from the sea. Historically, this has always meant large, blue water navies which blockaded, patrolled, and fought decisive battles with the best weapons and technologies available to them at the time. Modern naval doctrine developed from the classic sea power theories of Captain Alfred Thayer Mahan. His writings emphasize a strategy that centered on the clash of great battle fleets fighting for sea control and naval supremacy. Technological advances in naval warfare have traditionally focused on improving the warfighting potential of existing platforms to achieve this vision. Doctrine and tactics have evolved after the introduction of the new technology to the fleet.

The absence of a serious blue-water threat today and the proliferation of sophisticated and increasingly lethal weapon systems by the world's lesser navies has largely superseded this proposition. The navies of the world's regional powers

²⁰Poirier, 63.

are not designed to take on the U.S. Navy in a head-to-head clash. Instead, they are designed to delay outside intervention and to make it potentially very costly for the United States to become involved. The U.S. Navy was not designed to deal with small boat attacks, mine warfare and the threat of quiet diesel submarines.

Today, we are experiencing a concurrent revolution in the technology of naval warfare and a continuously changing threat dynamic. It is a time when we face a largely unknown future, making changes in doctrine difficult to articulate. This situation is very similar to the one which the Union Navy faced during the Civil War. It had presumptive sea control and the South, rather than challenging the North's superiority opted to harden key littoral areas such as Charleston harbor, New Orleans and the Mouth of the Mississippi River. They also employed emerging technologies such as the mine, ironclads and shore-to-ship gunnery.²¹ Naval engagements of the Civil War were attempts by the Union Navy to overcome these defenses; amphibious operations were attempts to take those positions by inserting land forces. These were the first "joint" operations between the Navy and the Army; they were also the last until World War II.

²¹Gary W. Anderson, (Lieutenant Colonel, USMC), "Beyond Mahan: Naval Doctrine in the Post-Cold War World." Marine Corps Gazette 76 (June 1992): 39.

The Navy's new doctrine "...From the Sea," outlined in Chapter III, envisions the U.S. Navy operating in the littoral regions of the world, rapidly responding to crises and providing the maritime bridge for CONUS-based forces to gain access to the theater. Projecting power ashore will be contingent on our ability to control the battlespace of the littorals. We need to move beyond our Cold War doctrine, which emphasizes power projection, in order to meet any challenges to our presence in the littorals. It is imperative that the U.S. Navy develop and maintain a strong sea control capability if it is serious about executing the missions which "...From the Sea" envisions.

C. SUMMARY

Up to the present this [command of the sea] has been understood to mean that the fleet commanding the sea openly plies upon it and the beaten antagonist does not dare to leave his ports. Would this be so today? Instructions bearing on the subject counsel the victor to avoid night attack from the torpedo-boats of his antagonist....Some seamen have become reconciled to this abnormality, yet if the matter were represented to a stranger he would be astonished. He would probably ask whether he properly understood that a victorious fleet should protect itself from the remnant of a vanquished enemy.²²

As we approach the 21st century, the Navy is faced with three inevitable trends: precipitously decreasing funding, the

²²Sergei O. Makarov, (Vice Admiral, Russian Navy), Discussion of Questions in Naval Tactics. Translated by Lieutenant John B. Bernadou (USN). ONI, part 2, General Information Series, no. 17. Washington, D.C.: Government Printing Office, 1898.

ever-expanding capabilities of many Third World militaries and a revolution in our own military affairs and technical capabilities which will revolutionize the ways that America wages war. We need to be proactive not reactive in our approach to the future. This requires a Navy-wide mind-set that the world is changing very rapidly, that the future of the Navy may very well be at stake and that we need to rapidly transform ourselves if we hope to survive.²³

Today, a tidal wave of discoveries and inventions is changing the ways that we interact, as individuals and as states, in peace and during war. Technologies are evolving so rapidly that it is impossible to know which sorts of industrial capabilities will be most crucial twenty years from now. This revolution in technology will transform the Navy in the same way that the steam engine, the battleship and nuclear weapons have. The primary difference will be that the changes will occur at a much faster rate, requiring us to alter our doctrine and tactics at a sometimes uncomfortable pace in order to cope with the evolving threat.

²³John L. Petersen, "Plan for the 21st Century Now," U.S. Naval Institute Proceedings 117 (August 1991): 54.

III. "...FROM THE SEA"

Wrapped around the principles of deterrence, forward positioning of forces and coalition operations with our allies, our strategy has come to recognize, once again, the necessity for a maritime nation to control vital sea lines of communication through naval superiority.²⁴

As the world struggles towards the twenty-first century, many nations are discovering that they have been freed from the constraints which the struggle between the United States and the Soviet Union imposed on international relations during the Cold War. Certain nations, such as India, Iran and China, have made it clear that they intend to pursue plans which will establish them as regional powers. While perhaps not interested in openly challenging the United States, they do have very specific regional goals and ambitions which may bring them into conflict with the United States. Other nations, such as Cuba and Libya, will continue to be thorns in America's side and the plethora of lesser crises which continue to spring up around the world shows little sign of abating. Many nations simply wish to be left to sort out their problems for themselves when crises arise.

²⁴P.X. Kelly, (General, USMC), "The Amphibious Warfare Strategy," U.S. Naval Institute Proceedings 112 (February 1986): 24.

In order to cope with these changes in the world's strategic landscape, our military has struggled to adapt its Cold War systems and methods of operation to fit the new, and constantly evolving threat. The United States Navy has sought to bridge this gap with "...From the Sea," a document which seeks to define a combined vision for the Navy and Marine Corps.²⁵ The purpose of this chapter is to analyze "...From the Sea," and examine its applicability in a world where technology diffusion and the proliferation of advanced weaponry will permit the world's lesser navies to challenge the United States Navy.

To provide the necessary background for "...From the Sea," the concept of gunboat diplomacy, in all its manifestations (forward naval presence, reactive crisis response and precise power projection) is developed in the first section of the chapter. Unfortunately, the ambiguous nature and indeterminate results of gunboat diplomacy (success is usually measured by "non-events") makes quantification difficult. There are, however, historical examples of lesser navies deterring and, in some cases defeating superior navies in the restricted waters of the littorals. These are included where applicable in the hope of offering some insight into the

²⁵"...From the Sea," 1.

dangers which the United States Navy may when conducting the operations envisioned in "...From the Sea."

In the second part of the chapter "...From the Sea" is analyzed with the explicit purpose of exploring ways in which the U.S Navy may be defeated or deterred. In the future, other nations may seek to deter the United States from involvement in their affairs by challenging our presence in their territorial waters. Given our intolerance of casualties, the lack of a well-defined threat and a hesitation to become involved in areas where our national interests are not directly threatened, an opponent may conclude that it is possible to deter the United States from intervention. Our experiences in Beirut, Somalia and Haiti would appear to indicate that in some cases, an early, well-planned attack against an arriving U.S. military asset may, rather than stiffen our resolve, lead to a U.S. withdrawal.

But "...From the Sea" by itself is not enough; in order to maintain our dominance at sea, the tools that we bring to the fight and the ways that we operate must change; Unfortunately, the Navy's current procurement strategies appear to be aimed at continuing to improve our power projection capability rather than establishing battlespace dominance in the littorals. New ships and aircraft, as well as innovative uses for existing systems, are necessary if we hope to control the battlespace in the littorals, deter

aggression against us and, when deterrence fails, quickly and decisively defeat the enemy at minimum cost to our own forces. Recommendations are made in Chapter IV.

A. DIPLOMACY, PRESENCE AND CRISIS RESPONSE

Despite recent isolationist calls, the United States will continue to remain actively engaged and our military forces will continue to respond to crises around the world. However, the technological asymmetry of military forces which we have favorably acted under during the Cold War era is narrowing giving other nations the ability to openly challenge the U.S. military should they choose to do so. This is particularly important for the U.S. Navy, usually first on-scene, which may be the initial target of direct challenges to our presence in an area. The world wide procurement of naval weapon systems outlined in Chapter IV would appear to have this capability as its ultimate goal.

1. Gunboat Diplomacy

Being forward-deployed has consistently allowed the U.S. Navy to be the first on-scene in responding to crises as they have emerged on the world stage. Between 1946 and 1989, in two hundred and forty instances of American military force being employed, the U.S. Navy has been the principle element

of our response in over 80% of the crises.²⁶ By comparison, the Air Force participated in 29% and the Army was involved in 18%.²⁷ Despite the naysayers' assertions, naval forces and gunboat diplomacy will continue to be America's most likely initial response to regional crises as they emerge in the twenty-first century.

Gunboat diplomacy is defined as the demonstration, threat or use of limited naval force for political objectives.²⁸ The literature on gunboat diplomacy indicates that the most effective use of naval forces occurs when a definitive, deterrent display of force is used by an attacker who has engaged in war in the defender's region and who is militarily prepared and politically stable compared to the defender.²⁹ The ability of a Navy to coerce an opponent by the threat or use of overwhelming force has been the bread and butter of every great maritime power and will continue to be so in the 21st century.

²⁶Adam B. Siegel, U.S. Navy Crisis Response Activity (1946-1989): Preliminary Report (Washington, DC: Center for Naval Analyses, 1989), 4.

²⁷Scott C. Truver and James A. Hazlett, (Commander, USN) "Surfacing a New Battle Group," U.S. Naval Institute Proceedings 117 (April 1991): 84.

²⁸Robert Mandel, "The Effectiveness of Gunboat Diplomacy." International Studies Quarterly 30 (March 1986): 59.

²⁹Ibid.

After fading from favor in the 1970s, offensive gunboat diplomacy was revived in the 1980s by the Reagan and Bush administrations which demonstrated a preference for the limited use of military force in regional conflicts. The United States Navy was the primary instrument of this force in operations in Lebanon (1983), Grenada (1983), Libya (1986) and the Persian Gulf (1987-88 and 1990-91). In addition, the Navy's Freedom of Navigation exercises, an intrusive program aimed at ensuring the right of safe passage, has aggressively challenged maritime claims on over forty occasions since 1980.³⁰ Many of the lesser conflicts of the twenty-first century may not be readily addressed by sailing a carrier into a region and rattling our sabers. Tailored joint force packages may be a much better response to these types of crises.

2. Forward Naval Presence

The United States has traditionally sized its military forces based on the perceived threat to its national interests. However, naval forces often find themselves conducting missions which they are not well prepared for and are not sufficiently equipped to perform. During the 1990s the Navy has been used to protect Kurdish refugees in Iraq (Operation Southern Watch); to enforce the embargo on Haiti;

³⁰Eric H. Arnett, Gunboat Diplomacy and the Bomb: Nuclear Proliferation and the U.S. Navy. (New York: Praeger, 1989), 1.

to maintain a ready force off Bosnia-Herzegovina (Operation Provide Promise); to ferry relief supplies to Somalia (Operation Restore Hope) and Bangladesh (Operation Sea Angel); and to perform maritime intercept missions in the Persian Gulf, Adriatic and Red Seas. These operations demonstrate the necessity of a timely response that forward deployed, naval presence provides.

The primary purpose of naval presence is to promote and defend American national interests by offering the promise of crisis diffusion and control before it escalates to the point where it is unmanageable. In addition, naval presence provides several other important functions in our international relations: support for acknowledged military and political commitments between the US and its allies; capability to move and act in support of unilateral or shared interests; the ability to assert American interest in regional conflicts without direct involvement; the ability to manifest credible warfighting capabilities during times of rising tensions; dispersal of humanitarian aid; and the ability to coerce an opponent to comply with some preferred course of action.

Naval presence helps fulfill these missions by contributing to two important strategic goals: extended-general deterrence and extended-immediate deterrence. Extended-general deterrence is defined as the threat of

military retaliation against another state in an attempt to prevent that state from taking military action against an ally."²¹ Extended-immediate deterrence applies the same principles but on a much more immediate basis, ie., the mobilization of military forces along a nation's border. In certain crises, the mere presence of an American battle group in the area has helped reduce the tension between adversaries before the situation races out of control. The India-Pakistan War of 1971 and the Yom Kippur War of 1973 are examples of the effect that American naval presence can have on a crisis that may have global connotations.

In lesser conflicts which did not immediately threaten American interests, naval presence has also been used to signal the interest and resolve of the United States. The usual outcome has been an attenuation of the crisis, a return to normalcy and noninvolvement on the part of the Navy. It was generally a low-risk strategy because the immediate risk to U.S. naval forces was minimal. The containment of crises in Lebanon (1958 and 1982), Thailand (1962), the Dominican Republic (1965) and Jordan (1970)²² are examples of this type of reactive naval presence.

²¹Paul K. Huth, Extended Deterrence and the Prevention of War. (New Haven: Yale University Press, 1988), 16.

²²James F. McNulty, (Commander, USN), "Naval Presence: The Misunderstood Mission," Naval War College Review (Summer 1974): 26.

The Navy has maintained a global American presence with high levels of success since the end of World War II, fostering good relations with our allies and showing resolve to our enemies. Despite the best work of our intelligence community, however, many serious crises have erupted with very little warning. Naval forces had been on patrol in the Persian Gulf since 1949 yet our presence did not deter Saddam Hussein from invading Kuwait in August of 1990. In this type of short-notice crisis, forward deployed American naval forces will be first on-scene to provide a range of escalation control characteristics and warfighting capabilities which other forces lack. If deterrence fails, naval expeditionary forces are a credible, combat ready force that can be used to handle a variety of crisis situations.

3. Crisis Response

Naval forces provide the National Command Authority with a wide range of crisis management options for handling lesser conflicts, most of which have the distinct advantage of being easily reversible. The movement of warships into an area conveys a certain sense of menace that is plausible to the opponent because it is a potent yet undefined threat. In addition, a naval force offshore provides an ongoing observation, communications and intelligence gathering asset in the region.

The chief advantage that naval forces provide for crisis management is their relative independence from fixed foreign bases and the political considerations that go along with the use of overseas bases. As we downsize and withdraw from many of our overseas bases, this autonomy will become increasingly important. Naval forces may also be quickly withdrawn if necessary and are nearly self-sustaining. They are usually at a higher state of readiness than land forces and their character can easily be shifted from one of peaceful intent to one of high violence. Aircraft carriers, tactical aircraft and cruise missiles all represent an impressive and useful demonstration of a naval force's capabilities in the event that deterrence fails and coercion becomes necessary.

However, naval forces also have certain weaknesses which need to be considered for crisis management. Land forces tend to show more resolve on the part of the deploying nation because of their real costs and the difficulty by which they are withdrawn. The flexibility of naval forces may be interpreted as a source of weakness by an opponent. Foreign leaders are also aware that ships can easily be withdrawn and may or may not indicate a high level of commitment on the part of the United States. The inherent uncertainty which makes naval warships attractive in the first place may also destabilize or escalate a crisis. In the case of extended

deterrence during an immediate crisis, warships may lead to expanded and unrealistic expectations by our allies.

In the future, the Navy will face new challenges when performing its traditional mission of crisis response. In order for naval ships to deter, it is generally acknowledged that they must come into view (and range) of an opponent's shore. Even when this occurs, a Third World leader's knowledge of an American warship's capabilities may be minimal and he may doubt our conviction to become involved. The utility of naval forces as a diplomatic tool quickly becomes marginal as an opponent gains the capability to attack the force. Without the conviction to act, the influence that warships can exert may be limited; they may be little more than an attractive target of opportunity.

Power projection requires mobility, flexibility and technology to mass strength against weakness.³³

When armed intervention is necessary to bring about physical coercion, presence has failed and the problem has moved from the deterrent to the war-fighting end of the war fighting spectrum.³⁴ For the United States Navy, this means delivering powerful, accurate and sustained firepower from the sea: offensive gunboat diplomacy. Projecting and sustaining high-intensity, precise offensive power against an enemy's

³³"...From the Sea," 6.

³⁴McNulty, 27.

center of gravity remains the core competency of the U.S. Navy and is at the center of modern American naval doctrine and procurement. This power projection capability comes from a variety of naval assets: aircraft carriers, amphibious ships, cruise missile-capable ships and submarines.

While the deterrent effect of naval presence and the threat of air strikes or cruise missile attacks has been sufficient to contain most crises in the past, the utility of Naval power projection may be questioned in many of the regional, low intensity conflicts of the future. Naval airpower and cruise missiles work very well against modern states with good target sets. Against undeveloped states it is difficult to identify and target critical strategic nodes and concentrations of military forces. Regardless of the conflict, ground troops will still have to land ashore where they and their delivering forces may be exposed to risks and opposition which we have not encountered since World War II.

4. Future Challenges

In spite of our apparent successes, the results and measures of effectiveness of modern gunboat diplomacy must be considered within the framework that the Cold War imposed upon the belligerents. I would argue that the "non-events" which have constituted success in most of the cases since 1945, may be attributable to other determinants such as the fear of escalation by the superpowers and the vast numerical advantage

and technical superiority that the United States Navy enjoyed during the majority of the Cold War.

With the exception of the Cuban missile crisis, post-war gunboat diplomacy has not involved nations which possessed the means to inflict serious damage against the U.S. Navy. Furthermore, it is difficult to evaluate the impact that naval presence and gunboat diplomacy has really had since the perceptions of the affected foreign leaders, many of whom are now dead or no longer in power, must be ascertained. A leader's political and military decisions are made on the basis of many diverse inputs, only one of which is the presence of American warships off his shore.

"...From the Sea" emphasizes that the Navy will operate in areas close to an enemy's shore, acting as the immediate on-scene commander while providing command, control and surveillance capabilities to the National Command Authority. By doing so, we may also represent an ideal target to an aggressor who has no interest in being deterred and is willing to take a chance by striking out against an American force off his shore.

While there is little doubt that the United States Navy will continue to enjoy a large overall numerical superiority well into the next century, several navies of the developing world, most notably India, Iran and China, are going through extensive periods of growth. The rapid

downsizing of our own military forces has severely tasked our ability to maintain a constant presence in many regions of the world. In the future, it may be difficult to quickly concentrate sufficient Naval forces should an enemy choose to assert their regional ambitions. The U.S. Navy may be deterred from involvement. The proliferation of modern naval weapon systems, sensor technologies and the addition of weapons of mass destruction to the equation, has certainly shifted the stakes of a confrontation upwards.

B. "...FROM THE SEA"

The end of the Cold War has removed the singular threat which sized American military forces and dictated their doctrine and training for the past fifty years. While the possibility of a global conflict between the United States and another superpower seems remote for at least the foreseeable future, American involvement in lesser crises appears to be on the rise. Changes in strategy have therefore tended to focus on regional, rather than global, threats.

In response to the changing nature of these threats, serious attention is being devoted in the United States to examining assumptions like national identity and grand strategy. Likewise, our military's roles and missions and the materials and procurement strategies which equip it, are being critically analyzed and redefined. Many tenets of current American military doctrine, which was developed to meet the

challenges that the Soviet Union presented during the Cold War, may no longer be applicable for the types of regional crises which we envision facing in the future. As a result, a new National Military Strategy has emerged and military doctrine has been revised to reflect the changing focus of this strategy.

The National Military Strategy, first articulated by President Bush in 1990 and currently embraced, somewhat reluctantly, by the Clinton administration, recognizes that our future operating environment will be shaped by four principal dangers: regional conflict; the proliferation of weapons of mass destruction; threats to democracy and reform; and economic competition.³⁵ In order to meet these threats, the defining elements of the National Military Strategy are: strategic deterrence and defense; powerful yet unobtrusive forward presence; extended and on-scene crisis response; and reconstitution in the event of a global conflict.³⁶ These four elements make up the fundamental tenets of current American military doctrine.

³⁵President of the United States, National Military Strategy of the United States. (Washington, DC: The White House, 1991), 1-2.

³⁶Chairman, Joint Chiefs of Staff, National Military Strategy of the United States, (Washington, DC: Department of Defense, 1992), 6-8.

1. Joint Military Doctrine

Military doctrine, the bridge which links a nation's grand strategy to the tactics of the military professional, has by necessity, undergone a period of reevaluation and redesign. For the United States Navy, this period of self-examination has produced "...From the Sea," a rethinking of the Navy's missions and a revision of the ways that it will be employed. Originally conceived in the fall of 1992, this document shifts the focus of naval operations from the blue-water scenarios of the Cold War to the brown and green-water operations envisioned in future regional crises. It represents a fundamental shift away from open-ocean warfighting on the sea toward joint operations conducted from the sea.³⁷ It also explicitly states that the Navy can no longer afford to go it alone. Joint operations and coalition warfare are the military buzzwords of the 1990s and our force planning, training and concepts of operations are being restructured to reflect their importance.

In contemplating the nature of future crises, "...From the Sea" accurately reflects the current Department of Defense planning guidance which establishes three different levels of conflict for force sizing and planning purposes: MRCs (Major Regional Conflicts), LRCs (Lesser Regional Conflicts) and LICs

³⁷"...From the Sea," 1.

(Low Intensity Conflicts). A global conflict against an emergent superpower does not appear likely in the near-term future and is therefore addressed by the rather ambiguous concept of "reconstitution."

Major Regional Conflicts (MRCs) are large, sustained operations requiring significant assets from all of the military services. Korea, Vietnam and Desert Storm are good historical examples; the conflict in the former Yugoslavia is an example of a current crisis which could expand and threaten the security of an entire region. In an MRC, the Army and the Air Force will provide the majority of combat forces ashore while the carrier battle group will operate offshore, launching strikes but more importantly, keeping the sea lines of communication open through aggressive antiair, antisurface and antisubmarine warfare against the adversary.³

At the lower end of the conflict spectrum are Lesser Regional Conflicts (LRCs) and Low Intensity Conflicts (LICs). In these lesser conflicts, the Navy and Marine Corps will often be deployed in their traditional role of peacekeepers and crisis managers, projecting precise power from the sea when required. Expeditionary forces may still be required but the crisis can usually be successfully dealt with by the

³Wayne P. Hughes, Jr. (Captain, USN Ret.), A Perspective on Joint Littoral Warfare. Paper presented for the Applied Physics Laboratory, Johns Hopkins University, (February 26, 1993), 4.

deployment of a limited naval force. Somalia, Haiti and Liberia are recent examples of this type of low-intensity crisis.

2. Sea Control and Battlespace Dominance

"...From the Sea" recognize the vital importance of naval and maritime capabilities to a strong national defense. Throughout history, sea power has often been the key component of victory when great powers have been challenged by lesser powers. The traditional capabilities that the U.S. Navy has provided (strategic deterrence, sealift, sea control and flexibility) remain relevant in today's regional versus global defense planning perspective.

In order to execute these missions successfully, four operational capabilities of naval expeditionary forces are stressed in "...From the Sea": power projection; command, control and surveillance; force sustainment; and battlespace dominance.³⁹ How well we are able to demonstrate these capabilities will largely determine the future applicability of naval forces in American defense planning.

Paramount among the military threats which the United States may face must be the deterrence of nuclear attack on the continental United States or any of its forward-deployed forces or allies. Despite a decline from thirty-seven SSBNs

³⁹"...From the Sea," 5.

to the eighteen which the 1991 Base Force planning guidance calls for, the Navy appears to be well-suited and properly equipped to continue providing the critical sea-borne leg of the American strategic nuclear Triad. Stealthy and autonomous, our SSBNs and the Trident D-5 ballistic missiles that they carry, represent a strong commitment to the goal of deterrence, the primary role of American military forces.

In addition to maintaining the strategic nuclear deterrent that our ballistic missile submarines provide, "...From the Sea" recognizes strategic defense against enemy ballistic missiles as a priority. More than thirty nations now boast a ballistic missile capability and seven have used them in combat.⁴⁰ In the future, naval assets will inevitably have to be placed within the missile radius of adversary states in order to conduct the missions envisioned in "...From the Sea." In some cases, naval assets will operate within confined harbors leaving them relatively vulnerable to a ballistic missile attack. The proliferation of ballistic missiles and weapons of mass destruction make the development of a viable Theater Ballistic Missile Defense (TBMD) capability aboard our Aegis warships essential for protecting our land-based forces and achieving mission success.

⁴⁰John B. Wolfsthal, "The Proliferation of Ballistic Missiles," Arms Control Today 22 (April 1992): 28.

Projecting high-intensity, accurate firepower from the sea will remain the core competency of the U.S. Navy. The CJCS Global Force Presence requirements and the Bottom-Up Review (BUR) have combined to generate a naval force which should allow the Navy to adequately perform this mission well into the twenty-first century.

Barring any major changes, the force structure which the Navy will be comprised of in FY99 will be: 331 ships with eleven active and one reserve aircraft carriers; eleven active air wings composed of 50 all weather strike aircraft; 55 attack and 18 ballistic missile submarines; 114 surface combatants; eleven amphibious readiness groups and enough lift to transport 2.5 Marine Expeditionary Battalions (MEBs).⁴¹ Our air wings will be centered around the F/A-18 aircraft and its precision-guided munitions. Surface combatants of the Aegis and Arleigh Burke classes will provide the added punch of 3,162 Tomahawk missiles.⁴² No force in the world could duplicate our capability to project power ashore for the foreseeable future.

Two less glamorous, but equally important, factors are integral to the success of "...From the Sea:" logistics and

⁴¹Leighton W. Smith, Jr., (Vice Admiral, USN), Force 2001: Shaping and Sizing the Navy for the 21st Century...a New Direction From the Sea. (Washington, DC: Department of the Navy, 1993), 49.

⁴²Ibid., 47.

sustainability. In a Major Regional Conflict, heavy sealift ships will provide the maritime bridge that heavy forces will require to gain access to the conflict. The immediate infusion of troops and supplies will probably be airlifted into theater; 99.5% of the troops deployed during Desert Storm arrived by air.⁴³ However, during a long-term crisis, most supplies will have to come from the United States. During Operation Desert Storm, 95% of the bulk supplies and equipment transported into the Persian Gulf area were brought by ship. Virtually every element of the United States' sealift capability, 385 ships in all, was tasked during the war. Sealift, although much slower, provides a quantitative advantage: one modern container ship can carry as much as 150 C-5 sorties.⁴⁴

Mobile support forces, sustained sealift and prepositioned forces are the critical elements of the forward logistic support concept which "...From the Sea" requires. Twenty-five vessels: thirteen for the Maritime Pre-Positioning Forces (MPFs) and twelve other prepositioned cargo containers, make up the Afloat Pre-Positioning Force (APF). These sea-based forces contain the equipment that the Marine Corps

⁴³Mark L. Hayes (Major, USMC), "Sealift: The Achilles' Heel of our National Strategy," Marine Corps Gazette 76 (November 1992): 72.

⁴⁴Ibid.

requires during a surge deployment. Eight other roll-on/roll-off, fast sealift ships (FSS) provide the balance of rapidly deployable heavy sealift assets. An additional 164 U.S. flagged merchant marine vessels are available for sealift duty during times of crisis.⁴⁵

In the wake of the successful resupply of coalition forces during Desert Storm, it is tempting to presume that USTransCom will be able to handle the supply challenges of the future. This, however, is a dangerous assumption. Many writers feel that our sealift capability is inadequate for handling the rapidly developing scenarios of the future. They point to an absence of opposition during the buildup for Desert Storm and the existence of eight ports and thirty-two major airfields in Saudi Arabia as factors which were crucial to the ultimate success of the operation. Outside of Europe, such a setup cannot be duplicated anywhere else in the world.

Ground and air combat forces will conduct the majority of the offensive operations in a Major Regional Conflict. The Navy's primary mission in an MRC will be to ensure the safe arrival of these heavy-lift ships, protecting them once they arrive and providing rapid, responsive transportation of supplies and equipment to the expeditionary units ashore. This will require absolute control of the sea lines of

⁴⁵Ibid., 74-75.

communication enroute and the littoral battlespace once in theater.

In order to fully understand the nature of the problem, the dimensions of the battlespace need to be appreciated. Most supplies will have to be transported from the United States: during Desert Storm this meant 8,700 mile one-way trips for our CONUS-based heavy sealift ships. Once in theater, the main body of the naval task force may remain up to a hundred miles offshore while elements operate along the enemy's shore and expeditionary units operate forty miles inland. These large transit distances and expansive areas of the littoral battlespace will pose a daunting sea control problem if our presence is actively challenged.

Dominating the battlespace presupposes effective command and control capabilities and serves as the logical prerequisite for the projection of power ashore."

An area where the Navy does not have a lot of recent experience is in the littorals: those areas of the world which are characterized by confined waters and congested airspace which is occupied by friends, enemies and neutrals. The operating environment of the littorals favors the opponent because he has a defensive advantage and an information edge. Our explicit knowledge of most of the coastal and littoral areas of the world is poor since maritime law limits our

"...From the Sea," 5.

access to other nation's territorial waters. Conversely, an opponent will have intimate knowledge of the operating area, giving him the overall tactical advantage even when confronted by technologically superior forces.

The key to "...From the Sea's" success will be the ability of the U.S. Navy to achieve battlespace dominance in the littoral regions of the world. Battlespace dominance is attained by detecting, targeting and destroying enemy forces that present a threat to our maneuver ashore.⁴⁷ It may also be achieved by taking preemptive action aimed at degrading the enemy's ability to conduct offensive operations. For the Navy this means aggressive anti-air, submarine and surface warfare, all prerequisites for conducting offensive operations against the enemy. The future relevance of naval forces may ultimately hinge on our ability to achieve this battlespace dominance of the littorals during times of crisis.

"...From the Sea" views the Navy as a strategic enabler, however, operating in the littorals means shallow water and therefore slower speeds, restricted maneuverability, navigational hazards and the threat from shore-based and sea-based weapons systems. Historically, the mere presence of a U.S battle group in an area was enough to deter opponents from

⁴⁷Carl E. Mundy, (General, USMC), "Getting It Right...From the Sea," U.S. Naval Institute Proceedings 120 (January 1994): 70.

attacking. However, given the proliferation of advanced naval weapon systems, the Navy may arrive on-scene with an unfavorable local balance of forces. In this situation, a limited probe by an opponent aimed at testing our resolve may be a very real possibility.

C. DEFEATING "...FROM THE SEA"

With the demise of the Soviet Union, the free nations of the world claim preeminent control of the seas and ensure freedom of commercial maritime presence."

The U.S. Navy has historically been called upon to contain crises through forward operations and rapid response with flexible and sustainable sea-based forces. While continuing to stress these concepts, "...From the Sea" somewhat naively assumes that the international respect for freedom of the seas will continue to permit American naval forces to gain access to the territorial waters of the world's nations. In today's world, casually cruising the coastlines of Third World adversaries during crisis situations only invites disaster.

In the event of an attack against U.S. naval forces, it is not entirely clear what our response would be. Four factors have combined to weaken our ability to deter our adversaries: an intolerance of casualties; an unwillingness to commit sophisticated (and expensive) military assets in areas where our national interests are not directly threatened; the

"..."From the Sea," 2.

increasing influence of public opinion on American foreign policy; and the declining level of overseas presence which we are able to exercise. These four factors have combined to open a door which our adversaries may be willing to step through.

1. Restrictions on American Foreign Policy

The United States is ill-suited to fighting wars of attrition. Since the Vietnam War, a fear of escalating casualties has led to a reluctance on the part of Congress and the American public to support military operations in areas where our national interests are not directly threatened. Once American naval forces are on-scene, our opponents, be they states or terrorists, may attempt to place forward-deployed units at risk, hoping to intimidate us into withdrawing, thereby undermining our credibility and achieving their own political and military goals.

Today, serious questions are being raised about the need to risk high-value assets and personnel in conflicts where our interests are marginal or poorly articulated by our decision-makers. During the Cold War, the perceived importance of the stakes at hand drove our willingness to commit the financial and material resources necessary to win. In an all-out conflict with the Soviet Union taking risks with high-value assets was acceptable. In many of the low-intensity conflicts of the future, it will become increasingly

difficult to justify risking an aircraft carrier (\$4 billion), an Aegis cruiser (\$1 billion) or even an F/A-18 (\$45 million) to contain a crisis which has little significance to American national interests. Even when an attack comes, our response may well be to withdraw rather than risk further casualties and losses.

Without the singular threat of Communism to justify the possibility of American casualties, recent public opinion polls indicate that Americans have a very low tolerance for casualties in low-intensity, regional conflicts. In areas where American interests are marginal, popular support for military missions vacillates and is directly related to the ease with which the mission is being conducted. Desert Storm was a major regional crisis and public opinion was carefully cultivated over a six month period. Tomorrow's crisis de jour will probably not give us the same luxury of preparation, from either a military or a public affairs perspective. While our political leaders may feel constrained by this consideration; our opponents may be inclined to take risks.

The recent U.S./U.N. operation in Somalia is a good example of the American public's declining tolerance for even minimal casualties. In January 1993, President Bush ordered U.S. Marines ashore in response to the civil war and mass starvation that was occurring in Somalia. The President had resisted becoming involved for two years but the media images

of the situation became too much to ignore. Over a twelve month period, a series of Time/CNN polls revealed the following public attitudes toward the operation." The question asked in all of the polls was, "Do you approve of the use of U.S. troops in Somalia?"

	<u>OCT.92</u>	<u>JAN.93</u>	<u>APR.93</u>	<u>OCT.93</u>
YES	36%	79%	50%	31%
NO	60%	17%	45%	65%
NO OPINION	4%	4%	5%	4%

*Margin of error $\pm$ 4%

This series of polls indicated some interesting trends. Although there could be a variety of reasons for the results, the ease with which the U.S. Marines were able to come ashore unopposed and the immediate impact that they appeared to have on the situation certainly contributed to the upswing in public opinion in January 1993. Conversely, the disastrous October 1993 attack against U.S. Army Rangers in Mogadishu contributed to the quick erosion of public support for the operation. Congress and the President were quick to react to the sagging public support for the mission by announcing a March 31, 1994 pullout date shortly thereafter.

"George C. Church, "Anatomy of a Disaster," Time 142 (18 October 1993): 42-50.

The rapid downsizing which the military is going through is also a restriction on American foreign policy because it will inevitably lead to a decline in our overseas presence. Seven hundred overseas bases will have closed by the year 2000. The 331 ships which the U.S. Navy will be left with in FY99 will increasingly be unable to provide year-round presence in various regions of the world. It is estimated that we will be unable to keep a carrier in the Mediterranean for more than six months of the year; in the Indian Ocean and Persian Gulf, this drops to five months in twelve.⁵⁰ Despite the Air Force's claims, it is doubtful that the forward presence role can be accomplished by CONUS-based bombers. Our response to major regional conflicts is bound to suffer: by the time the U.S. Navy arrives on-scene, the crisis may well have become a fait accompli.

2. Denial and Defeat

Given these four conditions, and the future operations which "...From the Sea" envisions, deterring or defeating the U.S. Navy may be achieved in one of two ways: 1) denying the Navy access to its territorial waters, thereby eliminating the threat that a naval battle group may pose or 2) threatening, or delivering, a knockout punch against a naval asset which causes the U.S. to withdraw from further conflict.

⁵⁰Jack Weible, "Future: Forward Absence?" Navy Times 2 May 1994, 5.

In order to deter the United States, the Navy's domination of the sea lines of communication and littoral regions must be challenged or at least disputed. The threat of an attack would, if nothing else cause the United States to reassess its involvement. By testing the capabilities and resolve of the United States, an opponent shifts the decision to escalate to us which, for a variety of reasons, may not be an option in areas where American national interests are marginal or ill-defined. This permits an opponent's strategy against the U.S. Navy to be one of denial rather than technological superiority.

As long as the sea remains the primary avenue by which the United States transports its war supplies, denying us free access to the littorals will be a primary goal of our adversaries' defense planning. As previously stated, the objective of naval forces in MRCs will be to maintain control of the battlespace above, below and on the world's oceans. By doing so, the sea lines of communication are protected, supplies and personnel can be safely delivered and the ability to attack targets ashore and support amphibious operations is ensured. Challenging our right to free access, whether done with a minefield, overt attacks or the threat of a nuclear weapons, may permit an opponent to deter the U.S. Navy from accomplishing its primary mission in an MRC: ensuring the safe delivery of goods and supplies. In lesser conflicts, it may

simply not be worth risking the potential consequences of involvement.

The Swiss military strategist, Antoine-Henri Jomini, postulated that there are certain principles of war which are timeless. Among these are the necessity of surprise and the ability to concentrate a severe blow against an opponent's decisive point.⁵¹ This may be especially applicable in the types of limited, low-intensity warfare (LRCs and LICs) in which we may find ourselves. In these types of conflicts, large-scale prolonged casualties like the ones which we suffered in Vietnam, are clearly unjustifiable. Even moderate casualties, such as those that we experienced in Beirut and Somalia may, rather than stiffening our resolve, cause the U.S. to reassess its involvement and ultimately lead to our withdrawal.

A clever opponent will not try to match up evenly against the strengths of the U.S. Navy; instead he will look to exploit our weaknesses, our "glass jaw." Many potential adversaries now believe that they will only have to get lucky once - perhaps a missile attack against a carrier or a single torpedo launched against a logistics supply ship - to raise the stakes high enough to break any coalition or cause enough domestic pressure on U.S. decision-makers to remove our

⁵¹John Shy, "Jomini," in Makers of Modern Strategy, ed. Peter Paret. (Princeton: Princeton University Press, 1986), 182.

forces. As Somalia demonstrated, an adversary need not win a clear military victory to cause the United States to withdraw. A single, dramatic attack with immediate live media coverage, would likely be sufficient to send a clear message to the United States.

The best military technology is not that which is superior; rather it is that which masks or neutralizes the other side's strengths, even as it exploits its weaknesses.⁵²

Since World War II there have been several cases where an inferior navy has been able to inflict enough damage against elements of a superior fleet to deter or even defeat them. In 1946, two British destroyers were heavily damaged by Albania and the British withdrew; in 1949, the Chinese gunboat Amethyst successfully denied the British fleet access to the Yangtse River; on several occasions, Iceland's patrol boats have successfully asserted that nation's exclusive fishing rights against the British; in 1968 the North Korean Navy captured the USS Pueblo without suffering consequences; and in 1977 the Argentine Navy fired on and detained nine Russian and Bulgarian trawlers on the high seas without repercussion.⁵³

There is no doubt that had the defeated nation chosen to fully engage the antagonist, the superior navy would have

⁵²Martin van Creveld, Technology and War (New York: The Free Press, 1989), 176.

⁵³Cable, 39.

easily prevailed. This was certainly the case of the Falklands War in 1982 when Britain chose not to be deterred from recapturing the Falklands from the Argentines. However in the aforementioned cases, an inferior force was able to strike a blow against a technologically superior force which, for whatever reasons, was not countered. From the lesser navy's point of view, the best tactic against the superior navy was to deny it the liberty of using its territorial waters. If an opponent is able to instill a fear of the consequences in a naval commander's mind, deterrence may succeed.

Today, technological diffusion and the proliferation of both advanced conventional weapons and weapons of mass destruction will give more actors access to technologies which a decade ago were the sole province of the two superpowers. The extent of this threat is outlined in Chapter IV. Given our aversion to casualties, the lack of a singular threat to focus our energies on, the increasing influence of the media on foreign policy and a sharp decline in our overseas presence, the days when an attack against American military forces raised popular slogans like "Remember the Maine" and "Avenge Pearl Harbor" may be gone forever.

D. SUMMARY

While "...From the Sea" may be a revolution in naval doctrine, it is not a fundamentally different approach for the

United States Navy. Instead, it merely articulates and codifies the types of operations that the United States Navy has been performing for years. However, the level of opposition and the sophistication of the threat have increased markedly. Success in future operations will largely depend on the Navy's ability to control the battlespace of the littorals. All other missions: surveillance, crisis management and power projection, are dependent on this dominance of the littoral battlespace.

The modern U.S. Navy was built to meet and defeat the Soviet Union's Navy, to project power against the Soviet's Eurasian bases and to ensure the reinforcement and resupply of the European continent by sea.⁵⁴ Most of the capabilities which we have developed in the last fifty years are still applicable for dealing with future regional threats. However, we are deficient in certain areas, namely mine detection and countermeasures, shallow-water ASW, ballistic missile defense and protection against chemical and nuclear weapons. These weaknesses undermine our ability to dominate the battlespace of the littorals and may represent an achilles heel which an opponent will try to exploit.

⁵⁴Roger W. Barnett, (Captain, USN Ret.), "Regional Conflict Requires Naval Forces," U.S. Naval Institute Proceedings 118 (June 1992): 31.

Despite these deficiencies, "...From the Sea" is exactly the type of doctrine that the U.S. Navy needs to transform itself from its previous Cold War orientation to an effective fighting force which is able to fight and win in the regional conflicts of the future. In any crisis, the arrival of U S. naval forces still sends a clear message of our interest. In the event that containment fails, our carrier and cruise missile firepower provide an impressive offensive and retaliatory strike capability. This potential use of force by the U.S. Navy will remain a critical tool in the practice of diplomacy and crisis management well into the twenty-first century. However, "...From the Sea" will remain a hollow doctrine unless we approach the future with innovation and creativity. The focus of future procurement strategies must be on achieving battlespace dominance in the littorals. Resting on our previous successes and relying on our superiority in power projection to achieve our goals is a recipe for disaster.

IV. THE THREAT

Technological advances and the proliferation of sophisticated sensors, advanced conventional weapons and weapons of mass destruction have given inferior navies the ability to contest the power of a blue-water navy operating in the restricted waters of the littorals. It is a daunting challenge which requires new approaches to old problems if we are serious about maintaining our dominance at sea.

Today, there are over sixty small but significant navies in the Third World, forty of whom now count some type of submarine in their inventories. Fifty militaries operate tactical aircraft which are capable of delivering antiship and cruise missiles against a surface ship.⁵⁵ Twenty-two nations have ballistic missiles capable of delivering various payloads and eight nations (United States, Russia, Ukraine, Khazakhstan, Belarus, France, Great Britain and China) are known to possess nuclear weapons. Five others are suspected of possessing limited numbers of crude weapons (India, Pakistan, Israel, North Korea and Iran) and others have developed nuclear weapons programs only to abandon them for one reason or another (South Africa, Iraq and Argentina).

⁵⁵Koburger, 2.

As the patterns of conflict change and the proliferation of high technology weapons increases, American naval forces will be subjected to new risks. These threats come from the proliferation of traditional "naval" weapon systems as well as from other non-traditional systems and technologies. The U.S. Navy's new doctrine, "...From the Sea" promotes joint warfighting in the littoral regions of the world, an area in which the U.S. Navy does not have much recent experience. It exposes naval assets to new dangers which need to be considered prior to their commitment.

While the possession of a weapon is not necessarily indicative of one's intent nor one's capabilities, it is nonetheless useful to examine the procurement of certain weapon systems and to analyze the threat that they may present to the U.S. Navy and the operations described in "...From the Sea." In this chapter, the proliferation of sophisticated sensor technologies, advanced conventional naval weapon systems and weapons of mass destruction is presented. The data reflects the nature of the current threat that these weapons and technologies bring to the military equation.

A. SENSOR TECHNOLOGIES

The best military technology is not that which is superior; rather it is that which masks or neutralizes the other side's strengths, even as it exploits its weaknesses.⁵⁶

⁵⁶van Creveld, 176.

Real-time, accurate geographical information is critical for the precise targeting of modern weapon systems. Space-based systems, unmanned aerial vehicles (UAVs) and reconnaissance aids (night-vision goggles, infrared target designators) are examples of systems which are rapidly leveling the playing field of modern naval warfare.

Many different technologies are available to improve the tactical intelligence gathering capability of Third World militaries. The availability of information provided by two advanced sensor technologies: space-based intelligence systems and unmanned aerial vehicles (UAVs), allows greater access to the types of information which was at one time the sole domain of the United States and the Soviet Union. When combined with modern delivery systems, conventional weapons or weapons of mass destruction, these systems complete a deadly package which has enormous political and military value and is potentially threatening to a U.S. Naval force.

1. Space Systems

Access to communications satellites and remote sensing imagery is nearly universal today. The data is used for mapping and land use management as well as monitoring global environmental change. In the developing world, nations are expanding their investments in space systems while funding for research and development has remained strong despite cuts in

many other military programs. One aspect of this otherwise benign use of space is the quest for real-time satellite imagery which can be used to target enemy forces and maintain surveillance during periods of tension. As has always been the case, the nation that possesses the best intelligence information is usually able to dictate the course and tempo of a military operation.

With the advent of space-based intelligence systems, the United States and Russia gained a tremendous strategic and tactical advantage over all other nations. The United States currently operates five KH-11 and Lacrosse real-time photo imaging satellites and the Russians maintain three of their Cosmos type satellites at any one time. In addition, both nations operate up to six signals intelligence satellites in geosynchronous earth orbit.⁵⁷ These satellites provide real-time communications monitoring to ground stations in their host countries. However, the dominance which the US and Russia have thus far been able to protect has recently been significantly reduced.

Since the early 1970s, other nations have sought to develop their own satellite imagery programs with mixed results. The Chinese have put twelve military photo reconnaissance satellites into orbit since 1970. However they

⁵⁷Jeffrey Richelson, "The Future of Space Reconnaissance," Scientific American 264 (January 1991), 40.

remain incapable of producing real-time photo imaging to ground stations. US intelligence sources believe that the Chinese are currently developing a more advanced system and may have already fielded the first of these new, more capable satellites.

Israel began its own space program in 1988 by launching the Offreq 1 intelligence satellite in cooperation with South Africa. India is preparing to launch its Polar Satellite Launch Vehicle (PSLV) in the near future which will enable it to increase its surveillance of long-term rivals Pakistan and China. The Indians have also confirmed that the PSLV satellite will be used to target its developmental intermediate-range ballistic missile, Agni.⁵⁶ Great Britain, Germany and Japan are all in the final phases of development with space-based earth observation systems and Brazil, Saudi Arabia and Iran have the foundations of programs already well established.

France too has developed a sophisticated network of satellite reconnaissance systems the centerpiece of which is the SPOT surveillance satellite. This satellite is able to produce black and white images which have 30 foot resolution and color images of 66 foot resolution. While this is only one-fifth of the resolution that American satellites are

⁵⁶Ibid., 44.

capable of, the images are good enough that the French military uses SPOT information for military intelligence. A French-Italian-Spanish joint effort to develop a system of four photo reconnaissance satellites called Helios will provide imagery information which is on a par with the United States'. France has stated that it will use Helios information to target its strategic nuclear missiles."⁹

Until recently the resolution of satellite imagery outside of the United States and Russia was not sufficient to fulfill the intelligence requirements of most nations. However, this is no longer the case as resolution and access have dramatically increased. During the Gulf War, Iraq sought out and received French SPOT imagery of coalition force deployments. The French were willing to sell what they considered non-technical imagery to an opponent which they were actively involved against. The United States had to eventually threaten to knock down the SPOT satellite before the French would acquiesce and restrict Iraqi access to the information. As access to this type of information becomes easier to get and protecting it becomes more difficult, the tactical advantage that the United States has long enjoyed may lessen.

⁹Ibid., 43.

The negative implications of this proliferation of space-based imagery are numerous. The element of surprise in military operations will become more difficult to achieve as will the ability to prepare for war without detection. The United States and the Soviet Union were able to maintain a sense of transparency throughout the Cold War largely through the use of satellites. They were the only two players with access to the information and an uneasy stalemate resulted. With the advent of new satellite networks such as GPS and the Russian Glonass system, and increased access to the information that they provide, the comparative advantage that the superpowers once held can no longer be taken for granted.

2. Unmanned Aerial Vehicles (UAVs)

UAVs represent the low end of the intelligence sensor spectrum but they represent an affordable and capable alternative to space-based systems for some nations. UAVs represent an entirely new use for technology on the modern battlefield. Missions include reconnaissance, targeting, naval gunfire support, artillery adjustment, target designation, mine sweeping, close air support coordination, electronic warfare and battle damage assessment.⁶⁰ The depth of the battlefield can be greatly increased by using UAVs for targeting, up to 800 km in the most sophisticated systems.

⁶⁰Edmond Dantes, "Military Aviation," Asian Defense Journal 12 (December 1992): 31.

With accurate targeting information, an enemy can be attacked by missile systems without risking tactical aircraft and their crews.

The first use of UAVs was by the Israelis during their clash with Syrian forces in the Bekka Valley in 1982. Israeli UAVs were used as decoys to deceive the layered Syrian air defenses and to provide real-time intelligence and targeting information to the Israeli Air Force. The United States successfully employed UAVs in 1991 to monitor Iraqi forces in Kuwait and to conduct surveillance across the battlefield during Operation Desert Storm.

Canada, France, Britain and the United States are the recognized leaders in UAV development and production. Most western militaries have incorporated UAVs into their military doctrines but like all new technologies the rest of the world will not be far behind. Indigenous UAV programs also exist in India, China, South Korea, Japan and Australia. Singapore began a sort of mini arms race over UAVs when they purchased an undisclosed number of Israeli Aircraft Industries Scout UAVs in 1989. Several other Asian nations followed suit shortly thereafter.⁶¹ The utility of UAVs is obvious and their proliferation is something which is bound to increase now that the potential of the systems has been proven in combat.

⁶¹Ibid., 36.

B. CONVENTIONAL NAVAL WEAPONS

In this section, five conventional naval weapon systems are presented: fast attack craft (FACs) and corvettes; diesel-electric submarines; tactical aircraft; mines; and antiship and cruise missiles. They were chosen because they are the most widely proliferated conventional naval weapon systems and they represent the most likely type of challenge to an American naval battle group in many of the littoral regions of the world.

1. Fast Attack Craft and Corvettes

The world's lesser navies have usually been discounted in American naval planning. They were usually poorly trained and equipped with outdated, low-tech weapons which could inflict little damage against a US Navy warship. Many nations of the world are no longer content with purchasing the decommissioned ships of the United States and Russia to perform the traditional naval functions of maritime presence, sea denial/sea control and deterrence. Increasingly, the platform of choice for Third World navies are highly sophisticated Fast Attack Craft (FACs) and Corvettes.

Despite the annihilation of the Iraqi Navy during the Gulf War, the proliferation of FACs and corvettes is increasing among the nations of the developing world. The fast attack craft (FAC) is a small, stealthy and highly maneuverable platform. These vessels can be outfitted with a

variety of guns as well as cargo rockets, surface-to-surface and surface-to-air missile systems. Most boats are between 90-150 feet long and weigh between 150-300 tons. Several are capable of speeds in excess of thirty-five knots.⁶² Their crews are small, usually less than thirty, and they are familiar with the coastal areas in which they work. FACs do not have a large radius of action but they do have good sea-keeping ability and carry significant firepower.

In addition to performing their primary mission of hit-and-run shipping strikes, FACs can also lay mines, conduct ASW operations, provide surveillance and spotting and electronic countermeasures. FACs can be camouflaged and hidden along a coastline making them virtually invisible to a ship's watchstanders and radar. Land-based radar and a data-link provide the patrol craft with a good surface picture and allows it to work in cooperation with other vessels, aircraft and control systems. Many navies employ them in teams supported by a tender which provides supplies, fuel, ammunition and repair facilities.

Most of the world's navies operate some type of FAC and more than sixty operate FACs capable of carrying antiship missiles. In the Asia-Pacific region, North Korea operates twenty-eight Russian supplied FACs and South Korea counts ten

⁶²John Cordle, (Lieutenant, USN), "Welcome to Our World," U.S. Naval Institute Proceedings 120 (March 1994): 63.

American built PSMM5 class boats. Malaysia, Indonesia, Vietnam and Thailand also possess large numbers of modern, sophisticated FACs.⁶³ China operates more than 210 Huangfen and Hegu class FACs, export versions of Russia's Osa I and Komar classes.

In the Mediterranean, Algeria (11), Egypt (22), Greece (14), Israel (19), Libya (24) and Turkey (16) all operate significant numbers of FACs. Syria's previously large fleet of nineteen FACs are in the process of being decommissioned.⁶⁴ Finland (16), Germany (40), Norway (30) and Sweden (28) operate FACs in the Northern Atlantic and North Sea and all of the Persian Gulf nations operate FACs with Bahrain (6), Iran (10), Qatar (7) and the UAE (10) having the most significant fleets.

The primary builders of FACs are the United States, Russia, China, Sweden, Israel and Germany. The largest exporter is currently China which recently delivered thirty-two of its Huangfen FACs to Pakistan, Bangladesh, Iran and Egypt.⁶⁵ The French have recently entered the market by introducing a new FAC (Iris) with a very specific capability, anti-air defense, to act as an escort for unarmed merchant

⁶³Joris Janssen Lok, "FACs: Adapting the Art of Hit and Run," Jane's Defense Weekly 17 (24 October 1991): 30.

⁶⁴Ibid.

⁶⁵Ibid., 28.

traffic." Sweden is considered the leading builder of high-tech FACs and its Smyge program has made great advances in stealth technology and survivability.

The corvette maintains many of the FACs characteristics but is a more capable craft and one which is not confined to coastal operations. They are larger (up to 200 feet), displace between 500-1000 tons and carry crews of up to 100. Corvettes often possess a more sophisticated anti-air and anti-submarine capability and can function as an independent command and control platform. They are equipped to operate independently for up to two weeks.

Twenty-four nations include corvettes in their navies with Russia's 208 vessels being by far the largest fleet. India operates twenty corvettes and the South Korean Navy twenty-six. Other significant corvette operators include Indonesia (16), Italy (14), Sweden (6), Singapore (6), Ecuador (6) and Peru (6). The primary builders of corvettes are Russia, Italy, South Korea and the United States while several others have programs in the development stage. India is currently attempting to establish an indigenous corvette

"Stan Zimmerman, "Modern Patrol Boats Bolster Smaller Navies," Armed Forces Journal International 128 (June 1991): 74.

building program that includes the development of gas turbine engines.⁶⁷

Many nations have realized that a strong coastal navy is important for challenging claims against its Exclusive Economic Zone (EEZ) and preventing the exploitation of its maritime resources. Additional missions for these coastal navies include combating smuggling, piracy and illegal immigration, and deterring the unwanted presence of an outside aggressor in its territorial waters.

The requirement for a fast, heavily-armed, low maintenance vessel to perform these missions makes FACs and corvettes the ideal platform for a number of the world's navies. Given the United States' continuing reliance on naval presence as a means of containing crises in the Third World, it is increasingly likely that our presence may be challenged by these highly capable vessels.

2. Diesel-Electric Submarines

The proliferation of modern diesel-electric submarines by many of the world's lesser navies represents a major threat to the U.S. Navy. Because of their relatively small size, diesel-electric submarines are well suited for operations in the world's coastal regions and maritime chokepoints,

⁶⁷Daniel Todd and Michael Lindberg, "The Trend Towards Replacement of FACs with Corvettes," Far Eastern Economic Review (September-October 1993): 286.

precisely the areas in which "...From the Sea" envisions the U.S. Navy operating.

The increasing sophistication and lethality of modern diesel-electric submarines requires that a large number of assets be devoted to locating and neutralizing them. In the Falklands War, the British were forced to expend significant resources on anti-submarine warfare in order to counter the threat that one Argentine submarine posed. The same would be true today if the Iranians attempted to close the Straits of Hormuz or the Indonesians threatened the Straits of Malacca. An approaching American battlegroup might be viewed as an attractive target to a hostile submarine particularly if he can approach the group undetected.

There are currently 425 diesel-electric submarines in service with forty-five navies.⁶⁴ These highly sophisticated and capable weapons platforms are becoming the ship of choice for many maritime nations wishing to develop modern navies. All are capable of launching torpedoes and laying mines and an increasing number are being equipped with tactical missiles. Advances in sensor technologies, propulsion systems and fire-control systems are bringing many of these submarines near technical parity with the United States' nuclear attack

⁶⁴David Miller, "The Silent Menace: Diesel Electric Submarines in 1993," International Defense Review 26 (August 1993): 613.

submarines. They are also an ideal platform for surveillance and the delivery of special forces troops.

The German Type 209 is the most common diesel-electric submarine in the world. Worldwide, there are fifty Type 209s operated by thirteen navies including Indonesia, Turkey, Greece, Argentina, Peru and Brazil. The Type 209 has a 400 nautical mile radius of action, can run at twenty-three knots submerged and carries fourteen torpedoes or twenty-eight mines. A relatively small crew of thirty and a high degree of automation make it an ideal purchase for many of the world's smaller navies and its price (currently \$100 million) is affordable by modern warship standards.⁶⁹

The Russian Kilo class submarine is the second most common diesel-electric submarine. Currently, seven navies operate a total of thirty-seven Kilos.⁷⁰ The Kilo is capable of carrying eighteen torpedoes or thirty-six mines and several versions have been outfitted with surface to surface missiles. The Kilo's significant mine-laying capability poses a threat which would be difficult to counter especially in the world's narrow shipping channels. It is a true ocean-going submarine with a radius of action of over 6,000 nautical miles and a crew of sixty.

⁶⁹Zimmerman, 76.

⁷⁰John Jordan, "The Kilo Class Submarine," Jane's Intelligence Review 4 (September 1992): 429.

In the Mediterranean, forty modernized and newly built diesel-electric submarines are operated by eleven countries. Israel, Italy and Turkey operate the most modern and capable submarines in the region while Libya, Albania and Yugoslavia operate the least sophisticated boats.⁷¹ In the North Arabian Sea and the Indian Ocean, Iran's three Kilos and the eight diesel-electric boats operated by India, are the most capable and could pose a significant threat to shipping in the region. Pakistan and Indonesia also possess modern diesel-electric submarines.

In the Asia/Pacific region, 130 diesel-electric submarines are operated by China, North and South Korea, Taiwan and Japan. Of these, thirty-five are modern boats capable of launching torpedoes and sub-launched tactical missiles.⁷² Japan's ten Yuushio class boats are the most sophisticated and are manned by highly trained crews. The twenty-four Whiskey and Romeo class boats operated by the North Koreans are considered the most technologically backward and poorly maintained in the region.⁷³ However, if survivability is not a consideration, they still represent a significant threat.

⁷¹Joris Janssen Lok, "Submarine Forces: Silent but Deadly Threat," Jane's Defence Weekly 18 (12 September 1992): 46.

⁷²Ibid.

⁷³Miller, 614.

The navies of South America operate the most uniformly modern diesel-electric submarines in the world. Brazil builds its own Type 209 class boats and fields twelve modern diesel-electrics. Peru, Chile and Argentina all have very capable diesel-electrics and Colombia, Ecuador and Venezuela also have older submarines in their naval inventories. An Argentine Type 209, "San Luis," stifled British ASW efforts during the Falklands War of 1982.

Large-scale, open-ocean warfare remains a possibility which the U.S. Navy cannot afford to ignore, however, it would seem very unlikely unless the Russian Navy was reconstituted and aggressively redeployed. Diesel-electric submarines represent the type of threat that the U.S. Navy is most likely to encounter in the crisis management and regional conflict scenarios that "...From the Sea" envisions. The sophistication and affordability of many of these vessels combined with the willingness of the Russians and the Chinese to export their military hardware in search of hard currency, means that the proliferation of these boats will continue to increase.

3. Tactical Aircraft

Modern tactical aircraft significantly increase the military potential of many nations of the developing world. They can carry weapons loads of several tons up to 1,000 kilometers and fly at speeds of up to Mach 2 in all weather

conditions. With modern fire control systems, tactical aircraft can drop ordnance with an accuracy of less than fifty meters.⁷⁴ By comparison, most ballistic missiles available to Third World nations have accuracies from a few hundred meters to a kilometer or more.⁷⁵

Because of these characteristics, the proliferation of advanced combat aircraft capable of delivering conventional and unconventional ordnance has increased dramatically in the last ten years. Since 1983, combat aircraft sales have increased in many regions of the developing world: East Asia +5%, Middle East +8%, Latin America +14%, South Asia +24% and Sub-Saharan Africa +39%.⁷⁶ During this same time period, the number of NATO and former Warsaw Pact tactical aircraft has remained relatively the same.

Fifty nations operate modern tactical aircraft and eight states in the developing world (India, Israel, Saudi Arabia, Cuba, Iran, Iraq, North Korea and Syria) operate what are considered top-of-the-line aircraft such as the American F-15 and Russian Mig-29.⁷⁷ Sixteen other nations fly less

⁷⁴John R. Harvey, "Regional Ballistic Missiles and Advanced Strike Aircraft," International Security 17 (Fall 1992): 47.

⁷⁵Ibid.

⁷⁶Keith Krause, Arms and the State: Patterns of Military Production and Trade (Cambridge: Cambridge University Press, 1992), 188-89.

⁷⁷Ibid., 191.

capable, yet highly sophisticated strike aircraft such as the F-16, Su-24, Tornado and Mirage 2000. These aircraft carry modern air-to-air and air-to-surface missiles, precision-guided munitions and sophisticated reconnaissance and surveillance systems.

The primary suppliers of modern tactical aircraft are the United States, Russia, France, Great Britain and China. Like many modern weapon systems, the infrastructure required to operate a squadron of modern tactical aircraft is extensive and complex. Many nations which boast modern, highly capable tactical aircraft do not have the trained pilots and technicians required to fully realize the potential of the aircraft and their systems. The dismal performance of the Libyans (1986) and the Iraqis (1991) against American pilots is indicative of this weakness.

The most sophisticated tactical aircraft are still those of the United States and future advances in stealth technology, precision-guided munitions and jet engines will continue to provide the United States with a qualitative edge over any adversary in most cases. However, as the Falklands War (1982) and the Iraqi attack on the USS Stark (1987) pointed out, American rules of engagement may allow an aggressive pilot in a relatively unsophisticated tactical aircraft to inflict a lot of damage against a modern naval warship equipped with the most sophisticated defenses. As

more nations become equipped with advanced tactical aircraft, the threat to American naval forces will only increase particularly in scenarios where a naval vessel is patrolling alone.

4. Naval Mines

Since World War II, naval mines have been used thirteen times in wars and lesser hostilities.⁷⁸ These large, unsophisticated, floating bombs have nearly been the bane of several modern navies, including the United States. Today, mine technology has improved significantly making the modern, multi-sensor mine with the ability to burrow itself into the sea floor and defend itself against most countermeasures, an extremely difficult threat to counter.

Absolute control of the littorals is crucial to the U.S. Navy performing the types of operations outlined in "...From the Sea." From a strategic point of view, the littorals offer an ideal mining target. Shallow water, a soft sea floor and a high volume of waterborne traffic produce excellent conditions for offensive mines. Coastal mine fields in very shallow water (10-40 feet) and the surf zone (10 feet to the beach) are hazards against which the U.S. Navy has very little protection.

⁷⁸J.M. Martin, (Captain, USNR Ret.), "We Still Haven't Learned," U.S. Naval Institute Proceedings 117 (July 1991): 66.

Modern mines are computer-controlled, programmable devices capable of recognizing potential targets by their acoustic, magnetic or pressure signatures.⁷⁹ They can be laid by surface vessels, aircraft and submarines and are capable of carrying a tremendous amount of conventional explosives, up to 2,400 kilograms in some cases.⁸⁰ Some can even be pre-programmed to attack specific types of vessels or delay detonation until a certain number of targets pass over it.

Mines sink ships either by direct contact or by shock waves and whipping effects. Even if a mine does not actually sink a ship, it often produces disabling effects which may place the vessel at risk to a secondary attack. When the USS Princeton struck a mine in the Persian Gulf, the ship's Vertical Launch System for Standard air-defense missiles, main gun and Harpoon anti-ship missile launchers were temporarily put out of action leaving the Princeton vulnerable to a surface or air attack which fortunately did not come.⁸¹

There are basically three types of naval mines: floating, moored and ground mines. All are activated by

⁷⁹Sheila Galatowitsch, "Undersea Mines Grow Smarter and Deadlier," Defense Electronics 23 (March 1991): 57.

⁸⁰Anthony Preston, "Mine Warfare in the 1990s," Asian Defence Journal 5 (May 1993): 48.

⁸¹David Foxwell, "Naval Mine Warfare: Unfunded and Underappreciated," International Defense Review 26 (February 1993): 125-26.

direct contact or by the influence of a passing vessel. The simplest mine is the buoyant contact mine which is triggered by contact with a target vessel. These mines are difficult to see or pickup on sonar and difficult to track because they drift with the prevailing currents. There are several variants of the moored mine including variable depth antisubmarine mines and the rising mine which can be laid in deep-water and programmed to rise to the surface at a later time. Ground mines are activated by vessels passing overhead and may bury themselves in the seabed floor to avoid detection. The average bottom mine is a shaped cylinder 21 inches in diameter and seven feet in length with a 1,000 pound warhead.⁶²

Modern naval mines are becoming increasingly sophisticated and difficult to detect. Some are coated with anechoic materials or materials that accelerate marine growth, making detection extremely difficult.⁶³ Many have a twenty year shelf life including up to 700 operational in-water days; aging mines may be kept operational by upgrading sensing and control systems. Future mines may be rocket-propelled, possess artificial intelligence and be extremely resistant to

⁶²Frank B. Kelso II, (Admiral, US Navy), "Building Blocks of Naval Power," U.S. Naval Institute Proceedings 118 (November 1992): 39.

⁶³Ibid.

countermeasures. The prototype Intelligent Self-Burying Hunter Mine (ISBHM) embodies all of the above features. These characteristics give the mine superb offensive and defensive weapon capabilities, making it a cheap and effective weapon for use against even the most powerful surface and submarine forces.

The military value of naval mines has been aptly demonstrated several times in the past decade. Shipping movements in the Red Sea were disrupted in 1983 by the Libyan minelayer, Ghat. During the Iran-Iraq War (1980-88) five merchant ships were sunk by mines before mine sweeping operations were begun. In spite of extensive clearing operations, two tankers (Bridgeton and Texaco Caribbean) and an American warship (USS Samuel Roberts) were also damaged when they struck moored mines.

During the Gulf War, two ships (USS Tripoli and USS Princeton) were both heavily damaged by mines and Iraq's mining of the beaches around Kuwait City effectively neutralized the American amphibious group waiting offshore. While it did not alter the ultimate outcome, Iraqi minefields did present risks which were viewed as excessive and essentially prevented an attack from the sea against Kuwait City. According to Major General Harry W. Jenkins, Jr., commander of the Marine amphibious force in the Persian Gulf, the Marines did not land on the beaches at Kuwait City

because, "The threat of mines in shallow water drove the planning and we didn't know where the mines were."⁴

Following the Gulf War, three lessons learned were gleaned in regard to mine warfare: Iraqi mines kept coalition forces from gaining total control of the northern Persian Gulf; mines interfered with sealift; mines prevented American battleships from maneuvering freely to provide naval gunfire support.⁵ The U.S. also contributed only 13% of the mine countermeasure forces during the war.⁶ In the early stages of many of the operations envisioned in "...From the Sea," the U.S. Navy will be going it alone and will not be able to depend on mine warfare support from its allies.

Today, the proliferation of naval mines needs to be one of the top concerns for U.S. Naval planners. Forty-six nations possess a mine laying capability and the mine inventory of Russia alone may be as high as 500,000.⁷ Fifteen nations produce naval mines for export including the United States, Italy, Great Britain, Russia, China, Sweden and

⁴Edward J. Walsh, "Navy and Marine Corps Focus on Achilles' Heel: Shallow-Water Mines," Armed Forces Journal International 131 (August 1993): 35.

⁵Ernest Fortin, (Lieutenant, USNR), "Those Damn Mines," U.S. Naval Institute Proceedings 118 (July 1992): 33.

⁶Martin, 67-68.

⁷Kelso, 40.

Germany."²² In spite of these statistics, mine warfare remains a significant weakness that the U.S. Navy has not adequately addressed.

The U.S. Navy's serious lack of "mine consciousness" is not duplicated by many of the world's lesser navies. Many navies devote a large portion of their naval budgets to mine laying and mine warfare operations. Forty nations have some form of mine warfare capability. Finland and Sweden both operate controllable fixed minefields off their shores as part of an overall coastal-defense strategy."²³ The purpose of these fields is to deter a seaborne invasion force by effectively closing the fjords in times of war. It is not unrealistic to imagine that the same type of fields might be built by other nations wishing to deter aggressors.

The naval mine continues to prove itself to be an effective and difficult-to-counter weapon that creates havoc well out of proportion to its small size. They are stealthy and anonymous, making them particularly attractive to small, Third World nations and terrorist groups which may seek to deter outside involvement in their affairs. They are also inexpensive, may be left in place for months and they can keep shipping contained to areas where it may be more easily

²²Foxwell, 129.

²³Ibid., 128.

attacked. These factors make them effective, highly economical force multipliers.

Since they are able to perform one of the traditional roles of maritime forces, sea denial, mines have quickly come to be viewed as a poor man's navy. In areas where the United States' interests are minimal, such as humanitarian and low intensity missions, an opponent may be able to achieve deterrence at a very low cost to himself. In 1950, Rear Admiral Allan Smith, commander of the amphibious task force at Wonsan, Korea, expressed the frustration that we may experience yet again:

We have lost control of the seas to a nation without a navy, using pre-World War I weapons, laid by vessels that were utilized at the time of Christ.⁹⁰

5. Antiship and Cruise Missiles

During the Gulf War, Iraq managed to launch two Silkworm missiles at coalition ships, neither of which struck its target. Some have suggested that this failure dispelled any notion that patrol boats or aircraft armed with antiship missiles could successfully engage large naval warships. Yet despite this most recent combat failure, an increasing number of small navies are purchasing sophisticated antiship missiles. Today, seventy-one nations have anti-ship missiles

⁹⁰Tamara M. Melia, Damn the Torpedoes: A Short History of U.S. Naval Mine Countermeasures, 1777-1991 (Washington: Naval Historical Center, 1991), 76.

and over one hundred have some form of cruise missile."¹ More than sixty navies possess vessels equipped with these surface-to-surface antiship missile and forty-eight are equipped with cruise missiles."² These powerful and increasingly accurate weapons pose a significant threat to U.S. Navy assets deployed near the coastlines of many Third World nations.

Antiship missiles and fast patrol boats provide smaller countries with the means to challenge larger navies in restricted coastal areas. An antiship missile has several advantages over a torpedo or gun: they have greater range, are very fast and stealthy and they require relatively unsophisticated aiming and guidance technology. Effective ranges of Western weapons are generally less than 100 miles while Russian and Chinese missiles have ranges of up to 250 miles."³ Antiship missiles are also able to cripple a vessel even if the warhead doesn't explode, witness the Exocet attacks on the USS Stark and the Atlantic Conveyor during the Iran-Iraq War and the HMS Sheffield during the Falklands War.

Defeating supersonic, low-flying antiship missiles is an extremely difficult proposition. A ship's radar is a line-

¹Truver and Hazlett, 82.

²Koburger, 2.

³Norman Freidman, "Modern Antiship Missiles - The Great Equalizers," Armed Forces Journal International 129 (June 1992): 38.

of-sight device and therefore has a very limited range. Any low-flying aircraft or cruise missile may approach within thirty miles of a ship before being detected, leaving only a few minutes of warning time before impact.

The failures of the Iraqi ships during the Gulf War can be attributed to the American dominance of the airspace above the Gulf and the Iraqis' lack of the sophisticated tracking sensors and antiair missiles necessary to intercept inbound missiles. These inadequacies have not gone unnoticed by other navies. In the low intensity scenarios envisioned in "...From the Sea," it is increasingly likely that an opponent may attempt to use an antiship missile much earlier in the conflict in the hope of inflicting the type of damage that would lead to a U.S. withdrawal.

Advertising by missile manufacturers stresses that antiship missiles are the great equalizer against superior naval forces and many nations have taken heed: seventy-one states now possess an advanced antiship missile capability.⁹⁴ The French-made Exocet is the most widely distributed antiship missile with over 2,000 of the weapons spread amongst twenty-nine nations.⁹⁵ In addition to France, other principle

⁹⁴Edward Kolodziej, Making and Marketing Arms: The French Experience and its Implications for the International System. (Princeton: Princeton University Press, 1987), 183.

⁹⁵Asian Defense Journal, "The Exocet - Deadly Family of Antiship Missiles," 10 (October 1990): 62.

exporters of antiship missiles are China, Israel, Japan, Russia and the United States." In addition, several other nations either have existing programs or are pursuing long-range antisurface missile programs.

An equally threatening trend in weapons proliferation in the developing world is the cruise missile. While the MTCR specifically addresses cruise missiles, the proliferation of these weapons has long been ignored by the signatories. One hundred and two nations currently have cruise missiles" including some 6,500 Harpoons and 10,000 Russian and Chinese variants of the Styx missile." There are eleven known cruise missile programs and eleven other nations are suspected of developing indigenous cruise missile production capabilities." Longer and more accurate targeting information will soon be available through GPS and the Russian Glonass navigation satellites.

Of recent concern is the apparent export of small American gas turbine engines to China. The fear is that these engines will be adapted to a modified Silkworm giving the

"Jane's Defence Weekly, "Standoff Delivery Comes of Age," 15 (16 March 1991): 391.

"James L. George, The U.S. Navy in the 1990s: Alternatives for Action, Annapolis: U.S. Naval Institute, 1992: 65.

"Zimmerman, 48.

"Duncan Lennox, "Missile Race Continues," Jane's Defence Weekly 20 (23 January 1993): 20.

Chinese a true cruise missile capability. Given China's apparent willingness to sell their weapons to anyone with the ability to pay, exports of a Chinese cruise missile are particularly worrisome.¹⁰⁰ Potential clients include Syria, Iran and Pakistan-all of whom are long time military customers of China.

Cruise missiles have ranges of up to 250 miles (in the case of the Tomahawk) and accuracies have been refined down to 10 meters. During the Gulf War, 288 cruise missiles were launched against Iraqi land targets with a reported accuracy rate of almost 85 percent.¹⁰¹ Navigation and homing technology is developing at a rapid rate and more nations are seeing the value of possessing a few unmanned air vehicles (UAVs) for tactical reconnaissance and targeting of their cruise missiles and other weapon systems. Naval forces are particularly vulnerable to low-flying, fast and stealthy cruise missiles whose presence in a conflict could seriously hamper the effectiveness of the U.S. Navy in performing its traditional mission of offshore presence.

¹⁰⁰Kevin Fedarko, "Confounded by the Chinese Puzzle," Time 17 (25 April 1994): 39.

¹⁰¹W. Seth Carus, Cruise Missile Proliferation in the 1990s (Westport: Praeger, 1992), 1.

C. WEAPONS OF MASS DESTRUCTION

The proliferation of weapons of mass destruction represents the greatest threat that a nation may present to an American naval battle group operating off its shores. The possession of weapons of mass destruction provide an opponent with two important capabilities that are relevant to "...From the Sea": by using them, they offer the possibility of inflicting enormous physical damage to American naval forces; and by merely threatening their use, an enemy may be able to dissuade the United States Navy from performing its traditional missions of presence, power projection and crisis management.

"...From the Sea" presupposes control of the sea lines of communication (SLOCs) by the U.S. Navy. By challenging our control of the SLOCs with the threat or use of weapons of mass destruction, an adversary may be able to deter the Navy from operating in its region. In this section, proliferation trends in nuclear, chemical and biological weapons are presented. Ballistic missile proliferation is also presented because it represents the primary means of delivering weapons of mass destruction against an opponent.

1. Nuclear Weapons

As more countries acquire nuclear arsenals, they may find themselves capable of preempting US maritime assets deployed for compellence or coercion. In addition, the

possibility that a country has such a capability may deter the US from projecting power against them.¹⁰²

Since the proliferation of nuclear weapons and other weapons of mass destruction represents potentially the most dangerous threat to American military forces, it is important that they be included in any discussion of the future of warfare at sea.

Eight nations are known to possess a nuclear weapons capability and five others are suspected of having developmental programs, if not actual weapons. It has been postulated that countries develop nuclear weapons programs under three sets of circumstances: there are those nations which feel immediately threatened (Israel, Pakistan, South Africa, North Korea) as well as those who have recently gone through a military defeat and seek an autonomous deterrent (France, China). Lastly, there are those nations who seek regional hegemony and see nuclear weapons as a valuable political and military tool (Iraq, Iran and India).

Since 1945, constraints on U.S. strategy in Third World conflicts were largely generated by a fear of escalation with the Soviet Union. With this threat now greatly reduced, the emergence of regional powers armed with nuclear weapons has become a source of concern for American military planners. The rapidly increasing access to multi-use technologies and a

¹⁰²Arnett, 2-3.

growing scientific and technological culture would appear to be fostering the ambitions of those who wish to arm themselves with man's most destructive weapon.

The threat of nuclear weapons or other weapons of mass destruction being used against a naval battle group by a regional adversary is sure to change the calculus of the crisis. The advantage of a nuclear weapon is that it can destroy a naval warship with a single blast. The accuracy of the weapon is not as important and it can severely incapacitate a ship it does not destroy by disrupting the electronics and communications equipment onboard. From an adversary's point of view, using a weapon of mass destruction only against naval forces at sea may avoid uncontrolled escalation, civilian casualties and indiscriminate damage to property on land.

2. Chemical Weapons

Since World War I, large-scale attacks using chemical weapons have occurred on five occasions: Italy's invasion of Ethiopia (1935-36), Japan's occupation of Manchuria (1937-45), Egypt's intervention in Yemen (1965-67), the Soviet Union's occupation of Afghanistan (1980s) and during the Iran-Iraq War (1980-88).¹⁰³ Today, two dozen nations maintain stockpiles of

¹⁰³Steve Fetter, "Ballistic Missiles and Weapons of Mass Destruction," International Security 16 (Summer 1991): 15.

chemical weapons including Cuba, Egypt, India, Iran, Libya, North Korea, Pakistan and Syria.¹⁰⁴

Chemical agents fall into one of four categories: choking agents, blood agents, blister agents and nerve agents. Choking agents, such as phosgene, attack the respiratory system, causing irritation and inflammation of the lungs. Blood agents act by preventing the utilization of oxygen in the blood. Common blood agents include hydrogen cyanide and arsine. Because they affect the respiratory system, both choking and blood agents are easily defeated by gas masks. Blister agents, such as mustard gas, kill by absorption through the skin as well as by inhalation.

Nerve agents are by far the most chemical weapons. They interfere with cholinesterase, an enzyme involved in nerve transmission.¹⁰⁵ Nerve agents are lethal in concentrations less than one-tenth that of choking, blood or blister agents. There is little defense against an attack with nerve agents.

The United States and the Soviet Union both developed ballistic missile warheads specifically designed for chemical munitions. The two most heavily exported Soviet missiles, the FROG and SCUD-B, can be or fitted with a small, cylindrical

¹⁰⁴Ibid., 14.

¹⁰⁵Ibid., 16.

burst charge surrounded by a large amount of chemical agent. However, it is not necessary to develop sophisticated warhead technology to deliver the agents. During the Iran-Iraq War, Iraq used crop-dusting helicopters purchased from the United States to carry out its chemical weapons attacks against Kurdish civilians.¹⁰⁶

Chemical weapons are not capable of producing the same numbers of casualties as nuclear or biological weapons. Yet, because production costs of chemical weapons are so low - as little as \$20 per kilogram - they offer Third World nations a cheap weapon of terror. Depending on the circumstances (wind conditions, warning time, type of agent, delivery vehicle), chemical weapons can be a minor nuisance or a weapon of massive destruction. While gas masks provide protection against all but heavy concentrations of nerve agents, their degree of protection is dependent upon variables such as availability, fit and training. Regardless of the type of agent, the threat of use against a military force necessitates the taking of precautions which may adversely impact the ability of the force to conduct its assigned mission.

3. Biological Weapons

The lethality of biological agents approaches that of small nuclear weapons. They are more difficult to develop

¹⁰⁶Stuart Auerbach, "\$1.5 Billion in U.S. Sales to Iraq," Washington Post, 11 March 1991, A1.

than chemical agents but are relatively simple to develop compared to nuclear weapons development programs. Officially, no nation is known to possess biological weapons today. However, the United States, Russia, Great Britain and Japan are known to have developed weapons in the past, and Russia, Iraq and Syria, are strongly suspected of having biological weapons programs in various stages of development.¹⁰⁷

Biological agents are divided into two categories: toxins and pathogens. Toxins, such as botulism, are deadly chemicals produced by living organisms while pathogens, such as anthrax, are living organisms which produce disease. Toxins are not well-suited for aerial delivery because they decay rapidly when they come into contact with air. They are, however, inexpensive and easily introduced to the water supplies of civilian populations or unsuspecting military units.

Pathogens, on the other hand, have proven to be ideal agents for air-dropped or missile-delivered munitions. Pathogens form spores which are very resilient to violent delivery methods and do not decay upon exposure to air, light and water. Estimates say that nuclear weapons are 100 to 1,000 times more deadly than chemical weapons yet only about

¹⁰⁷Fetter, 23.

10 times as deadly as an anthrax warhead attack.¹⁰⁸ Nearly all those exposed to the anthrax virus are killed within a few days and the spores may be able to survive in the soil for up to a decade. When used against a prepared population, an anthrax weapon would produce the same number of casualties as a small nuclear weapon.

Chemical and biological weapons have not posed a serious threat to the United States Navy in the past. But to perform future missions, "...From the Sea" envisions operations close to an enemy's shore and in MRCs, elements of a battle group may be positioned within a harbor to provide anti-air or TBMD capabilities to nearby forces or the civilian populace. This may place Naval forces in grave danger of exposure to chemical and biological weapons. These weapons have the potential to neutralize any naval warship by killing the entire crew while leaving the vessel intact. Their relatively low cost, ease of delivery and lack of effective safeguards against them these weapons an ideal choice for military, as well as for deterrent and terroristic, purposes.

4. Ballistic Missiles

The Missile Technology Control Regime (MTCR), signed in 1987 and supported by twenty-three countries today, has helped curb the spread of long-range missiles that might

¹⁰⁸Ibid., 27.

threaten the United States. However, it does not deter the spread of tactical ballistic missiles with a range of 100 to 1000 miles and the transfer of the technologies which are necessary to build them. The acquisition of tactical ballistic missiles by many Third World nations presents the U.S. Navy with a dangerous and extremely difficult threat to counter.

The list of countries which possess a ballistic missile capability now numbers thirty-four and is growing every year.¹⁰⁹ Seven nations (Iran, Iraq, Syria, Libya, Afghanistan, Egypt and Yemen) have used ballistic missiles in combat.¹¹⁰ These weapons are highly sought because they affect the regional military balance in the following ways: they are very fast weapons and therefore provide little warning of an incoming attack; they are capable of delivering a variety of warheads; accurate missiles can hit small, mobile military targets; and only the United States and Russia currently have even a rudimentary defense against ballistic missiles.

The acquisition of tactical ballistic missiles is limited only by the resources which a nation wishes to devote to them. In nations where the leadership feels constantly threatened by its enemies or is inspired to disrupt the status

¹⁰⁹Lennox, 18.

¹¹⁰John B. Wolfsthal, "The Proliferation of Ballistic Missiles," Arms Control Today 22 (April 1992): 28.

quo, the acquisition of a minimal missile capability may be their number one acquisition priority. The goal is the possession of a weapon which can be used for deterrence, retaliation or terror against one's perceived enemies. High-tech delivery and guidance systems is readily available and may be added to relatively unsophisticated missiles, greatly extending their range, accuracy and lethality.

Modern warhead technology is widely available and can be obtained at a relatively low cost. Conventional warheads in ballistic missiles include high explosives, bomblet warheads and fuel-air explosives. Chemical warhead agents and small nuclear devices are also readily adaptable to ballistic missiles. Sophistication is not required; the mere capability may be sufficient to make an opponent take elaborate protective measures if not deter him completely.

The ease with which technology is acquired is not meant to convey that the development of a ballistic missile program is relatively easy cheap. Testing, quality control and the import of scientists and technology make the program one which requires a large allocation of available resources. Outside of the G-7 nations and Russia, only Israel and China possess an indigenous ballistic missile production capability.

But Spain, Taiwan, North Korea and India are close to developing their own programs.¹¹¹

The legal barriers to acquiring ballistic missile production technology can be circumvented since most of the technology involved is considered "dual use", meaning that it has non-military applications as well, and is therefore difficult to regulate. Equally difficult to control is the selling of weapons and technology by the former Soviet Union. The end of the Cold War has provided those nations who have a desire for ballistic missiles with a ready source of information and in-stock items. The same holds true in China where the leadership has used the collapse of the Soviet Union to liberalize their own economic policies including the sale of ballistic missiles, satellite imagery and other high tech items previously unavailable on the open market.

D. SUMMARY

Maritime power cannot be measured by static comparisons of the naval forces available to two combatants but must be considered in the context of the immediate dispute. In the post-Cold War era, the asymmetry of naval forces which the United States has acted under appears to be narrowing, giving many nations of the Third World the ability to challenge the

¹¹¹Lennox, 18.

U.S. Navy, especially in the limited, shallow-water operations described in "...From the Sea."

The United States Navy has traditionally held the home field advantage when it projects power ashore because it usually did so from the safe confines of the open ocean; rarely was it forced to sail in harm's way. By contrast, littoral warfare requires that high value assets be placed in vulnerable positions that may result in their loss. The necessity of conducting operations in the narrow seas presents opponents with an opportunity to strike a damaging blow against a U.S. military asset in order to deter American involvement in the conflict.

The United States will continue to have the world's largest and most capable Navy for the foreseeable future. In the absence of the Soviet threat and in spite of the current downsizing, the United States military should be able to devote significantly more assets to regional contingencies. Nevertheless, the U.S. Navy may initially arrive on-scene outgunned and at a tactical disadvantage.

Many nations are well aware of the potency of a modern coastal navy in defending their national interests. The opponents that we may face in the future will attack with fast attack craft, diesel-electric submarines, modern strike aircraft, sophisticated mines and high-speed cruise missiles. They will employ modern sensor technologies for surveillance

and targeting and they may possess the ability to threaten a battle group with weapons of mass destruction. All of these factors will combine to severely challenge the U.S. Navy's ability to perform the missions outlined in "...From the Sea." Forward presence, power projection and crisis management, traditional missions for the United States Navy, become increasingly complicated in a world where military technologies and capabilities may eventually become equal.

V. OPERATIONALIZING "...FROM THE SEA"

The key to "...From the Sea's" success will be the ability of the Navy to establish sea control and achieve battlespace dominance in the littoral regions of the world. Whether fought on the high seas or in the littorals, these two objectives have always been central tenets of naval warfare. If we are unsuccessful in our bid to control and dominate the battlespace of the littorals, the threat of air strikes and cruise missile attacks from the sea becomes hollow.¹¹² For the U.S. Navy, this means aggressive anti-air, submarine and surface warfare, all prerequisites for conducting offensive operations against the enemy ashore.

"...From the Sea" may represent a new approach for the U.S. Navy but if this evolution in doctrine is not complimented by a concurrent period of equipment development and procurement, a time lag will occur between the new technical capabilities and the realization of the operational capability. In this era of declining budgets and increasing commitments, it is imperative that we allocate the available

¹¹² Wayne P. Hughes, Jr. (Captain, USN Retired), Naval Forces in Joint Littoral Warfare, Paper presented at the Military Operations Research Symposium under the auspices of the Johns Hopkins University Applied Physics Laboratory, February 26, 1993, 4-5.

resources to the areas where they will have the most impact. This will require a relentless program of recapitalization in order to build the framework and foundation for tomorrow's fleet.

Despite the current downsizing, the Navy still maintains a formidable power projection and crisis response capability in the form of its aircraft carriers, Aegis warships, amphibious assault ships and submarines. However, we are deficient in certain areas, namely mine detection and countermeasures, shallow-water ASW, close-air support (CAS), naval surface fire support (NSFS), ballistic missile defense, sealift, medium-lift helicopters and protection against chemical and nuclear weapons. These weaknesses undermine our ability to exercise sea control in the littorals and project power ashore. They also represent an Achilles heel which a clever opponent may try to exploit.

To truly operationalize "...From the Sea," the Navy needs a strategic vision for itself and a coherent and comprehensive long-term plan keyed to that vision. This requires strong leadership, a comprehensive procurement plan, strategic research and development and innovative new concepts of operations. The overall goal of this strategic vision should be to design and build a post-Cold War Navy which is able to conduct the types of missions envisioned in "...From the Sea"

in a world made increasingly hazardous by the proliferation of modern weapons and technology.

A. A LITTORAL WARFARE PLAN

In a recent interview with Navy Times, Secretary of the Navy John H. Dalton emphasized "quality of life, minority recruitment, retention and women in the Navy."¹¹³ His only mention of operations was his assertion that the deep-strike mission will continue to be carried out by aircraft carriers well into the 21st century. Admiral Mike Boorda emphasized moving allowances, PRTs, alcoholism, equal opportunity and other personnel issues in his first published interview as CNO.¹¹⁴ While these are certainly relevant, I believe that it is equally important to present a vision of the future operating environment and lay out a plan detailing how the Navy will deal with future threats and challenges.

In order to do this, the Navy may be able to glean some insight from the business world, where "right-sizing" and strategic planning have been going on for years. Strategic planning is a disciplined effort to produce the fundamental decisions and actions that shape and guide what an

¹¹³Navy Times, "Dalton's Navy: Steady as She Goes." May 30, 1994, 8.

¹¹⁴Navy Times, "Boorda's Fast Start." 9 May 1994, 12-15.

organization is, what it does, and why it does it.¹¹⁵ It is a way to help organizations deal with their changing environment (threats and opportunities) and to resolve the most critical issues they face. It seeks to build on their strengths, minimize their deficiencies and exploit the weaknesses of their competition.

A good framework for strategic planning may be found in John M. Bryson's book, Strategic Planning for Public and Non-Profit Organizations, (San Francisco: Jossey-Bass, 1988). Bryson advocates an eight-phase process which embraces a wide range of alternative strategic planning models. The resulting hybrid model consists of an analysis of the strengths and weaknesses within an organization (SWOT analysis) and the identification of internal and external threats to the organization (Harvard Policy Model). Strategic issues are then developed with these threats in mind which helps an organization formulate its response to a rapidly changing set of conditions (Ansoff and Eadie).

It is clear that the chief danger to the U.S. Navy as it approaches the 21st century is the proliferation of advanced weapon systems and technologies previously outlined in chapter three. Unfortunately, these systems improve our opponent's capabilities in precisely the areas which the Navy is itself

¹¹⁵John M. Bryson, Strategic Planning for Public and Non-Profit Organizations (San Francisco: Jossey-Bass, 1988), 5.

vulnerable. If we do not develop a strategic littoral warfare response to cope with these threats. The American leadership (military and civilian) may eventually have to reassess the feasibility of deploying the U.S. Navy to regional hotspots.

The doctrine to deal with the threat is there. "...From the Sea" is exactly the type of doctrine which we need to transform the Navy from a Cold War, open-ocean fleet to one which can fight effectively in future regional conflicts and win at a minimal cost. However, without a strong commitment by the Navy's senior leadership to outfitting the fleet with the proper tools, "...From the Sea" is nothing more than hyperbole. It also entails more than just buying the right systems and equipment; organizational restructuring and changes in the ways that we train and operate are also necessary.

The Bryson strategic planning model emphasizes the importance of a comprehensive "vision of success" and a leader who is willing to act as the sponsor to endorse and legitimize the effort.¹¹⁶ It also requires process champions, (other leaders who are committed to making the process work) and clear agreement amongst key decision-makers about the direction and purpose of the strategic plan. Admiral Jeremy M. Boorda, as the new CNO and chief sponsor of all things

¹¹⁶Ibid.

Navy, has a golden opportunity to establish a new strategic vision for the U.S. Navy which places as much emphasis on littoral sea control and battlespace dominance as it does on power projection.

Process champions for this new strategic vision would logically be Admiral Thomas J. Lopez, Deputy CNO for Resources, Warfare Requirements and Assessments (N8) and Admiral J. Paul Reason, Deputy CNO for Plans, Policy and Operations (N3/5). The Deputy CNO for Training (N7) and the Deputy CNO for Logistics (N4) would also have to be actively involved. The heads of the warfare communities: N85 (Expeditionary Warfare), N86 (Surface Warfare), N87 (Submarine Warfare), N88 (Air Warfare) and N89 (Special Programs), would make up the strategic planning team.

Readiness and combat effectiveness are contingent on the ability of the Navy's leadership to effectively articulate our roles and missions and ensure that our investment of increasingly scarce resources makes sense for the future. By speaking with clarity and a unity of purpose, the Navy's leadership will ensure that the Navy maintains a steady course and is able to meet the challenges of the future.

B. CONCEPTS, OPERATIONS AND TRAINING

In addition to new doctrinal and force-structure thinking, "...From the Sea" requires innovative concepts, creative operations and focused training in order to succeed in the

regional and littoral environment. It may require the Navy to mute or abandon certain traditional missions and focus its efforts on more specific roles within the framework of joint littoral warfare. All restructuring efforts should concentrate on improving the Navy's ability to exercise sea control and battlespace dominance in the littorals. The following recommendations are designed to bridge the gap between the doctrinal concepts of "...From the Sea" and the operational capabilities which the Navy currently has or is pursuing.

When the fighting starts, the carrier disappears over the horizon. We've known that since Guadalcanal.¹¹⁷

Naval aviation has traditionally been relied on to perform five missions: strategic land attack, tactical attack, air superiority and anti-surface surveillance and strike warfare. A problem that continues to plague the Navy is the view that sea-based airpower can, and should, accomplish all of these missions. But the Navy has spread itself very thin in aircraft procurement and focused its efforts on improving its power projection capabilities.

The Gulf War highlighted some important limitations of carrier-based airpower. U.S. carriers were designed for open-ocean, blue-water operations. Shallow and confined waters, the

¹¹⁷Bill Sweetman, "Naval Air Power for 2000: Time to Change Course." International Defense Review 25 (September 1992): 842.

threat of mines and attacks from shore and sea-based missiles were not considered when designing modern aircraft carriers. Because of these constraints, U.S carriers operated in the Red Sea and the southern Persian Gulf for the majority of the war. The long distances to Iraqi targets meant that each carrier was limited to launching two strike packages of 20-30 aircraft per day.¹¹⁸ By contrast, the 900 U.S. Air Force aircraft operating out of Saudi Arabia flew 5-6 missions per day. Discounting fleet-defense missions, the sortie totals were 29,400 for the USAF and 6,200 for the Navy. When one considers that it took six carriers to achieve this result, it becomes apparent that the foremost role of carrier-based airpower may not be in deep-strike, strategic-bombing in competition with the USAF.

To preserve naval aviation, the Navy must reevaluate its role in future defense planning scenarios and tailor its procurement, training and tactics to best perform its mission. Given the increasingly sophisticated nature of the regional threat, it has become increasingly hazardous to bring a carrier into the littorals. Unsupported carrier-based air forces also cannot take full advantage of inflight refueling, a requirement if they are to get within range of deep-strike land targets. In addition, risking manned-aircraft for these missions seems unwise, given the success of the TLAM attacks against Iraqi

¹¹⁸Ibid.

targets during Operation Desert Storm. With this in mind, strategic land-attack should be formally abandoned as a mission for Naval aviation.

Naval aviation should instead be refocused on air superiority and the close air support of expeditionary forces is so critical to the success of "...From the Sea." In regional conflicts, naval forces will earn their keep by establishing dominant sea control in the littorals and protecting the seaborne transport of troops and supplies into the theater, not by conducting deep-strike missions against the enemy. Conducting deep-strike, strategic missions will be the primary role of the Air Force in a Major-Regional conflict. Its bombers combine heavy payloads with a longer unrefueled range, reducing their need for tactical support. Navy Tomahawk cruise missile attacks will also perform deep-strike strategic missions.

However, USAF bombers and Navy cruise missiles cannot perform close-air support (CAS), battlefield air interdiction (BAI) and defensive counter-air missions. F/A-18s and AV-8s from CVNs and LHD/LHAs, are tailor-made platforms for conducting these classic tactical air missions. In the critical initial stages of a conflict, sea-based airpower is the only element which can rapidly concentrate in support of U.S. and allied expeditionary forces. Our research, procurement and training should be realigned to better prepare Naval and Marine Corps operators for warfare in the littorals.

The F/A-18 Hornet will provide the Navy-Marine Corps team with a short-range, high-tech, multi-mission, survivable, all-weather strike aircraft. However, having both Navy and Marine Corps F/A-18s is redundant. If the Navy and Marine Corps are serious about their joint team, this redundancy must be addressed. Deploying a Marine Corps F/A-18 squadron aboard an aircraft carrier is creative but it does not provide sufficient close-air support for an expeditionary force. Transferring all F/A-18 assets to the Navy and reorienting their mission, is both smart and cost-effective.

In a large-scale amphibious operation, Navy F/A-18s and Marine AV-8Bs would provide close-air support and conduct battlefield air interdiction missions. Both aircraft are well-suited to conduct these missions and the F/A-18E/F (Advanced Hornet), with its greater range, endurance and payload, will enhance this capability even further when introduced in the year 2000. Eliminating this redundancy would allow both forces to maintain their core capabilities and perhaps even allow for a growth in the number of airframes and pilots within each community.

In future low intensity conflicts, surface units will consistently operate independently outside of the protective cover of carrier aviation. Tactical Naval helicopters provide a low-cost organic air capability to these ships operating in the littorals. During the Gulf War, Army helicopters operating

off U.S. Navy ships provided surface units with an autonomous attack, defense and reconnaissance capability. British Sea Lynx helicopters armed with Sea Skua missiles successfully engaged and sank a half dozen Iraqi warships. Future Army helicopters, such as the RAH-66 Comanche and AH-64D Apache, will make use of unparalleled communications and sensor technologies making them the ideal platform for conducting integrated operations between land and sea-based forces.

The inherent flexibility of tactical helicopters makes them the ideal platform for conducting a host of the missions in the regional warfare scenarios envisioned in "...From the Sea." These actions include enforcement of embargo sanctions, offensive strikes against hostile forces, antisubmarine operations and defense against fast attack craft (FACs) armed with surface-to-surface missiles.¹¹⁹ Additionally, helicopters provide Navy ships with a true Over-the-Horizon (OTH) targeting capability, extended reconnaissance range and the ability to conduct logistics transfers. Newly emerging technologies (Magic Lantern) hold the promise of further expanding the mission portfolio of Naval helicopters by detecting and countering mines using laser technologies.

¹¹⁹D.A. Dahl, (Lieutenant Commander, USN), "Tactical Naval Helicopters Can Help." U.S. Naval Institute Proceedings 119 (September 1993): 72.

Despite the advantages that tactical Navy helicopters would bring to the fleet, the Navy's plan to outfit a limited number of SH-60F helicopters with Hellfire and Penguin missile systems continues to slide. One option is to deploy Army or Marine helicopters aboard Navy ships on a full-time, extended cruise basis. This would greatly improve the combat effectiveness of ships operating in the littorals and enhance joint training while minimizing the requirement for new investments in Naval helicopter weapon systems.

Increasing the efficiency, availability and capabilities of Naval helicopters while minimizing costs should also be a primary goal any littoral warfare plan. Four different helicopters, and logistics trails, currently support the fleet (SH-3H, CH-46D, SH-60B/F and CH-53E). None have forward-firing guns, standoff anti-ship missiles or defensive countermeasures like the AN/ALQ-144 Infrared Jammer and AN/ALE-47 chaff/flare dispenser. Increased aircraft commonality and systems modularity would successfully convert existing Naval helicopters into effective littoral warfare assets. Unfortunately the FY-94 budget request cancelled the development and procurement of the SH-60R, a modular concept H-60 variant equipped with the requisite weapon systems and designed to perform a variety of brown and green water missions.

Our future maritime superiority will depend on significant assistance from our allies. In areas such as diesel submarines,

Fast Attack craft, frigates and minesweepers, our allies have assets which could greatly enhance our ability to exercise sea control in the littorals. Conversely, the U.S. Navy can provide a high-tech centerpiece for a naval group deployed to a crisis which the U.S. may be reluctant to commit a Naval battle group to.

A much touted, but little used capability during peacetime, is coalition warfare. Joint Coalition Force Packages (JCFPs) would make the best use of existing resources while enhancing our ability to conduct coalition warfare. One example might be using German Fast Attack Craft (FACs) to protect an American amphibious group from surface attack as it patrols along an enemy coastline. Other examples may be to use American Aegis cruisers to provide air defense for a French aircraft carrier, incorporating British SSNs into a US carrier group or attaching Canadian support vessels to a U.S. group for a six month deployment. Training and mini-deployments would greatly enhance interoperability between allies and test the concept of Joint Coalition Force Packages.

C. PROCUREMENT

If the U.S. Navy is serious about "...From the Sea" and the operations that it envisions, we should be able to verify it by analyzing the restructuring of the fleet. Unfortunately, our recapitalization strategy appears to concentrate on improving the areas in which we have an overwhelming dominance (power

projection) while neglecting areas in which we are weak and potentially vulnerable (sea control and battlespace dominance). As the Navy budget continues to shrink (\$85 billion in FY-93, \$77.5 billion in FY-94, \$78.6 billion in FY-95 and a projected \$75.6 billion in FY-96), it is imperative that we allocate our resources to areas where they are most needed.

The FY-94 Defense budget purchased 36 F/A-18 C/D aircraft (\$1.6 billion), three Arleigh Burke-class destroyers (\$2.7 billion) and a sixth Wasp-class LHD (\$1.2 billion). The only helicopter funded was the Marine AH-1W (twelve for \$145 million). The six high-speed PHM hydrofoils were decommissioned, nine HH-60H combat search and rescue helicopters were cancelled and funding for improvements to P-3 reconnaissance aircraft was slashed by \$100 million.¹²⁰ The greatest decrease in Navy Research and Development funding came in undersea warfare programs while the Advanced Medium-Range Air-to-Air missile (AMRAAM) was fully funded.¹²¹ Funding for C3 countermeasures was cancelled, AV-8C R&D was deleted and the procurement schedule for air-to-surface missiles was reduced.

¹²⁰Department of Defense, Congressional Action on FY 1994 Appropriation Request (Washington, DC: Office of the Comptroller of the DOD, January 1994), 65-67.

¹²¹Center for Strategic Strategies and Operations. Tomorrow's Fleet: Effective Force or Rotten Timber? (Arlington, VA: Techmatics, Inc., 1994), 8.

The FY-95 Defense budget, billed as the first comprehensive defense budget by Defense Secretary William Perry, requested \$43.3 billion in procurement spending. Included in this is \$3.65 billion for a ninth Nimitz-class nuclear carrier (CVN-76) which represents 42% of all shipbuilding funds in the FY-95 budget. In addition, \$2.7 billion was authorized for three more Arleigh Burke-class destroyers and \$1 billion was appropriated for 24 F/A-18 C/D aircraft.¹²² A total of \$320 million was allocated to mine warfare programs and \$500 million was doled out to continue studying the V-22, effectively putting off that decision for another year.

The FY-96 budget is currently being developed and already serious problems appear on the horizon for a number of Navy programs. There may be a lack of funding for five mine warfare programs including plans to equip Marine air cushion landing craft (LCACs) with mine sweeping gear, the Magic Lantern airborne mine detection system and procurement of 15 SLQ-53 deep-water sweeps for the MHC-51 class mine hunters. Additional cuts are proposed against Naval aviation including the delay of a plan to outfit H-60 helicopters with Hellfire and Penguin missile systems. Funding to overhaul and refuel a nuclear aircraft carrier (\$1.5 billion), to purchase three additional

¹²²Navy Times, "New Aircraft Carrier Gets All-Clear Signal." April 25, 1994, 3.

Arleigh Burkes (\$2.7 billion) and 18 F/A-18C/Ds (\$750 million) appears safe from the budget ax at this time.

These numbers indicate that the Navy continues to pursue a downsized version of a Cold War procurement strategy aimed at purchasing the ships, aircraft and weapon systems it needs to project power ashore. Despite the rhetoric associated with "...From the Sea," the Navy continues to neglect purchasing the less glamorous systems which it vitally needs to dominate the littoral regions of the world. Muddling along in this way results in a chronic suboptimization of organizational performance, costly in the business world, potentially deadly for the U.S. Navy.

In order to successfully bridge the gap between doctrine and capabilities, a long-term procurement strategy aimed at improving our ability to control the battlespace of the littorals is necessary. Ships, aircraft and weapon systems take years to develop and introduce to the fleet. Because of this, any radical changes to our near-term procurement strategy will probably have to occur by adding new capabilities to existing platforms. This requires a ruthless program of recapitalization and modernization in order to build the framework and foundation for tomorrow's fleet. With this in mind, the following procurement recommendations are made:

1. Naval Aviation.

The view that sea-based airpower can, and should, accomplish the entire range of aerial missions in warfare has forced the Navy to spread itself very thin in aircraft procurement. In the 1980s the Navy spent \$10 billion on new aircraft programs without a single operational aircraft ever reaching the fleet. The A-6F, F-14D, A-12 and the AF/X, all power projection aircraft, have all been cancelled. The only survivor of this procurement cycle is the V-22, a program which remains on extended life-support only through extraordinary efforts by the Marine Corps and certain members of Congress.

In the future, the Navy's deep-strike mission will be performed by Tomahawk cruise missiles launched from surface ships and submarines. The success of the Tomahawk during Operation Desert Storm and the adversity to risking aircrews and expensive manned aircraft to perform this mission will allow Naval aviation to be reoriented towards achieving the primary missions of the Navy in littoral warfare: local air superiority and close air support (CAS) for expeditionary forces ashore. This would permit the accelerated decommissioning of the Navy's A-6E squadrons and the cancellation of the A-6 upgrade program funded in the FY-94 budget.

In the 1980s, the Navy bought, on average, almost 800 aircraft per year; in FY-95 we will buy less than 100. The Navy's increased reliance on the F/A-18C/D makes the development

of an improved aircraft with greater payload, endurance and capabilities (F/A-18 E/F) a critical procurement choice. An improved version of the Harrier VTOL jet (AV-8C) and the Advanced Short Takeoff and Vertical Landing (ASTOVL) aircraft should be pursued to enhance the capabilities of the eleven large deck amphibious ships to serve in a true forward presence/crisis response role.

Stealth also becomes less important if you eliminate the deep-strike mission. What is important for close air support and air superiority is long loiter times, a large payload capacity, precision-guided weapons and seamless communication with expeditionary forces. Forward-looking infrared equipment, integrated GPS, night vision capabilities, improved displays and increased payload are attributes which should be strived for in future aircraft procurement and modernization programs.

A recent Navy-Marine Corps war game, Naval Logistics 2001, pointed out the deficiencies in fighting an MRC in 2001. Among the shortfalls were a lack of sufficient standoff weapons to sustain the force as well as significant shortages in ground forces ordnance. Less than a third of the naval aircraft which participated in the Gulf War carried precision-guided weapons.¹²³ Outfitting all carrier-based aircraft with advanced, multi-sensor precision weapons would provide the Navy with a much

¹²³Rand Research Review, "Airpower and the Changing Face of Battle." 17 (Fall 1993): 1-3.

greater ability to conduct the anti-surface and close air support missions required in littoral warfare. Standoff weapons, including the Joint Direct Attack Munition (JDAM), the Joint Standoff Weapon (JSW) and the Tri-Service Standoff Attack Missile (TSSAM) would be particularly useful when conducting the ship defense and anti-surface missions.

The inadequacies of the Marine's H-46E helicopter (130 knot speed, 1.3 hour fuel capacity, non-inflight refuelable and severe flight restrictions) represent an Achilles heel of the Marine Corps "Operational Maneuver ...From the Sea." Because of the H-46's deficiencies, the Amphibious Task Force (ATF) is going to have to get very close to shore in order to conduct a full-scale amphibious operation, leaving the LHA/LHD vulnerable to surface, subsurface and air attack. To avoid this, the V-22 Osprey needs to be freed from the political morass which it has been bogged down in since the mid-1980s. It should be made a top priority of the Navy's leadership and production should be pushed to ensure that the aircraft reaches the fleet before 2000.

All tactical Naval aircraft should also have the capability to detect, track and attack small surface combatants which threaten the battle group. A standoff weapon of moderate range and size, such as the Harpoon, can permit aircraft to attack these ships from outside of the SAM range. Non-lethal technologies may also provide some interesting possibilities. Disabling a warship's sensors with a fragmentation weapon

detonated overhead or using a precision-guided weapon to take out the ship's steering system are two examples of this type of warfare. Given the proliferation of portable SAMs, Naval aircraft operating in the littorals should be equipped with defensive countermeasure systems such as the AN/ALQ-144 Infrared Jammer and AN/ALE-47 chaff/flare dispenser.

2. The Surface Fleet

The U.S. Navy is already committed to the platforms which will be the backbone of the fleet well into the twenty-first century. Just as Naval aviation has committed to the F/A-18, the surface fleet has committed to the Arleigh Burke and Ticonderoga Aegis-class ships and the Wasp and LPD-17 (LX) class amphibious assault ships. If we look at the fleet of 2010, we discover that 73% of all tactical aircraft, 99% of all surface combatants and 75% of the amphibious lift ships have already been committed to with long-lead time funding.¹²⁴

The surface fleet of 2000 will be centered around 12 aircraft carriers, 11 large deck amphibious assault ships, 27 Ticonderoga class Aegis cruisers and 32 Arleigh Burke class destroyers. All surface combatants will be powered by gas turbine or nuclear propulsion. The improved Flight IIA Arleigh Burke class destroyers will be outfitted with a helicopter hanger, advanced Sea Sparrow missiles and numerous other systems designed to enhance its littoral warfare capabilities. The 21st

¹²⁴Captain Ron Gumbert (USN), Assistant Deputy Director Strategic Plans and Policy (J-5) Joint Staff, interview by author, 2 May 1994, Monterey, CA, tape recording.

Century Destroyer (SC-21) and the Future Surface Combatant (CGX) are programs which will further enhance our ability to dominate the littoral battlespace.

Tailoring the Navy's surface fleet to perform the missions envisioned in "...From the Sea" requires that add-on systems and technologies be procured as a near-term fix for existing platforms. Commercial Off-the-Shelf (COTS) technologies can provide many of the required improvements. A good place to start would be with the thirteen PC class special operations ships. Too large, poorly armed and unable to defend themselves, these ships are a single mission platform at best. They must be improved and their missions expanded if they are to be justified in an era of continuously declining resources. Adding a surface-to-surface missile capability and an anti-missile defense system would make these craft much more valuable to the fleet.

To free up valuable ship-building funds, the Navy should also accept a smaller carrier force and cancel CVN-76 and CVN-77. At \$4.3 billion a piece, it is difficult to justify risking these assets to conduct the low-intensity, regional missions of the future. By cancelling CVN-76 and CVN-77, the carrier force numbers would decrease to eleven in 2003, ten in 2007 when USS Constellation is retired and nine when the USS John F. Kennedy is decommissioned in 2010. With nine aircraft carriers and eleven large deck amphibious assault ships, the Navy appears well equipped to maintain its power projection and crisis response missions; forward presence may be accomplished using

other assets. The money saved by cancelling these two carriers would be better spent pursuing alternative aircraft carrier plans and developing an advanced Harrier STOVL type aircraft. The focus of future expeditionary warfare is on the need to quickly and efficiently transport Marines from our Amphibious Task Forces to the shore. This means that programs like the V-22 Osprey, Advanced Amphibian Assault Vehicle (AAAV), LCAC (Air Cushion Assault Craft and the follow-on amphibious landing dock ships (LX/LPD-17) must be a top priority of the Navy and Marine Corps' procurement strategy. Blocking Congress' desire to fund an unnecessary seventh Wasp class LHD could allow the Marine Corps to transfer valuable funds into these programs while preserving the integrity of the Corps' eleven ARG force structure.

For the rest of this decade, tactical ballistic missiles attacking ships moving on the high seas will not be a problem. No one has for sale a ballistic missiles that's going to steer its way into a moving ship. But when you approach the littoral area and you've got ships anchored, it's something that you've got to be very concerned about.¹²⁵

Theater ballistic missile defense systems, operating in concert with airborne early warning systems, can provide area defense for joint expeditionary forces. A TBMD system could also be used to provide protection for host-nation bases and airfields as well as population centers in the area. In fact, nearly 60% of all of the world's population centers can

¹²⁵Edward Shaefer, Jr. (Rear Admiral, USN) Defense Week (24 May 1993): 13.

be protected by even a minimal TBMD system.¹²⁶ Given the increasing likelihood that U.S. Naval warships and expeditionary forces will operate within range of surface-to-surface missiles, deploying sea-based TBMD systems to a crisis area should be a top priority.

Deploying Patriot batteries to overseas crisis areas takes time and is inherently cumbersome. Sea-based TBMD systems offer the same advantages of traditional naval forces: rapid response time, high flexibility, mobility and standoff range. The Navy's sea-based TBMD programs, both upper and lower tier systems, appear to enjoy widespread political and military support. The lower-tier systems are designed to be fitted to existing assets, the Navy's Aegis cruisers and destroyers. These ships are already equipped with the SPY-1A and D radar systems, Vertical Launch System (VLS), extensive C3 capabilities and between 90 (Burke) and 122 (Ticonderoga) Standard Missiles which will eventually be upgraded to the SM-2 Block IV.¹²⁷ Using the extensive Aegis infrastructure should allow lower-tier TBMD to be developed in the near-term and at a relatively low cost. Upper tier systems research is centered on developing a variant of the Army's THAAD long-range interceptor to provide even broader protection for joint and allied forces.

¹²⁶Rodney P. Kempt (Captain, USN), "Killing Scuds From the Sea," U.S. Naval Institute Proceedings 119 (June 1993): 53.

¹²⁷National Defense, "Sea-Based Shield Will Counter Missile Threat." 79 (February 1994): 26-27.

Despite its obvious importance, TBMD has been the subject of recent cutbacks. The FY-94 budget request allocated \$240 million for Navy TBMD programs out of a total BMD initiative of \$1.8 billion. A recent Congressional Budget Office report stated that only two core TBMD programs could be supported through FY-99. In light of these developments, this may be one case where a single service management and procurement plan may be in the best interests of all the services. Redesignating the Navy as the program manager and bringing Army and Air Force funding under its purview would streamline the acquisition and fielding of a viable TBMD system. Navy TBMD programs should also be accelerated and provided with increased budget support within the BMD initiative.

To successfully execute forcible-entry operations from the sea, the Navy needs a ship-based fire support system (NSFS) which is capable of delivering a high volume of fire up to 20 miles in all weather conditions. However, with the decommissioning of the New Jersey class battleships, the Navy is left with only its 5 inch Mark 45 Mod 2 gun to provide gunfire support for expeditionary units ashore. This gun fires 20 conventional "dumb" rounds per minute up to 13 miles with limited accuracy, hardly sufficient to support an opposed amphibious landing.

In the near-term, improving the ballistic characteristics of the Mark 45 round and testing the

feasibility of using high energy, low vulnerability propellants is the preferred solution. The Army's tactical missile system (ATACMS) and the Multiple Launch Rocket System (MLRS) are being studied to determine their suitability as mid-term solutions. The long-term proposal is the New Generation Gun (a 155mm weapon with a range of 50 miles) and the MK-31 5 inch Rolling Airframe Missile (RAM) but neither is projected to enter service until 2010. None of these proposals holds the promise of being the definitive answer to the Navy's gunfire support problem.

Therefore the scale of investment in Naval gunfire support should be adjusted to reflect its importance to the success of the missions envisioned in "...From the Sea." Research and development funds must be allocated to the study of new technologies like electro-thermal guns and kinetic-energy rounds. Future ship designs like the LPD-17 amphibious landing dock, Flight Three Arleigh Burke class destroyers and the 21st Century Destroyer must have the capability to provide all-weather naval gunfire support to expeditionary units ashore.

Operating close to shore in crisis response scenarios also requires that Navy ships be able to defend themselves against a wide-variety of threats including anti-ship missiles and submarines. Sailing a single warship into an area to show the flag may be inviting disaster. Ships must also be able to fight in a variety of environments including chemical and

nuclear contaminated areas. Research should continue into improving ship self-defense capabilities including advanced sensors, electro-thermal guns, laser weapons, decoys and automatic response weapons. Whether the group is a nuclear aircraft carrier or an individual warship, the fear of escalation must remain subservient to the desire to protect our ships, craft and personnel.

With the focus of naval warfare shifting towards control of the littorals, naval forces will be required to stay much closer to shore than they traditionally have and operate with a wide variety of American and coalition forces. Expanding the Command, Control, Communications, Computers and Intelligence (C4I) capabilities of existing warships will therefore be critical for conducting the types of future joint operations that "...From the Sea" envisions. Modern communications and data systems have given us present us the ability to provide an incredible amount of data to our Naval commanders. However, adapting inherited "legacy" systems to incorporate modern technologies is a difficult challenge for Navy planners and researchers. Many existing "stovepipe" systems, such as the UYK-43 and -44 shipboard processors were developed with little regard for interoperability with other services or our allies.

Commercial Off-the-Shelf (COTS) technologies can also provide near-term solutions for many of these C4I problems. In April 1994, an integrated hardware and software

architecture, linked by a fiber optic local area network (LAN), was successfully demonstrated aboard the USS Independence (CV-62) by C3 Inc. and Sun Microsystems.¹²⁸ Satellite technologies and improvements in existing communications and intelligence gathering systems offer additional possibilities and should receive priority funding in future Navy budgets.

3. Submarines and Undersea Warfare

Dominating the undersea battlespace is crucial in allowing the surface ships and expeditionary units to get close enough to perform their missions. Given the nuclear attack submarine's inherent stealthiness and unequalled ability to project power ashore, it should be viewed as a critical component of the littoral warfare team. Submarines also play an important role in surveillance and insertion of special operations teams in advance of an amphibious assault as well as in the mine warfare effort. Submarines may detect mines using remotely-piloted craft and on-board sensor as well as laying Mk-67 mines themselves.

So far, the submarine service appears to have taken the lead in integrating existing platforms into the new littoral warfare plan. Attack submarines now deploy with carrier and amphibious surface groups, emphasizing special warfare, mining, shallow-water operations and strike warfare.

¹²⁸Edward J. Walsh, "Navy Aims at Joint Operations Roles and Economies for C4I." Sea Power (April 1994): 52.

American nuclear attack submarines participate actively in NATO exercises and conduct training with deployed American battle groups. They are quiet, multi-mission platforms despite their great cost; the perfect type of weapon for the U.S. Navy.

The first units of the Los Angeles class nuclear attack submarines are being decommissioned thirteen years earlier than originally planned. At the same time, plans for the design and procurement of the New Attack Submarine (NSSN) are being developed with the Seawolf acting as a "bridge" between the two classes.¹²⁹ At \$2.4 billion a copy, using the Seawolf as a "bridge" until long-lead funding for the NSSN is requested in FY-97, seems financially irresponsible in an era of diminishing resources.

Improving the current Los Angeles class boats and slowing down their decommissioning would serve as a much more efficient bridge until the NSSN is funded and built. The USS San Juan (SSN-751) is the first of the SSN-688I (Improved Los Angeles class) attack boats. Adding Harpoon anti-missiles, active sonar and improved Mark 48 ADCAP torpedoes to existing Los Angeles class boats has greatly improved their warfighting potential at a relatively minimal cost. The SSN-688I class boats are also outfitted with the AN/BSY-1 integrated combat suite. All aspects of the submarine's combat systems, including targeting information from all sensors, is

¹²⁹Center for Strategic Strategies and Operations, 33.

coordinated and the output is then fed to individual weapon systems. A follow-on suite, the AN/BSY-2, is being developed for the Seawolf but it could also be backfitted to the SSN-688I class boats.

What is needed to realize the full potential of future nuclear attack submarines are highly integrated, modular systems using advanced technology and weapon systems. The Seawolf has serious deficiencies; it is not designed for operations in the littoral battlespace and it cannot carry special operations teams. With this in mind, the third Seawolf (SSN-23) should be cancelled. The NSSN is designed to be a truly multi-mission platform, capable of carrying modules for special operations, cruise missile VLS cells and perhaps even ballistic missiles. In production, the NSSN is projected to be significantly more capable and about half (\$1.3 billion) of what the Seawolf will cost. Further research into Air Independent Propulsion (AIP) as an alternative means of propulsion also holds promise for future submarine designs.

As previously noted in chapter three, Strategic Ballistic Missile Submarines (SSBNs) are well prepared to provide the supporting leg of our strategic nuclear triad well into the 21st century. With the decommissioning of the last Polaris missile submarines in FY-94, the strategic deterrence mission will fall to the eighteen existing Trident class SSBNs. A deficiency exists in that there is currently no program for a follow-on to the Trident SSBN submarine fleet.

The Department of Defense's ongoing Nuclear Posture Review needs to address the issue of a follow-on for the Trident SSBN and the future of the Trident II/D5 ballistic missile, a program which is allegedly being considered for termination.¹³⁰

The world's other 425 submarines also represent a significant threat to the U.S. Navy. In a Major Regional Conflict (MRC), the United States would rely on sealift to transport the majority of reinforcements and supplies into a theater. Diesel-electric submarines, whether operating independently or as a pack, represent a potential "war-breaker" if they are allowed to roam free and interdict regional shipping in the area. During the Falkland's War, a large amount of resources and ordnance was expended during anti-submarine operations against a single Argentine diesel-electric submarine, the San Luis. Despite the best efforts of the British Task Force commander, the San Luis successfully eluded all detection efforts.¹³¹

Detecting and engaging enemy submarines should then be a top priority of the Navy's leadership and funded appropriately. Unfortunately, shallow-water anti-submarine warfare (ASW) is an extremely difficult proposition. The world's littoral regions are characterized by difficult acoustic conditions, shallow water and numerous surface

¹³⁰Ibid., 35.

¹³¹P. Kevin Peppe, (Lieutenant Commander, USN), "Submarines in the Littorals." U.S. Naval Institute Proceedings 119 (July 1993): 47.

clutter in the form of small ships and boats. Active, rather than passive, sonar represents the best tool for detecting submarines in these conditions. The retirement of the Navy's H-3 squadrons and the cancellation of H-60F procurement has retarded the Navy's airborne active sonar capability. No greater threat exists to successful operations in the littorals than a professionally operated diesel submarine, yet our efforts to counter the threat have received scant attention.

Mine warfare programs have historically been ignored or cut by Navy planners because its programs tend to offer small targets that don't raise Congress' ire like the cancellation of larger weapon systems does. Despite the mining of the USS Tripoli, USS Princeton and USS Samuel B. Roberts in the Persian Gulf, policy rhetoric still diverges from the reality of funding these programs. Adequate research and development funding needs to be allocated and protected against budget cuts to achieve a responsive shallow-water mine detection and countermeasures capability in the immediate future.

The current mine warfare plan calls for 26 mine countermeasures ships (MHC-51 Osprey and MCM-1 Avenger classes), two squadrons of MH-53E helicopters and one MCM command-control and support ship (LPH-12, USS Inchon). Unfortunately, all of these assets will be based in Ingleside, Texas and many of them may be transferred to the Naval

Reserve. Forward basing of mine warfare assets should be considered. An organic mine-hunting and neutralization capability should be deployed with all carrier and amphibious battle groups. To do otherwise risks neutering the effect that these groups can have in regional crisis scenarios. Equipping Marine LCACs with mine sweeping gear and adding the Magic Lantern laser detection system to H-60 helicopters would accomplish this at a minimal cost.

Countermining is an effective tactical measure for containing a crisis in its early stages and provides a first step in establishing sea control. The problem is that the U.S. Navy has no surface ships equipped to lay mines. Submarines can lay a limited number of mines but aerial minelaying is the only option for laying the type of large minefield necessary to close a port. The Navy should therefore consider resurrecting its own offensive and defensive mine laying capability and develop the tactics and doctrine necessary to utilize these capabilities effectively.

D. SUMMARY

As we approach the 21st century, a key question is whether a trimmed down, largely CONUS-based U.S. military can win a Major Regional Conflict launched by a Third World nation with little or no warning. In most cases, the U.S. Navy will be the first on-scene and the primary instrument of American diplomacy and coercion. Success in this scenario will depend on how well the Navy is able to overcome the challenges of

small forward deployments, short warning times, great deployment distances and the increasingly sophisticated nature of the Third World threat.

The Navy's new doctrine, "...From the Sea" provides the Navy with a framework to adjust to these challenges. In order to fulfill its potential, "...From the Sea" requires a commitment from the Navy's leadership to train and equip our sailors with the equipment they need to perform future missions. When deployed in support of National Command Authority objectives, naval forces must be able to control the littoral battlespace, defend themselves and possess sufficient warfighting potential to prosecute the crisis should deterrence fail. New platforms and weapon systems, as well as imaginative uses for existing systems, are necessary if we hope to exercise sea control, deter aggression and, when deterrence fails, quickly and decisively defeat the enemy at minimum cost to our own forces.

However, we are five years into the post-Cold War era yet we are still training, operating and buying with a Cold-War mentality. The absence of a major global threat makes this an opportune time to launch a concerted effort aimed at plugging the holes in areas which we are vulnerable. Many of these areas are the very capabilities which are crucial for success in littoral warfare: close air support, mine detection and countermeasures, shallow-water ASW, coastal patrol craft, reconnaissance and Theater Ballistic Missile Defense (TBMD).

Navy leaders and their Congressional supporters should therefore refocus their efforts away from power projection and towards improving the Navy's ability to control the battlespace of the littorals.

To enhance our capabilities while maintaining a substantially smaller force and spending less money, the Navy must make tough procurement choices while seeking to further expand its qualitative edge. Specifically, it must make significant investments in precision-guided munitions, advanced military aircraft and state-of-the-art command, control and communications systems. It may also be necessary for the Navy to postpone certain improvements or abandon certain missions in order to refocus and selectively modernize elements of the fleet. Unless we approach the future with innovation and creativity, the threat that naval forces are exposed to may eventually render gunboat diplomacy obsolete as a tool for protecting America's national interests.

VI. CONCLUSIONS

As we approach the 21st century, a key question is whether a trimmed down, largely CONUS-based U.S. military can win a Major Regional Conflict launched by a Third World nation with little or no warning. Many Third World nations are outfitting their militaries with modern, high-tech weapon systems which utilize the latest sensor and communications technologies as well as weapons of mass destruction. When combined with declining American defense budgets and a rapidly decreasing oversea presence, it is apparent that the likelihood of encountering resistance and/or attack may have increased significantly for U.S. forces. This is especially disconcerting for the U.S. Navy, usually first on-scene and the likely target of any initial challenge to our presence in a region.

Since the mid-nineteenth century, the United States Navy has consistently faced an identifiable adversary. Our force structure, training and doctrine were all designed to contend with the threat which our opponent's naval forces presented to our mastery of the seas. The absence of a serious blue-water threat today requires that we move beyond the writings of Mahan in order to develop ways of using our existing and

future forces to further our national goals and interests while countering the emerging threat to our presence.

Waging war in the world's littoral regions is intrinsically difficult; the opponent has the home-field advantage and experience conducting operations in his local waters. In future low-intensity regional conflicts, the U.S. Navy will operate in these areas, close to an enemy's shore and well within range of an imposing array of sophisticated weapon systems. Success under these conditions will depend on the Navy's ability to exercise sea control and dominate the littoral battlespace.

The Navy's new doctrine, "...From the Sea" provides the Navy with a framework to adjust to these challenges. However, in order to fulfill its potential, "...From the Sea" requires a commitment from the Navy's leadership to train and equip our sailors with the equipment they need to perform future missions. Naval forces must be able to control the littoral battlespace, defend themselves and possess sufficient warfighting potential to prosecute the crisis should deterrence fail. New platforms and weapon systems, as well as imaginative uses for existing systems, are necessary if we hope to exercise sea control, deter aggression and, when deterrence fails, quickly and decisively defeat the enemy at minimum cost to our own forces.

If the U.S. Navy is serious about "...From the Sea" and the operations that it envisions, we should be able to verify it by analyzing the restructuring of the fleet. Unfortunately, our recapitalization strategy appears to concentrate on improving the areas in which we have an overwhelming dominance (power projection) while neglecting areas in which we are weak and potentially vulnerable (sea control and battlespace dominance).

This is potentially disastrous for the U.S. Navy. We are five years into the post-Cold War era yet we are still training, operating and buying with a Cold-War mentality. The absence of a major global threat makes this an opportune time to launch a concerted effort aimed at plugging the holes in areas which we are vulnerable. Many of these areas are the very capabilities which are crucial for success in littoral warfare: close air support, mine detection and countermeasures, shallow-water ASW, coastal patrol craft, reconnaissance and Theater Ballistic Missile Defense (TBMD). Navy leaders and their Congressional supporters should therefore refocus their efforts away from power projection and towards improving the Navy's ability to control the battlespace of the littorals.

To enhance our capabilities while maintaining a substantially smaller force and spending less money, the Navy must make tough procurement choices while seeking to further

expand its qualitative edge. Specifically, it must make significant investments in precision-guided munitions, advanced military aircraft and state-of-the-art command, control and communications systems. It may also be necessary for the Navy to postpone certain improvements or abandon certain missions in order to refocus and selectively modernize elements of the fleet. Unless we approach the future with innovation and creativity, the threat that naval forces are exposed to may eventually render gunboat diplomacy obsolete as a tool for protecting America's national interests.

BIBLIOGRAPHY

- Anderson, Gary W. (Lieutenant Colonel, USMC). "Beyond Mahan: Naval Doctrine in the Post-Cold War World." Marine Corps Gazette 76 (June 1992): 38-41.
- Armstrong, Charles L. (Lieutenant Colonel, USMC) "Blueprint for Intervention." Marine Corps Gazette 74 (January 1990): 55-59.
- Arnett, Eric H. Gunboat Diplomacy and the Bomb: Nuclear Proliferation and the U.S. Navy. New York: Praeger, 1989.
- Arquilla, John and David Ronfeldt. "Cyberwar is Coming." Comparative Strategy 12 (December 1993): 141-165.
- Asian Defense Journal. "The Exocet - Deadly Family of Antiship Missiles." 10 (October 1990): 62-64.
- Atkinson, Edwin C. (Captain, Royal Navy) "Naval Roles in the New World." U.S. Naval Institute Proceedings 119 (March 1993): 38-41.
- Auerbach, Stuart. "\$1.5 Billion in U.S. Sales to Iraq." Washington Post, 11 March 1991, A1.
- Barnett, Roger W. (Captain, USN Ret.) "Regional Conflict Requires Naval Forces." U.S. Naval Institute Proceedings 118 (June 1992): 28-33.
- Blaker, James R. "Now What, Navy?" U.S. Naval Institute Proceedings 118 (May 1992): 58-65.
- Booth, Ken. Law, Force and Diplomacy at Sea. London: George Allen and Unwin, 1985.
- Bracken, Paul. "The Military After Next." The Washington Quarterly 16 (Autumn 1993): 157-174.
- Breemer, Jan S. "Naval Strategy is Dead." U.S. Naval Institute Proceedings 120 (February 1994): 49-53.

- _____. "The End of Naval Strategy: Revolutionary Change and the Future of American Naval Power." Strategic Review 22 (Spring 1994): 40-53.
- Brodie, Bernard. Sea Power in the Machine Age. Princeton, NJ: Princeton University Press, 1941.
- _____. "Technological Change, Strategic Doctrine and Political Outcomes," in Historical Dimensions of National Security Problems, Klaus Knorr, ed. (Lawrence: University Press of Kansas, 1976), 299.
- Bryson, John M. Strategic Planning for Public and Nonprofit Organizations. San Francisco: Jossey-Bass Publishers, 1988.
- Cable, James. Gunboat Diplomacy, 1919-1979. Houndmills: MacMillan, 1981.
- _____. Diplomacy at Sea. Annapolis: Naval Institute Press, 1985.
- Carlisle, Edwin R. Developing Battlefield Technologies in the 1990s. Washington, DC: Institute for National Strategic Studies, National Defense University, 1993.
- Carus, W. Seth. Cruise Missile Proliferation in the 1990s. Westport: Praeger, 1992.
- Center for Strategic Strategies and Operations. Tomorrow's Fleet: Effective Force or Rotten Timber? Arlington, VA: Techmatics, Inc., 1994.
- Chairman, Joint Chiefs of Staff. National Military Strategy of the United States. Washington, DC: Department of Defense, 1992.
- Church, George C. "Anatomy of a Disaster," Time 142 (18 October 1993): 42-50.
- Cordle, John, (Lieutenant, USN). "Welcome to Our World." U.S. Naval Institute Proceedings 120 (March 1994): 63-64.
- Dahl, D.A. (Lieutenant Commander, USN). "Tactical Naval Helicopters Can Help." U.S. Naval Institute Proceedings 119 (September 1993): 72-74.

Dantes, Edmond. "Military Aviation." Asian Defense Journal 12 (December 1992): 28-36.

Department of Defense. Congressional Action on FY 1994 Appropriation Request. Washington, DC: Office of the Comptroller of the DoD, January 1994.

Department of the Navy. ...From the Sea: Preparing the Naval Service for the Twenty-First Century. (Washington, DC: Department of the Navy White Paper, 1992).

Donovan, James A. (USMC, Ret.). "New Concepts and New Doctrine." Marine Corps Gazette 76 (June 1992): 42-44.

Dunn, Richard J., III. From Gettysburg to the Gulf and Beyond: Coping with Revolutionary Change in Land Warfare. Washington, DC: Institute for National Strategic Studies, National Defense University, 1992.

Fedarko, Kevin. "Confounded by the Chinese Puzzle." Time 17 (25 April 1994): 39.

Fetter, Steve. "Ballistic Missiles and Weapons of Mass Destruction." International Security 16 (Summer 1991): 5-42.

Fortin, Ernest, (Lieutenant USNR). "Those Damn Mines." U.S. Naval Institute Proceedings 118 (July 1992): 30-34.

Foxwell, David. "Naval Mine Warfare: Unfunded and Underappreciated." International Defense Review 26 (February 1993): 125-129.

Franck, Raymond E. (Colonel, USA) and Gregory G. Hildebrandt. Potential Military Rivals: Some Technological Economic and Operational Considerations. Monterey, CA: Naval Postgraduate School, October 1993.

Freidman, Norman. "Modern Antiship Missiles - The Great Equalizers." Armed Forces Journal International 129 (June 1992): 38-39.

Galatowitsch, Sheila. "Undersea Mines Grow Smarter and Deadlier." Defense Electronics 23 (March 1991): 57-64.

George, Alexander L., ed. Avoiding War: Problems of Crisis Management. Boulder: Westview Press, 1991.

- George, James L. The U.S. Navy in the 1990s. Annapolis: Naval Institute Press, 1992.
- Glantz, David M. (Colonel, USA) "Challenges of the Future: Developing Security Issues in the Post-Cold War Era." Military Review 71 (December 1991): 2-9.
- Goure, Dan. "Is There a Military-Technical Revolution in America's Future?" The Washington Quarterly 16 (Autumn 1993): 175-192.
- Gray, Colin S. War, Peace and Victory: Strategy and Statecraft for the Next Century, New York: Simon and Schuster, 1990.
- _____. "U.S. Naval Power and Competitive Grand Strategy." International Defense Review 23 (March 1990): 255-258.
- _____. "Deterrence Resurrected: Revisiting Some Fundamentals." Parameters (Summer 1991): 13-21.
- _____. Weapons Don't Make War. Lawrence: University of Kansas Press, 1993.
- Gumbert, Ron (Captain, USN), Assistant Deputy Director Strategic Plans and Policy (J-5) Joint Staff. Interview by author, 2 May 1994, Monterey, CA. Tape recording.
- Hammer, Michael and James Champy. Reengineering the Corporation: A Manifesto for Business Revolution. New York: Harper Collins, 1993.
- Harvey, John R. "Regional Ballistic Missiles and Advanced Strike Aircraft." International Security 17 (Fall 1992): 41-83.
- Hayes, Mark L. (Major, USMC). "Sealift: The Achilles' Heel of our National Strategy." Marine Corps Gazette 76 (November 1992): 71-80.
- Hooker, Richard D., Jr (Capt., US Army) and Ricky L. Waddell (Capt., US Army). "The Future of Conventional Deterrence." Naval War College Review, 45 (Summer 1992): 78-88.

- Hughes, Wayne P., Jr. (Capt., USN Ret.), Naval Forces in Joint Littoral Warfare. Paper presented at the Military Operations Research Symposium under the auspices of the Johns Hopkins University Applied Physics Laboratory, February 26, 1993.
- _____. Fleet Tactics: Theory and Practice. Annapolis: Naval Institute Press, 1986.
- Huth, Paul K. Extended Deterrence and the Prevention of War. New Haven: Yale University Press, 1988.
- Ikle, Fred Charles. Every War Must End. New York: Columbia University Press, 1991.
- Jane's Defense Weekly. "Standoff Delivery Comes of Age." 15 (16 March 1991): 387-395.
- _____. "Calming Stormy Waters. 16 (10 August 1991): 241-242.
- Jeremiah, David E. (Admiral, USN) "Beyond the Cold War." U.S Naval Institute Proceedings 118 (May 1992): 52-57.
- Jervis, Robert. Perception and Misperception in International Politics. Princeton: Princeton University Press, 1976.
- _____. "Deterrence Theory Revisited." World Politics 31 (10 August 1979): 289-324.
- Jones, Rodney W. and Steven A. Hildreth. Modern Weapons and Third World Powers. Boulder: Westview Press, 1984.
- Jordan, John. "The Kilo Class Submarine." Jane's Intelligence Review 4 (September 1992): 427-431.
- _____. "Littoral Warfare: The Shape of Things to Come?" Jane's Intelligence Review 5 (March 1993): 140-143.
- Kahn, Herman. On Thermonuclear War. Princeton: Princeton University Press, 1960.
- Kaiser, Karl. "From Nuclear Deterrence to Graduated Conflict Control." Survival 32 (November-December 1990): 483-496.
- Keegan, John. The Price of Admiralty: The Evolution of Naval Warfare. New York: Viking, 1988.

- Kelley, P.X. (General, USMC) and Hugh K. O'Donnell (Major, USMC) "The Amphibious Warfare Strategy." U.S. Naval Institute Proceedings 112 (February 1986): 20-29.
- Kelso, Frank B., II, (Admiral, US Navy). "Building Blocks of Naval Power." U.S. Naval Institute Proceedings 118 (November 1992): 39-44.
- Kempt, Rodney P. (Captain, USN). "Killing Scuds From the Sea," U.S. Naval Institute Proceedings 119 (June 1993): 52-58.
- Kendall, Frank. "Exploiting the Military Technical Revolution: A Concept for Joint Warfare." Strategic Review (Spring 1992): 23-30.
- Kennedy, Paul. Preparing for the Twenty-First Century. New York: Random House, 1993.
- Koburger, Charles W., Jr. Narrow Seas, Small Navies and Fat Merchantmen: Naval Strategies for the 1990s. New York: Praeger, 1990.
- Kolodziej, Edward. Making and Marketing Arms: The French Experience and its Implications for the International System. Princeton: Princeton University Press, 1987.
- Krause, Keith. Arms and the State: Patterns of Military Production and Trade. Cambridge: Cambridge University Press, 1992.
- Lehman, John F., Jr. "The 600 Ship Navy." Proceedings 112 (February 1986): 32-40.
- _____. "Inexplicable Decisions, Realpolitik and Childish Power Play." International Defense Review 26 (July 1993): 553-554.
- Lennox, Duncan. "Missile Race Continues." Jane's Defence Weekly 19 (23 January 1993): 18-21.
- Lok, Joris Janssen. "Submarine Forces: Silent but Deadly Threat." Jane's Defence Weekly 19 (12 September 1992): 45-46.
- _____. "FACs: Adapting the Art of Hit and Run." Jane's Defense Weekly 18 (24 October 1991): 27-30.

- Macksey, Kenneth. Technology and War: The Impact of Science on Weapon Development and Modern Battle. New York: Prentice Hall Press, 1986.
- Mandel, Robert. "The Effectiveness of Gunboat Diplomacy." International Studies Quarterly 30 (March 1986): 59-76.
- Martin, J.M., (Captain, USNR Ret.) "We Still Haven't Learned." U.S. Naval Institute Proceedings 117 (July 1991): 64-66.
- Martin, Lawrence W. The Sea in Modern Strategy. New York: Praeger, 1967.
- Maynard, Wayne K. (Major USA) "The New American Way of War." Military Review 73 (November 1993): 5-17.
- Mazaar, Michael J. The Military Technical Revolution: A Structural Framework. Washington, DC: Center for Strategic and International Studies, 1993.
- MccGwire, Michael, ed. Soviet Naval Developments: Capability and Context. New York: Praeger, 1972.
- McNulty, James F., (Commander, USN), "Naval Presence: The Misunderstood Mission." Naval War College Review (Summer 1974): 21-31.
- Mearsheimer, John J. Conventional Deterrence. Ithaca: Cornell University Press, 1983.
- Melia, Tamara M. Damn the Torpedoes: A Short History of U.S. Naval Mine Countermeasures, 1777-1991. Washington: Naval Historical Center, 1991.
- Miller, David. "The Silent Menace: Diesel Electric Submarines in 1993." International Defense Review 26 (August 1993): 613- 617.
- Miller, Paul D. (Admiral, USN) "The Military After Next: Shaping U.S. Armed Forces for the Next Century." U.S. Naval Institute Proceedings 120 (February 1994): 41-44.
- Mott, C.P. (Commander, USN) "Naval Forces After...From the Sea." Proceedings 119 (September 1993): 44-46.
- Mueller, John. War, Presidents and Public Opinion, New York: Wiley, 1973.

- Mundy, Carl E., Jr. (General, USMC) "Getting it Right...From the Sea." U.S. Naval Institute Proceedings 120 (January 1994): 69-71.
- Murphy, Frank J. (Lieutenant Commander, USN) "Littoral Warfare: Adapting to Brown-Water Operations." Marine Corps Gazette 77 (September 1993): 65-73.
- National Defense. "Sea-Based Shield Will Counter Missile Threat." 79 (February 1994): 26-27.
- Navy Times. "New Aircraft Carrier Gets All-Clear Signal." April 25, 1994: 3.
- Nitze, Paul. "Deterring Our Deterrent." Foreign Policy 25 (Winter 1976-77): 195-210.
- Nolan, Janne E. Trappings of Power: Ballistic Missiles in the Third World. Washington: Brookings Institute, 1991.
- Odom, William E. (Lieutenant General, USA Ret.) America's Military Revolution: Strategy and Structure After the Cold War. Washington, DC: The American University Press, 1993.
- Paret, Peter, ed. Makers of Modern Strategy: From Machiavelli to the Nuclear Age. Princeton: Princeton University Press, 1986.
- Peppe, P. Kevin, (Lieutenant Commander, USN). "Submarines in the Littorals." U.S. Naval Institute Proceedings 119 (July 1993): 46-48.
- Perry, Nancy J. "How Defense will Change." Fortune 123 (25 March 1991): 58-62.
- Petersen, John L. "Plan for the Twenty-First Century Now." U.S. Naval Institute Proceedings 117 (August 1991): 49-54.
- Poirier, Michael (Lieutenant Commander, USN). "Sea Control and Regional Warfare." U.S. Naval Institute Proceedings 119 (July 1993): 63-65.
- Posen, Barry R. The Sources of Military Doctrine: France, Britain and Germany Between the World Wars. Ithaca: Cornell University Press, 1984.

- Office of the President of the United States, National Military Strategy of the United States. Washington, DC: The White House, 1993.
- Preston, Anthony. "Mine Warfare in the 1990s." Asian Defence Journal 5 (May 1993): 48-52.
- Pugh, Philip. The Cost of Seapower. London: Conway Maritime Press, 1986.
- Rand Research Review, "Airpower and the Changing Face of Battle." 17 (Fall 1993): 1-3.
- Renshon, Stanley A., ed. The Political Psychology of the Gulf War: Leaders, Publics and the Process of Conflict. Pittsburgh: University of Pittsburgh Press, 1993.
- Reynolds, Clark G. Command of the Sea. New York: William Morrow and Co., 1974.
- Richelson, Jeffrey. "The Future of Space Reconnaissance." Scientific American 264 (January 1991): 40-44.
- Ripley, Tim. "Close to the Edge." International Defense Review 26 (July 1993): 571-572.
- Sauerwein, Brigitte. "Military Doctrine: The Software of Defense." International Defense Review 23 (May 1990): 501-503.
- Shelling, Thomas C. Arms and Influence. New Haven: Yale University Press, 1966.
- Siegel, Adam B. U.S. Navy Crisis Response Activity (1946-1989): Preliminary Report. Washington, D.C.: Center for Naval Analyses, 1989.
- Simpkin, Richard E. Race to the Swift: Thoughts on Twenty-First Century Warfare. London: Brassey's Defense Publishers, 1985.
- Smith, Leighton W., Jr., (Vice Admiral, USN). Force 2001: Shaping and Sizing the Navy for the 21st Century...a New Direction From the Sea. Washington, DC: Department of the Navy, 1993.
- Smoke, Richard. War: Controlling Escalation. Cambridge: Harvard University Press, 1977.

- _____. "Extended Deterrence: Some Observations." US Naval War College Review 36 (September-October 1983): 37-48.
- Sun Tzu. The Art of War. Translated by Samuel B. Griffith. London: Oxford University Press, 1963.
- Sweetman, Bill. "Naval Air Power for 2000: Time to Change Course." International Defense Review 25 (September 1992): 837-845.
- Todd, Daniel and Michael Lindberg. "The Trend Towards Replacement of FACs with Corvettes." Far Eastern Economic Review (September-October 1993): 284-291.
- Toffler, Alvin and Heidi Toffler. War and Anti-War: Survival at the Dawn of the Twenty-First Century. New York: Little, Brown and Co., 1993.
- Truver, Scott C. and James A. Hazlett (Commander, USN) "Surfacing a New Battle Group." U.S. Naval Institute Proceedings 117 (April 1991): 81-88.
- United States Joint Chiefs of Staff. DOD Dictionary of Military and Associated Terms, JCS Publication 1. Washington, 1984.
- van Creveld, Martin. Technology and War: From 2,000 B.C. to the Present. New York: The Free Press, 1989.
- _____. The Transformation of War. New York: The Free Press, 1991.
- Walsh, Edward J. "Navy and Marine Corps Focus on Achilles' Heel: Shallow-Water Mines." Armed Forces Journal International 131 (August 1993): 35-38.
- _____. "Navy Aims at Joint Operations Roles and Economies for C4I." Sea Power (April 1994): 49-56.
- Watkins, James D. (Admiral, USN) "The Maritime Strategy." U.S. Naval Institute Proceedings 112 (February 1986): 3-17.
- Weible, Jack. "Future: Forward Absence?" Navy Times 2 May 1994, 5.
- Wolfsthal, John B. "The Proliferation of Ballistic Missiles." Arms Control Today 22 (April 1992): 28-29.

Zimmerman, Stan. "Modern Patrol Boats Bolster Smaller Navies." Armed Force Journal International 128 (June 1991): 74-75.

INITIAL DISTRIBUTION LIST

	No. of Copies
1. Defense Technical Information Center Cameron Station Alexandria, VA 22304-6145	2
2. Library, Code 52 Naval Postgraduate School Monterey, CA 93943-5100	2
3. Dr. Thomas C. Bruneau Chairman, National Security Affairs (NS/Bn) Naval Postgraduate School Monterey, CA 93943	1
4. Dr. Paul Stockton Code NS/Sc Naval Postgraduate School Monterey, CA 93943	2
5. Captain Wayne P. Hughes, USN (Ret.) Code OA/Hw Naval Postgraduate School Monterey, CA 93943	1
6. Lieutenant David A. Schnell Helicopter Combat Support Squadron Three NAS North Island San Diego, CA 92135	4
7. Chief of Naval Operations Expeditionary Warfare Division (N85) Attn: Dr. Frank Shoup Navy Department Washington, DC 20350	1
8. Chief of Naval Operations Assessment Division Associate Director for Assessment (N81D) Attn: Mr. M. Henry Navy Department Washington, DC 20350	1