DOES THE FAST PATROL BOAT HAVE A FUTURE IN THE NAVY?

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ABSTRACT

DOES THE FAST PATROL BOAT HAVE A FUTURE IN THE NAVY? by LCDR Daniel B. Uhls, U.S. Navy**,** 118 pages.

The post-Cold War era has posed new priorities to the United States Navy. The absence of a naval threat capable of challenging the Navy for control of the seas has allowed the Navy to refocus its efforts to littoral operations. A majority of the Navy leadership's efforts during the past decade has been directed at redefining the capabilities and roles of the Cold War fleet rather than seeking new alternatives for littoral operations. More and more the Navy has found itself involved in Military Operations Other Than War (MOOTW) missions in the littoral. These missions have called into question the operational and financial prudence of employing its high technology, high cost fleet in low-end operations.

This thesis evaluates the use of fast patrol boats as an alternative means for conducting littoral MOOTW missions. This thesis uses the operational and financial histories of the *Cyclone* (PC-1) class patrol coastal and the *Oliver Hazard Perry* (FFG-7) class guided missile frigates as the basis for a historical study. This study concludes that fast patrol boats are relevant to the Navy of the future, and should be included in the force structure.

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LIST OF ABBREVIATIONS

AAW	Anti-Air Warfare
ASUW	Anti-Surface Warfare
AT/FP	Anti-terrorism/Force Protection
BUPERS	Bureau of Naval Personnel
C5F	Commander, United States Fifth Fleet
CENTCOM	United States Central Command
CG	Guided Missile Cruiser
CHINFO	Chief of Naval Information
CIA	Central Intelligence Agency
CN	Counter Narcotics
CNSWC	Commander, Naval Special Warfare Command
CJCS	Chairman of the Joint Chiefs of Staff
CONUS	Continental United States
CP/I	Coastal Patrol and Interdiction
CV	Aircraft Carrier
CVN	Nuclear Aircraft Carrier
CVBG	Carrier Battle Group
DDG	Guided Missile Destroyer
DD	Destroyer
DEA	Drug Enforcement Agency
EPMAC	Enlisted Personnel Management Center
ESM	Electronic Support Measures

FF	Frigate
FFG	Guided Missile Frigate
FPB	Fast Patrol Boat
GAO	Government Accounting Office
GCCS-M	Global Command and Control System-Maritime
JIATF-E	Joint Inter-Agency Task Force-East
JSOC	Joint Special Operations Command
IRGCN	Iranian Revolutionary Guard Corps Navy
ITEMPO	Individual Tempo
LANT AREA	Commander, United States Coast Guard--Atlantic Area
LIC	Low Intensity Conflict
LIO	Leadership Interception Operations
MIF	Multi-National Interdiction Force
MIO	Maritime Interception Operations
MNF	Multi-National Force
MOOTW	Military Operations Other Than War
NAVCENT	United States Naval Forces-U.S. Central Command
NAVSEA	Commander, Naval Sea Systems Command
NCA	National Command Authorities
OMN	Operations and Maintenance-Navy
OPCON	Operational Control
OPTEMPO	Operational Tempo
PAC AREA	Commander, United States Coast Guard--Pacific Area

PACCOM	United States Pacific Command
PC	Patrol Coastal
PERSTEMPO	Personnel Tempo
PHM	Patrol Hydrofoil Missile
PMSA	Port and Maritime Security Act of 2001
QDR	Quadrennial Defense Review
SCN	Ship Construction-Navy
SLOC	Sea Lines of Communications
SOC	United States Special Operations Command
SOCCENT	Special Operations Command--U.S. Central Command
SOUTHCOM	United States Southern Command
SS	Submarine
SSN	Nuclear Submarine
SWO	Surface Warfare Officer
TLAM	Tomahawk Land Attack Missile
UNSCR	United Nations Security Council Resolution
USCG	United States Coast Guard
USIC	United States Interdiction Coordinator
USN	United States Navy
USSOCOM	United States Special Operations Command
USW	Undersea Warfare

CHAPTER 1

INTRODUCTION

Introduction

The United States Navy focused its efforts on the threat posed by the Soviet Navy during the half century following the end of the Second World War. Each navy tried to establish and maintain supremacy in the open waters of the Atlantic and Pacific. The United States Navy organized itself and developed a force structure to support these efforts. Nuclear submarines, carriers and the ships designed to hunt them were the order of the day. Throughout the Cold War (1945-1991), except for limited forays into littoral warfare in Korea and riverine warfare in Vietnam, open ocean, blue-water operations for command of the sea was the over-arching focus. Entire generations of naval officers and naval strategist knew nothing else. The United States Navy dedicated little effort or funding to developing a force capable of operating in the world's littoral regions.

All of America's armed forces entered a period of organizational uncertainty, upon the demise of the Union of Soviet Socialist Republics (USSR). Uncertainty manifested itself both at home during Capitol Hill battles over budget and policy, and deployed trying to define its roles and missions in the post Cold War world. This change in the strategic environment forced the Pentagon to redefine each service's role. Navy leadership took a bold step, redefining its role in the 1992 white paper *…From the Sea.* This vision, while not abandoning the Navy's traditional blue-water role of destroying an enemy fleet and controlling the high seas, refocused efforts on developing the ability to operate in the littoral and project power ashore.

The shift in strategic focus away from challenging the Soviet fleet for supremacy of the deep waters of the mid-ocean, to operating in support of regional engagement policies precipitated this fundamental reorganization (U.S. Navy 1994, 1). The 1994's Department of the Navy white paper *Forward…From the Sea* and the Marine Corps white paper *Operational Maneuver From the Sea* further elaborated on this redefinition. The vision provided by *Forward…From the Sea* has been routinely reaffirmed, most recently in 2001 with *Force 2001: A Program guide to the US Navy*, which stated

> Our strategies and policies have continued to evolve to reflect what we have learned from our experiences and to prepare us for new challenges and opportunities of this highly dynamic world. Our emphasis remains on the littoral. (U.S. Navy 2001, 7)

The Navy's shift of focus from the blue-waters of the mid-ocean to the brown-waters of the littoral signified more than simply a shift in the geographic location of operations. The blue-water and the littoral operating environments each provide the Navy with a unique set of likely missions, mission profiles, required operational capabilities, and challenges. The depths of the mid-ocean serve as a naval operating environment were large, high technology, high endurance, surface combatants, aircraft carriers, and submarines reign supreme. Fleet-on-fleet combat is the focus. Safety of navigation is easy, as there are few shoals or dangerous currents. Sparse shipping densities facilitate the maintenance of an accurate situational awareness; only naval combatants and larger commercial vessels operate there. The littorals, on the other hand, are a much more challenging and confusing arena of operations. Shallow, treacherous waters, high shipping densities, including coastal and coastwise traffic, characterize these

areas. The mission also changes in the littoral; in addition to fleet combat the Navy must conduct a wide variety of lower intensity, but no less important missions.

The terrorist attacks of 11 September 2001, and the subsequent publication of the *2001 Quadrennial Defense Review* (QDR) provided impetus for a further refining of the Navy's role in national defense. Secretary of the Navy Gordon England directed that an updated strategic vision be developed to stress counter-terrorism and the protection of US borders as part of the homeland security mission (Svitak 2001, 6). The Navy has added homeland defense as a key mission area, and is expected to publish an updated vision statement incorporating the homeland defense and friendly shipping protection as areas of concentration in 2002 (Troshinsky 2002, 1).

Navy Roles and Missions

> Sea power in the broad sense . . . includes not only the military strength afloat that rules the sea or any part of it by force of arms, but also the peaceful commerce and shipping from which alone a military fleet naturally and healthfully springs, and on which it securely rest. (Mahan 1957, 273)

The United States, as a maritime nation, inherently has an economy and thus national security strategy inexorably linked to control of our maritime trade routes, our sea-lines of communication (SLOC) (U.S. Navy 2000, 3). The defense and prosperity of the Republic has been tied to the seas since it's founding, and the United States Navy has been the primary protector of that security. Today, ninety percent of the world's trade and ninety-nine percent of American inport-export tonnage is transported on the sea (U.S. Navy 2000, 3). This trade is the driving force behind the world's and thus the American economy. A closure of any of the world's major commercial SLOCs would almost certainly imperil the economy, and thus the American way of life. Unlike the days of

Captain Mahan, today, most of the shipping that calls on the nation's ports is not American flagged. These foreign flagged vessels do, however, carry the fuel that fires the American economy. Not surprisingly, America's national security strategy dictates that the Navy conducts deployments into the most vital areas to protect our national interest by maintaining a free flow of commerce (U.S. Navy 1994, 2).

Accordingly, the Navy, today as it has for decades, routinely maintains a forward presence in the Mediterranean Sea, Red Sea, Caribbean Sea, Arabian Gulf, and Pacific Ocean in support of successive national security and military strategies. Historically, this naval presence has been used to facilitate flow of materiel along maritime routes when considered advantageous and to preclude maritime commerce when considered contrary to America's national interest. Joint Publication 3-07 defines the attempts to prevent or facilitate the flow of commerce along sea-lines of communication as a Military Operations Other Than War (MOOTW) (Chairman of the Joint Chiefs of Staff 1995, iv).

The United States Navy has been involved in numerous MOOTW missions and periods of armed conflict in the littoral during the past few decades. These operations were designed to establish and maintain control of various sea lines of communication, and include:

1. 1950-1953: Conducting counter insurgency patrols along Korean coast during Korean War.

2. 1965-1973: Conducting riverine and coastal operations in Vietnam in an attempt to control flow of North Vietnamese weapons, personnel and materiel (Operation Game Warden, Operation Market Time).

3. 1986: Conducting strikes against Libya in reprisal for Red Sea mining (Operation El Dorado Canyon, Operation Intense Look).

4. 1987-1989: Escorting re-flagged crude oil tankers through the Strait of Hormuz and into the northern Arabian Gulf (Operation Earnest Will, Operation Prime Chance, Operation Nimble Archer).

5. 1988: Conducting strikes against Iranian shipping involved in Strait of Hormuz mining operations (Operation Praying Mantis).

6. 1982-present: Conducting counter-narcotics (CN OPS) in the Caribbean Sea and eastern Pacific Ocean.

7. 1990-1991: Enforcing arms embargo against Iraq in the Arabian Gulf, Gulf of Oman and Red Sea (Operation Desert Storm) in retaliation for the invasion of Kuwait.

8. 1991-present: Enforcing United Nations sanctions against Iraq in the Arabian Gulf, Gulf of Oman, and Red Sea (Operation Southern Watch).

9. 1993-1994: Enforcing an arms embargo against the Former Republics of Yugoslavia (FRY) in the Adriatic Sea and Gulf of Otranto (Operation Sharp Guard, Operation Maritime Monitor) during civil war in Bosnia-Herzegovina.

10. 1996-1999: Enforcing an arms embargo against Serbia in the Adriatic Sea and Gulf of Otranto (Operation Determined Guard) during civil war in Kosovo.

11. 1994: Enforcing a limited embargo against Haiti in the Caribbean Sea (Operation Support Democracy).

12. 2001-present: Conducting boarding and vessel escort duty in support of homeland defense along the American coastline (Operation Noble Eagle, Operation Safe Transit).

13. 2001-present: Conducting leadership interception operations in support of America's war on terrorism in the Arabian Sea and Indian Ocean (Operation Enduring Freedom).

14. 2001-present: Conducting Anti-piracy patrols in the Malacca Strait (Operation Enduring Freedom).

The United States Navy's surface fleet is currently pursuing three operationally significant MOOTW missions designed to control sea lines of communication; maritime interdiction force (MIF) operations in the Arabian Gulf and Arabian Sea, counter-narcotics (CN) operations in the Caribbean Sea and eastern Pacific Ocean, and homeland security. In fact, these missions, along with presence and power projection ashore via the *Tomahawk* Land Attack Missile (TLAM) serve as the three primary missions currently being undertaken by the United States Navy's surface fleet.

In the Caribbean, CN operations have evolved over the last two decades from those which focused on locating, boarding and inspecting, slow moving, north bound, sailing boats and fishing trawlers in the Caribbean Sea to one which focuses on the detection and interception of "go-fast" (speed boats specifically designed and outfitted as smuggling craft) in the littoral waters of the islands around the Caribbean basin (Chairman of the Joint Chiefs of Staff 1998b, iv-1). The realization that the United States Navy was ill equipped to compete with them in their newfound littoral operating areas, was at least partially responsible for this change of tactics. This scenario was best articulated in the *United States Naval Institute's* 1999 General Colin Powell Joint Warfighting Essay Contest winner, in which the author stated:

> It is difficult to overemphasize how much the drug war has changed in a relatively short period. From the early days of random, slow, and easy catch bulk shipments of marijuana, the drug trade has evolved into a sophisticated operation fueled by immense profits and a growing global appetite for cocaine. Using superior military technology, U.S. ships and aircraft under JIATF [Joint Interagency Task Force] control were perfect to counter the smugglers' slow-flying aircraft and containerized bulk shipments. Unfortunately this is no longer the threat faced in the Caribbean. Today the maritime smuggling method of choice is the small, oceangoing speedboat, or go-fast, possibly the most serious challenge ever faced by maritime law enforcement. (Watts 1999, 99)

The Navy soon put to use the lessons learned during CN Operations when it embarked on Maritime Interception Operations (MIO) at the onset of the Persian Gulf War in 1990. The mission of SLOC control remained the same only the operating area and types of contraband cargo changed.

Multinational Interception Force operations also known as MIO consist of locating, tracking and boarding sea-going vessels attempting to transfer cargo in violation of various sanctions or embargoes. At times these boardings are conducted via non-compliant means (vessel's crew is non-cooperative and attempts active or passive countermeasures), and may result in the seizure of the vessel and its cargo as well as legal action against the vessel's crew and owners. MIF operations have been underway continually in the waters surrounding the Arabian Peninsula since the Iraqi invasion of Kuwait in 1990, and will be for the foreseeable future. Originally, these operations were conducted in the more open waters of the region in a attempt to enforce a total embargo against Iraq, and has evolved into a operation designed to enforce United Nations sanctions against Iraq and is being conducted in the coastal and relatively shallow waters of the Arabian Gulf off Iraq and Iran. They are being conducted to prevent the Iraqi

regime from rebuilding its military and acquiring weapons of mass destruction. Oil exports and imports with military applications are the current target of the embargo.

As a result of the September 2001 terrorist attacks on America, Commander, United States Naval Forces--Central Command (COMUSNAVCENT) extended the patrol area into the Arabian Sea and Indian Ocean in search of Al-Queda or Taliban leadership trying to escape Afghanistan by sea via Pakistan. COMUSNAVCENT has referred to the extended operations as "Leadership Interception Operations (LIO)" (Perry 2002, 1).

In the wake of the terrorist attacks of 11 September 2001, the United States Navy like the rest of the armed services tackled the mission of homeland security. To date the United States Navy's surface fleet has provided the lion's share of the services contribution to the mission. Defensive picket stations were established almost immediately after the attacks and by naval forces along each of our nation's coast. The role of the naval pickets continues to evolve, and as of yet is ill defined, but has become a mission of focus for the United States Navy.

Force Structure

The United States Navy, over the past quarter-century, has assigned the vast majority of the responsibility for MOOTW missions to its fleet of blue-water surface combatants, to include the Ticonderoga (CG-47) class cruisers, Arleigh Burke (DDG-51) and Spruance (DD-963) class destroyers and Oliver Hazard Perry (FFG-7) class guided missile frigates. Each of these ship classes was designed in the 1960s through 1980s, and formed the core of the world's most capable blue-water fleet for the Cold War competition with the Soviet Union in the vastness of the world's oceans. These ships

were for the most part; oversized, with too deep of draft, with insufficient speed, improperly armed, over-manned, overpriced and generally ill-suited for the MOOTW missions, especially in the littoral.

Two classes of ships, while not specifically designed for the mission, proved to have unique operational characteristics that allowed them to prosper while conducting MOOTW in the littoral. The Pegasus (PHM-1) class hydrofoil and the Cyclone (PC-1) class patrol coastal each enjoyed some operational success while participating in our nation's war on drugs in the Caribbean Basin. The Cyclones saw additional use in the Arabian Gulf during MIF operations, and as one of the Navy's primary contributions to homeland defense (Perry 2001, 1).

The Pegasus and her sister-ships were designed as a Cold War anti-surface warfare (ASUW) platform. They were optimized for combat against larger surface combatants in a coastal conflict. For most of their operational career they were stationed at, and operated from Key West, Florida, in a counter-narcotics role. Due mostly to their extraordinary speed (greater than forty knots), they enjoyed some operational successes. The Pegasus's were considered, during their service life, the most effective counter-narcotics platform in the Navy's surface fleet. Post-Cold War Pentagon economics proved to be the Pegasus' demise, as all six ships were decommissioned in the early 1990s without replacement.

Commander, Naval Special Warfare Command (CNSWC) and Commander in Chief, United States Special Operations Command (SOCCOM), as a direct result of the Department of Defense's and the United States Navy's experiences during the Arabian Gulf operations of the late 1980s (Operations Earnest Will and Praying Mantis), realized

and articulated the need for a dedicated littoral surface combatant. Commander, Naval Sea Systems Command (NAVSEA), from CNSWC's requirement, designed and initiated the procurement process for the Cyclone class patrol coastal ships. Naval leadership envisioned these ships not as a replacement for the Pegasus, but as a ship to support special operations in the littoral. They were specifically designed to act as a long-range insertion platform for special operations forces and to conduct coastal patrol and interdiction (CP/I). In 1993 CNSWC and SOCCOM commissioned USS *Cyclone* (PC-1), the lead ship of the class, and immediately placed her into action. The remainder of the fourteen Cyclone class patrol coastal ships was placed into service over the next seven years. CNSWC designed these ships from the keel up, manned, and trained, to conduct special operations in a littoral environment. Since the initial operational deployment, the geographic theater Special Operations Commander (SOC) or Joint Special Operations Command (JSOC) exercised operational control (OPCON) of the Cyclones. While these ships were designed for special operations and operated by the various special operations commanders, when tasked, they proved at least partially capable of fulfilling littoral MOOTW missions currently associated with the Navy's blue-water fleet.

In 2001, Navy officials made the decision to decommission its fleet of Cyclones by 2003 as a cost cutting measure in favor of larger, more complex, more expensive surface combatants. The demise of the Cyclones leaves the Navy without a dedicated littoral platform and has further extenuated the shortage of surface ships to fulfill the Navy's MOOTW commitments. With the Navy's ever increasing number of MOOTW

missions, especially in the littoral, it is doubtful that the blue-water fleet will be able to meet future requirements.

For the early portions of the post Cold War period, this mix of complex blue-water surface combatants and a very limited number of specialty ships proved, while not optimal for MOOTW in the littoral, capable of performing the mission. The Navy accomplished this mission by committing large numbers of ill-equipped surface ships to saturate the areas of operations and create the desired effect by sheer presence. This process, while expending large amounts of underway ship-days was acceptable when the fleet numbered greater than 500 as it did in the early 1990s, and had relatively liberal restrictions placed upon its underway-operational tempo. The personnel drawdown and austere financial years after the Persian Gulf War and lasting until recently resulted in a significant reduction in the Navy's force structure. The Navy's fleet consists of 310 warships today, with only 107 suited to conducting MOOTW in the littoral (Naval Vessel Registry 2002, 1).[1] Fiscal Year 2003 Navy Programming guidance indicates that the reduction of the force structure will continue throughout the five year duration of the Future Years Defense Plan. Navy officials predict that the fleet will reach 286 ships with only 98 surface combatants (Koch 2001, 1). For most of the late 1990s the Navy responded to the force structure reduction, without a commensurate reduction in operational commitments, by deploying its available ships at greater frequency. The Fiscal Year 2000 Department of Defense (DOD) appropriations bill seemed to have precluded this practice by placing restrictive limits on the total number of days sailors, and, in turn, the ships they man, can be deployed.

Definitions

The value of this thesis depends a great deal upon the definition one uses for four basic concepts: littoral, blue-water surface combatant, fast patrol boat, and low intensity conflict (LIC) and MOOTW. The level of understanding required for each of these concepts goes beyond simply looking in an academic encyclopedia for a meaning. A greater understanding of both the literal definition of the word, as well as the applications and connotations the concepts have within the maritime community is required.

Littoral. The *Joint Doctrine Encyclopedia* defines littoral as "The area consist of two parts. First is the seaward area from the open ocean to the shore, which must be controlled to support operations ashore. Second is the landward area inland from the shore that can be directly supported and defended from the sea" (Chairman of the Joint Chiefs of Staff 1997a, 464). While this definition is of broad scope and contains the areas usually defined as littoral in naval vernacular, it is not definitive enough to adequately describe how the term is used in today's Navy. In the twenty-first century Navy, littoral is defined in a variety of ways, to include the coastal regions and that area of ocean from which one can directly affect it. This definition does not place a numerical delineation on the area, but describes it in an effect-relationship basis. The Navy has not, nor will this thesis attempt to define the littoral as the ten, twenty, or one-hundred nautical miles from a coastline. While the littoral is not numerically definable, it is safe to assume that a vast majority of littoral areas share common traits of: shallow water in relation to the ocean in general, congested sea-lines of communications, heavy concentrations of the world's naval forces, and sometimes significant geographical constraints, such as choke points and shoal waters. Additional considerations when

trying to define the littoral, is the capability of the coastal nation to project power seaward to maintain both a situational awareness and the ability to dominate the area. For the purpose of this study the littoral is defined as that area of ocean which characteristics are dominated by its proximity to the coastline, shallow, congested water, and the presence of coastwise maritime traffic.

Blue-water combatant. A blue-water surface combatant is a warship that due to its hull design and armament is optimized for operations in the open ocean. They are generally capable of conducting operations in high sea-states and of remaining on station for extended duration. A blue-water surface combatant's combat systems may vary, but is designed to conduct at least one of the following surface warfare core competencies: anti-air warfare (AAW), anti-surface warfare (ASUW) and undersea warfare (USW). For the purpose of this thesis, a blue-water surface combatant is a vessel that displaces greater than 1000 tons and is designed to be proficient in at least one of the core competencies, and probably at least marginally capable in the others. This definition excludes ships designed primarily to support amphibious or aviation operations. There are currently four classes of blue-water combatants in the United States Navy; Ticonderoga class guided missile cruisers, Arleigh Burke class guided missile destroyers, Spruance class destroyers, and Oliver Hazard Perry class guided missile frigates.

Fast Patrol Boat. The term fast patrol boat, or FPB, is used to describe a family of small warships optimized for missions in the shallow and congested waters of the littoral and capable of conducting operations in the open ocean. This optimization is in the form of size, speed and mission capabilities. These vessels are often armed with a variety of missiles and or torpedoes and minor caliber guns. FPBs are usually shallow draft and

commonly capable of high speeds, but have limited sustainability and survivability in high sea states. For the purpose of this thesis, an FPB is a vessel of between 200 and 750-ton displacement, with a draft less than 15 feet and with top speeds in excess of twenty knots. This vessel design possesses an inherent capability in CP/I and ASUW, while maintaining only self-defense capabilities in the other corps competencies. The Cyclone class patrol coastals are the only FPBs in the United States Navy's force structure.

Low Intensity Conflict. Joint Publication 1-02 defines a low intensity conflict as a "political -military confrontation between contending states or groups below conventional war and above routine, peaceful operations among states. . . . Low intensity conflicts are often localized, generally in the Third World, but contain regional and global security implications" (Chairman of the Joint Chiefs of Staff 1994, 272). For the context of this thesis, in addition to the political circumstances surrounding a low intensity conflict, assumptions will be made about the physical threat from hostile fire while operating in this environment. It is assumed that during this genre of conflict, that naval vessel can operate without a significant threat of being involved in unconstrained general warfare, and thus should not be the object of a large-scale enemy offensive operation. Small scale, low-level confrontation from an asymmetric threat is the most likely physical danger in this environment.

Medium Intensity Conflict. Medium intensity conflict is those periods of armed conflict above the threshold of low intensity conflict, but not full-scale war (high intensity conflict). For the purpose of this thesis, it is assumed that during this genre of

conflict, naval vessels will be subject to a physical threat from symmetric forces. Large-scale enemy offensive operations are, however, still deemed unlikely.

Military Operations Other Than War (MOOTW). Joint Pub 1-02 defines MOOTW as "operations that encompass the use of military capabilities across the range of military operations short of war. These military actions can be applied to complement any combination of the other instruments of national power and occur before, during and after war" (Chairman of the Joint Chiefs of Staff 1994, 294). Joint Publication 3-07, *Joint Doctrine for Military Operations Other Than War,* delineates sixteen mission areas that comprise MOOTW (Chairman of the Joint Chiefs of Staff 1995, iv). Of those sixteen, only the seven that are routinely conducted by United States Navy surface forces (Combating Terrorism, DOD Support to Counterdrug Operations, Enforcement of Sanctions, Maritime Intercept Operations, Enforcing Exclusion Zones, Ensuring Freedom of Navigation, Protection of Shipping, Show of Force Operations) will be considered.

Posse Comitatus Act of 1878. The Posse Comitatus Act (PCA) is the popular name for the statute Title 18, US Code, Section 1385. This statute makes it a crime to use the Army, and by derivation the Air Force to enforce civil law. The statute has been extended, by DOD instruction, to cover the Navy and the Marine Corps. The Posse Comitatus Act is designed to create a clear distinction between civil law enforcement activities and the military's mission. There are a number of exceptions to the PCA, in place that allow military assistance to law enforcement activities, under specific circumstances (Chairman of the Joint Chiefs of Staff 1998b, I-4). DOD support to Counterdrug Operations and participation in homeland security are examples.

Sea Lines of Communication (SLOC). SLOCs are the maritime routes, which connect the source of a product, and its consumer. SLOCs are usually the most direct deep-water routes between trading nations. The Strait of Malacca, Strait of Gibraltar, Strait of Hormuz, Suez Canal, and Panama Canal are some of the world heaviest use SLOCs. SLOCs have both a civilian and military component. For the civilian mariner, transiting the SLOC's is the method in which they deliver their civilian cargo and carry on normal commerce. For the military mariner, the SLOCs are the sea routes, which connect the operating force with their supply and support bases, on which forces and materiel are delivered.

Thesis Question

This thesis will evaluate the operational and financial viability of the United States Navy developing and maintaining a small fleet of fast patrol boats specially designed to operate in the littorals during low and medium intensity conflicts. The study will answer the following question: Should the Navy build and maintain a small number of fast patrol boats specifically for littoral operations? This serves as the primary question for this thesis.

Prior to undertaking to answer the primary question a number of other related questions (secondary and subsequent levels) must be answered to provide a foundation for an educated discussion of the subject manner. Among those questions the following are paramount:

1. Is the United States Navy likely to conduct littoral operations in the future?
2. Do FPBs have a key role in littoral operations?
3. Is there an operational benefit to employing a FPB during littoral operations?

a. Historically how have FPBs performed in MIF/CN operations compared to their blue-water optimized counter-parts?

4. What are the budgetary impacts the Navy of maintaining FPBs for operations in the littoral?

a. What are the per hull procurement costs for a FPB (PC-1)?

b. What are the per hull procurement costs associated with a blue-water surface combatant (FFG-7), currently in the force structure?

c. What are the per hull operations and maintenance costs associated with a FPB (PC-1)?

d. What are the per hull operations and maintenance costs associated with a blue-water surface combatants (FFG-7), currently in the force structure?

5. What are the tactical considerations when considering employing a Cyclone or Perry class?

Limitations and Delimitations

Public information available through the United States Army Combined Arms Research Library (CARL), including interlibrary loan, and electronic media will form the majority of the research materiel for this study. When possible, primary sources available from United States Government sources, including United States Navy, United States Special Operations Command and the Government Accounting Office will be utilized. When not, secondary sources will be evaluated for relevancy and used if they provide added value to this study. In keeping with the intent of producing an unclassified thesis, no classified information will be in this study.

This study will evaluate the feasibility of maintaining a small fleet of specially-designed, surface combatants (fast patrol boats) for conducting littoral operations in a low intensity environment from a financial and operational standpoint. While not specifically designed for the mission, or designated as an FPB, the Cyclone (PC-1) class patrol coastal will be compared to the larger, blue-water, surface combatants. This study will use Cyclone class for comparison, due in large part to the availability of operational histories. No attempt will be made to evaluate the theoretical operational performance of future designs or even those that sail the world's oceans under the flags of foreign navies. This study is being conducted to evaluate the specialized platform's feasibility in a low intensity environment. No effort will be made to compare or contrast the separate hull forms damage control or survivability characteristics or their potential for conducting offensive operations against a near peer navy in an open ocean environment. Other areas of study including; the effect of building and maintaining a fleet of FPBs on the U.S. ship building industry, increased command opportunities for junior officers, and the command and control of small combatants, are simply beyond the scope of this thesis and will not be addressed.

[1]This approximation was accomplished by summing the total number of active cruisers, destroyers and frigates in the force structure. All warships are theoretically capable of performing the mission, but due to their operational characteristics (size, maneuverability, speed, mission) they are considered unsuitable. Thus, other ship classes are excluded from the total.

CHAPTER 2

LITERATURE REVIEW

This chapter will analyze the available documentation, lessons learned, and DOD planning and operational guidance to be used when comparing FPB and FFG hull utility for the twenty-first century Navy. By analyzing the available information, one may make a determination whether the United States Navy should build and maintain a small fleet of surface combatants optimized for use in the littoral environment.

While no absolute outline for the future of the Navy exists, the Navy's vision statement contained in *Forward...From the Sea* provides the basis for which the Navy of today is making decisions about the Navy of tomorrow. *Forward...From the Sea* provides the Navy with its strategic vision, by addressing the current operational environment and projecting it into the future (U.S. Navy 1994, 1). This document delineates what Navy leadership considers the service's primary contributions to national security (U.S. Navy 1994, 3). These documents, along with the *2001 Quadrennial Defense Review,* provide the basis for determining the likely roles and mission the Navy will undertake in the immediate future (Secretary of Defense 2001, 27).

The concept of maintaining a small surface combatant for operations in the littoral is a very contentious topic for the Navy today. The debate has polarized those who favor fewer, larger ships and those in favor of a greater number of smaller ships. Those who favor larger, more complex ships argue that technological advantages associated with the larger platforms mitigate the reduction in numbers created by their cost. Those in favor of the use of smaller ships believe in the inherent value provided by the use of more numerous, but less capable weapon systems. As with most debates in the public forum,

there is a significant volume of literature being published on the subject. Most of the work explores the optimal force structure needed to support the current and future operating environments. One of the most influential voices in the debate has been Vice Admiral Arthur Cebrowski, USN (retired), director of the DOD's Office of Transformation.

Admiral Cebrowski, in conjunction with Captain Wayne P Hughes, USN (retired), (Naval Post Graduate School--Monterey California) has published a significant amount of tactical, technical, and scholarly literature on the subject of a smaller surface combatants place in the twenty-first century Navy. They have, in coordination, published a significant volume of work on their Street-fighter design (Cebrowski and Hughes 1999, 37-38). Their Street-fighter design is a small combatant (2000-3000 tons), with considerable capabilities in all surface warfare competencies (Freedberg 2001, 1). The conceptual ship is designed for medium to high intensity conflict, and is inexpensive enough to allow construction of a significant number of ships within the constraints of projected ship building budgets. It is designed to be capable in all the traditional blue-water mission areas (Anti-Surface Warfare, Anti-Air Warfare, and Underseas Warfare), and have strike capability with the Tomahawk missile system, while maintaining the capability to operate in the littoral. While the Street-fighter project and this study are not explicitly related, they do share a number of common threads including the evaluating maintaining a fleet of smaller, less costly surface combatants for future engagements. The Cyclone and Street-fighter are however, completely different in operational characteristics and the financial burden placed upon the Navy to build and maintain these ships. The *Cyclone* was commissioned as a thirty million-dollar ship, manned with

thirty-five personnel, and only equipped for operations in the littoral (Gourley 1996, 1). Admiral Cebrowski envisions the Street-fighter as a blue-water capable, littoral combatant, crewed by approximately one-hundred sailors with a cost several times that of a *Cyclone* (Jaffe 2001, 1).

VADM (ret) Arthur K. Cebrowski, currently head of the DOD's office of force transformation, spent the final tour of his thirty-seven-year naval career as president of the Naval War College in Newport, R.I. Previous assignments as a naval aviator included combat tours in Vietnam and the Persian Gulf, and command of an air wing, an assault ship and two aircraft carriers. As a flag officer, he became a policy expert on the Joint Staff and the Navy staff in the areas of command, control, communications and computers. CAPT (ret) Wayne P. Hughes teaches tactical analysis at the Naval Post Graduate School (NPS) in Monterey, California. An NPS professor since 1979, he previously held the chairs of applied systems analysis and tactical analysis. While at NPS he has published several articles and books including Fleet Tactics (1980) and Fleet Tactics and Coastal Combat (2000). During his thirty-one years of active service, he served as an operations analyst on three fleet staffs, and commanded a minesweeper and a destroyer (Hughes 2000c, 1).

The *United States Naval Institute Proceedings* and *Naval War College Review* have published numerous articles in recent years, presenting various theories and suppositions about the track the Navy should take in dealing with its problems fighting the littoral battle. Unfortunately, most articles, as well as trends in United States Navy procurement have focused on adapting the Cold War legacy force structure to the post Cold War national security strategy. Several articles champion the use of platforms as

varied as frigates, submarines, and carriers in a littoral warfare role. In general they do not evolve into the bold and somewhat controversial direction, toward the small-dedicated littoral warfare platform. The United States Naval Institute and The United States Naval War College, the publishers of these articles, are considered by most to be the foremost authorities on American naval thought.

Because this study addresses operational United States Navy ships, not theoretical or foreign designs for comparison, there is a great deal of statistical data available from United States Government sources. At least one government organization has captured and recorded almost every aspect of each design's history. The United States Government Accounting Office (GAO) has published reports on the Navy's efforts to develop the capabilities to operate in the littoral (U.S. Congress 2001a, 1). The GAO has also analyzed the financial pressures placed on the Navy's current and future force structure (U.S. Congress 1997, 1). In addition, the GAO has submitted to Congress several reports on both the feasibility and relevancy of current force structure and programmed shipbuilding efforts. The United States Navy's Naval Center for Cost Analysis has published a major volume on the financial aspects of each ship type (Naval Center for Cost Analyses 2001a, b). These sources provide the raw data needed to facilitate a factual, vice theoretical, evaluation of the thesis.

In addition to the work being conducted in the United States exploring the procurement of small combatants optimized for littoral conditions, the Canadian Forces Command and Staff College has published a discussion on the future of small combatants in twenty-first century Canadian Navy. LCDR R.J. Hitesman, Royal Canadian Navy, authored one of the more detailed studies with his *Fast Patrol Boats: A Necessary*

Addition to Canada's Maritime Force Structure. In his study Hitesman looks at capabilities requirements, as delineated in Canada's *Defence White Pape*r (1998), and compares them with the Canadian Navy's current force structure. He argues that the Canadian Navy has maintained, and built upon its Cold War legacy force structure to meet post Cold War security requirements (Hitesman 1998, 2). Hitesman examines the current Canadian national maritime strategy, its roles and missions, and delineates the capabilities required to accomplish those missions (Hitesman 1998, 5). He argues that when a high capability Canadian Navy ship conducts a mission that does not require its capabilities, that an uneconomical capability excess exist. He concludes that economic constraints do not allow the procurement of a sufficient number of high technology, high cost ships to meet mission requirements. He proposes that the Royal Canadian Defense Forces (Navy) reprogram some procurement funds to develop low cost FPBs to fill low threat MOOTW missions (Hitesman 1998, 10). Reprogramming in this way would allow higher technology ships to concentrate on missions that require their added capabilities. While subject is outwardly the same as in this study, significant differences do exist with respective nation's security environment and thus security requirements.

While a discussion the FPB's role in past and future naval operations has been well documented, the FPB's role in the evolving mission area of homeland security has not. After the attacks of 11 September 2001, each of the military services has struggled to define its role and mission in homeland security. The Navy, for its part, commissioned a report by the Center for Naval Analyses to better delineate its roles. Their report, entitled *Navy Role in Homeland Defense Against Asymmetric Threats* stated the service's

responsibility was to defend the homeland against the symmetric threats of: mines, submarines, surface combatants and cruise missile launching platforms (Center for Naval Analyses 2001, 4). The report argued that the Coast Guard's law enforcement powers, gave it the jurisdiction, and made it the only relevant force for littoral maritime security. In view of the events of 11 September and the bottom-up reevaluation of the DOD's role in homeland security, the ultimate disposition of this discussion is in doubt.

As with most issues in the public domain there is a great volume of work being published on an almost daily basis on the subject. Opinions of the opposing sides in the argument, and the annals of ongoing operations provide insight into the debate. As with most current and changing debates there is no clear consensus among the contributors. Newspapers and defense industry journals as varied as the *Wall Street Journal* and *Jane's Defense News* have published articles within the last year on the future of small combatants in the twenty-first century Navy. In general, the available literature, while not authoritative in nature, provides a more than adequate basis for this study.

CHAPTER 3

RESEARCH METHODOLOGY

This thesis evaluates the operational and financial viability of the United States Navy developing and maintaining a small fleet of fast patrol boats (FPBs) specially designed to operate in the littorals in support of MOOTW and low intensity conflict. The research methodology in this study is designed to answer the basic question proposed in this thesis. Should the Navy build and maintain a small fleet of fast patrol boats specifically for littoral operations? In addition to the primary question, the following secondary questions are addressed: Is there an operational benefit to employing a FPB during littoral operations? What are the financial impacts the Navy of maintaining FPBs for operations in the littoral? What are the tactical considerations when considering employment of an FPB?

The internal assumptions are: the required operational capabilities and projected operational environment as outlined in DOD guidance will remain valid, that no near peer competitor will develop for the United States Navy before 2020, and that funds available for shipbuilding (Ship Construction--Navy (SCN)) and operations (Operations and Maintenance--Navy (OMN)) will not increase significantly in the near future. If any of these assumptions proves untrue in the future, the validity of this study may come into question.

The first step in answering this thesis's primary question is to determine if a requirement exists, and will continue to exist, for United States Navy surface combatants to operate in the littoral. An examination of White House and DOD planning guidance was made to answer this question. By examining stated doctrine and policy such as the

"National Security Strategy, National Military Strategy, 2001" *Quadrennial Defense Review Report* and the United States Navy's vision statements included in *Forward…From the Sea*, this study seeks to determined whether, or not the requirement to operate in the littoral exists. If there is no clear requirement, the practical significance of the rest of the study is removed.

On determining that documentation validated the future requirement to operate in the littoral, the next step was to determine the likely operating environment and missions. The 2001 *Quadrennial Defense Review Report* was utilized to refine the geo-political arena in which the United States Navy will likely be called upon to operate in the future. An understanding not only of the political environment, but also the geographic composition of the area, required capabilities and the likely threats, are required before one can determine the types of capabilities best suited for the environment. *The World Fact Book 2001*, published by the Central Intelligence Agency (CIA), provides the bulk of the geo-political information on the anticipated region. The military capabilities, and thus military threat, resident in the anticipated area of littoral regions were analyzed using various publications from Janes Information Group Ltd., including *Janes Fighting Ships*, *Janes Weapon Systems*, and *Janes All the World's Aircraft*, as the predominant sources of information. The publications from Janes Information Group Ltd. provide a recognized open source for worldwide defense related materiel. Open source information is used to maintain this thesis unclassified.

Once the likely operating environment was codified an analysis of the likely missions was made using the traditional United States Navy mission areas of sea control, power projection and presence to provide a framework. Special emphasis was given to

those missions, which fall into the genre of MOOTW. The projected operating environment, as delineated by current doctrine, was used to provide a representative sample, and not to provide a definitive set of likely missions.

Once a study of the projected operating environment, and likely mission requirements was made, this study examines the characteristics and capabilities of various current surface combatants and identified those optimal for operations in the littoral. The relevancy of a small, shallow draft surface combatant (FPB) optimized for littoral operations is evaluated along several avenues. Most evaluations were made using comparisons between the existing United States Navy Cyclone (PC-1) class patrol coastal and Oliver Hazard Perry (FFG-7) class guided missile frigates. The two classes of ships are representative of the two broad genres of surface ships being evaluated in this study.

The Cyclone is accurately described as a fast patrol boat, while the Perry class frigates are representative of the vast majority of blue-water optimized ships in the world's navies. The Cyclones are the only remaining class of fast patrol boats in commission in the United States Navy, thus they were chosen for evaluation by default. The Perrys (4064 tons) were chosen for comparison because; they are, next to the Cyclone class (334 tons), the smallest, shallowest draft, most maneuverable surface combatant in the Navy's arsenal. Additionally, using the Perry's for comparison delimits the missions of naval surface fire support (NSFS) and precision strike via the Tomahawk missile system from this thesis, as neither platform is capable of either mission. A detailed cost analysis of each ship type was made using data in all relevant funding categories, including initial procurement cost (SCN), operational and maintenance-Navy (OMN), and personnel cost (OPN). This data is, almost exclusively be drawn from

official Navy, and General Accounting Office sources. This financial data served as the basis for a total cost of ownership comparison of the two hull types. The financial data also provided the entering point for discussions about affordability as part of force structure determination, and as a measure of cost effectiveness for each ship type. Numerous ship configurations within each class precipitate significant differences in initial procurement cost, operating cost, and capabilities. For the purposes of this thesis, only the most updated configurations (active duty, Flight II guided missile frigates, and well deck configured patrol coastals) were used. Limited comparisons were made using operational characteristics of other surface combatants, including the United States Navy's Ticonderoga (CG-47) class guided missile cruisers and the Royal Norwegian Navy's Skjold class coastal patrol ship.

Once the applicable operational and financial data was assimilated and analyzed, it was used to evaluate the feasibility of the navy developing and maintaining a fleet of FPBs for littoral use. The intention was to not simply enter into the perpetual high cost (technology)-low numbers or low cost (technology)-high numbers argument, but to evaluate the impact, both operational and financially, of maintaining a small fleet of specially designed ships for use in the littoral environment using proven designs with well documented histories.

Each ship type’s performance was analyzed using historical data from missions that most closely replicate those derived from this thesis’ study of the projected operating environment. Each ship type’s documented employment history in the Arabian Gulf and Caribbean Sea areas of operation was used to compare operational performance. No

attempt was made to evaluate the theoretical operational performance of future designs or even those that sail the world's oceans under the flag of foreign navies.

In addition to the likely missions derived from the projected operating environment, a study of each ship type's performance and potential in the homeland security role was made. In the wake of 11 September 2001, terrorist attacks the United States Navy, like the rest of the armed services, has assumed an active role in homeland security. The Navy has not codified the service's exact role in homeland security, due in large part to the past-perceived restrictions under the Posse Comitatus Act of 1878. Due to a lack of Navy strategic vision for homeland security, this study has utilized current operations for a model of likely future requirements.

This study was conducted to evaluate the specialized platform's feasibility in a low intensity environment, and thus no effort has been made to compare or contrast the separate hull forms damage control or survivability characteristics or their potential for conducting offensive operations against a near peer navy in a open ocean environment. Other areas, including, the effect of building and maintaining a fleet of FPBs on the ship building industry, increased command opportunities for junior officers, command and control of small combatants, are simply beyond the scope of this thesis and were not addressed.

Public information available through the Combined Arms Research Library (CARL), including interlibrary loan, and electronic media formed the majority of the research materiel for this study. When possible, primary data available from United States Government sources, including United States Navy, United States Special Operations Command and the Government Accounting Office were utilized. When not,

secondary data has been evaluated for its relevancy, and used if it provided value added to this study. In keeping with the intent of producing an unclassified thesis, no classified data has been used.

CHAPTER 4

ANALYSIS

With the 1992 publication of *…From the Sea*, the United States Navy shifted its strategic vision toward the littoral. The Chief of Naval Operations published this vision to take the service beyond the Cold War and into the twenty-first century. *…From the Sea* signaled a change in focus for the service away from operations on the high seas and toward employment of naval forces in the littoral (U.S. Navy 1994, 1). With *…From the Sea*, the Navy redefined how it proposed to contribute to national security, shifting the service's justification for American naval power from destroying the enemy's fleet and controlling the high seas to a littoral strategy which focused on full spectrum operations in support American's regional engagement challenges (Rhodes 1999, 2). The absence of a challenge for command of the sea made this shift possible.

Forward…From the Sea, published in 1994, refined the Navy's *…From the Sea* delineated strategic vision. This refinement updated and expanded the strategic concept articulated in *…From the Sea*, and reaffirmed the Navy's orientation toward the littoral. The coastal waters of the world compromise only five percent of the earth's surface (Miller 1986, 176). This area seems insignificant when compared to the sixty-eight percent of the earth covered by the ocean's blue-waters, yet it is in these coastal, or littoral waters, that the vast majority of the world's trade, commerce, and naval activity occurs.

…From the Sea and *Forward…From the Sea* leave little doubt that the intended post Cold War focus for the Navy, both in peacetime and in wartime, is the littoral. The idea that the United States Navy must be able to operate in the littoral, and project power

from it, is not a post Cold War development as these vision statements might suggest. Littoral operations have, in fact, have been recurring events throughout the Navy's history. While the Navy has always maintained a blue-water capability, only in the bi-polar world of the Cold War, did the Navy nearly abandon the littorals for the open ocean**.** During the Cold War, the Navy returned to its littoral roots only when forced to by emerging crises, such as Korea and Vietnam.

Likely Operating Environment

From the Sea and *Forward…From the Sea* clearly articulate the Navy's future operating environment as in the littoral, in support of regional engagement challenges. They, however, do not further articulate the anticipated operating regions, nor its geographical composition. The *2001 Quadrennial Defense Review Report*, however, leaves little doubt as to the anticipated location of the most likely regional challenges, and, thus, Navy operating environment. It states:

Although the United States will not face a peer competitor in the near future, the potential exists for regional powers to develop sufficient capabilities to threaten stability in regions critical to U.S. interest. In particular, Asia is gradually emerging as a region susceptible to large--scale military competition. Along a broad arc of instability that stretches from the Middle East to Northeast Asia, the region contains a volatile mix of rising and declining regional powers. The East Asian littoral--from the Bay of Bengal to the Sea of Japan--represents a particularly challenging area. (Secretary of Defense 2001, 4)

To gain a better understanding of the Navy's operating environment and roles in the 2001 Quadrennial Defense Review Report projected operating arena, it is necessary to look at the geo-political composition of the area. The arc of instability includes twenty-six nations, of which twenty-four are coastal. Only Afghanistan and Laos are landlocked. It includes a majority of the world's oil reserves, the huge populations of the Indian Subcontinent, and the industrial powers of Northeast Asia. Geographically speaking, every nation in the East Asian littoral is a coastal nation. While the East Asian littoral is not the only possible arena of operations, it is representative of the most logical and challenging eventualities. The Indonesian Archipelago, the heart of the East Asian littoral, is the focus of this analysis.

TABLE 1

INDONESIAN ARCHIPELAGO, GEOGRAPHIC

COMPOSITION AND MERCHANT FLEET

	Population (millions)	Coastline (Km)	Islands	Merchant vessels	Merchant DWT*
Indonesia	228.5	54,716	17,508	609	3,723,933
Malaysia	22.3	4,675	809	362	7,574,999
Philippines	82.9	36,289	7,106	459	8,512,326
Singapore	4.3	193	58	879	33,215,317
Brunei	.4	161	7	7	340,635
New Guinea	5.0	5,152	690	20	51,096
Spratley Islands (Contested)	0	926	300	0	0
Total	343.4	102,112	26,478	2,336	53,418,306
United States	278	19,924	-	376	14,416,517

Source: Central Intelligence Agency 2002.
*Dead Weight Tons (DWT) is a nautical term used to quantify the size of a vessel and merchant fleets.

The Indonesian Archipelago is a vast conglomeration of islands and coastal waters extending along the north coast of Australia, from the Bay of Bengal to the Coral Sea. The area encompasses six major nations (Indonesia, Malaysia, Philippines, Singapore, Brunei Darussalam, and Papua New Guinea), and several smaller island nations. The six major nations have a population base of 343 million people, including Indonesia, which has the world's largest Muslim population (228 million). The 26,000 islands of the Archipelago have a combined coastline of 102,000 kilometers, over 5 times that of the continental United States.

Fig. 1. Map of the Indonesian Archipelago. Source: University of Texas 2002.

The Indonesian Archipelago is also home of world's highest density of commercial maritime traffic. Nearly eighty percent of the world's commerce passes through the Straits of Malacca and into the South China Sea. Almost all of the hydrocarbons produced in the Middle East pass through the area on its way to fuel the economies of Japan and South Korea. In addition to the inter-regional maritime traffic, the nations of the Archipelago possess significant open ocean merchant marine fleets. Collectively the fleets are 6 times the size of the American fleet in numbers (2,336 vs. 376), and 4 times the size in tonnage (53.4 million tons vs. 14.4 million tons). These factors combined with the countless thousands of smaller inter-island trading craft that sail the Archipelago's waters, create an extremely congested, sometimes hazardous maritime environment. General Carl E. Mundy, former commandant of the Marine Corps, summed up this operating environment in his 1994 *Joint Forces Quarterly* article when he added:

> Operations in the often compressed battle space of littoral regions hinder multilayered defense. The broad array of military threats, air and surface traffic congestion, and natural forces complicate littoral force employment, especially command and control. Moreover, employment is likely to be in congested littoral areas, with crowded shipping lanes and civilian air corridors, combined with problems of uncharted shallows. (Mundy 1994, 47)

America's national interest in the Indonesian Archipelago is as varied as the islands are themselves. The United States has a mutual defense treaty with the Philippines (Flournoy 2000, 251). American forces are permanently stationed in Singapore, implying an interest in Singaporean national defense. The Republic is

dedicated to supporting democratically elected regimes around the world (President of the United States 2000, 1). Indonesia, The Philippines, Malaysia, and Papua New Guinea all have insurgents actively trying challenge their governments. Indonesia has already experienced a bitter war of secession in East Timor. Many of the secessionist organizations have well documented ties with, and the support of, international terrorist organizations. A collapse of any of these nations would be detrimental to American interests. There is a danger that it would result in the spread of sectarian violence in the region, massive refugee relocations, and a security threat to the world's merchant fleets as they transit the Strait of Malacca and South China Sea. Additionally, the chaos associated with a governments collapse would certainly facilitate the presence and security of international terrorist organizations.

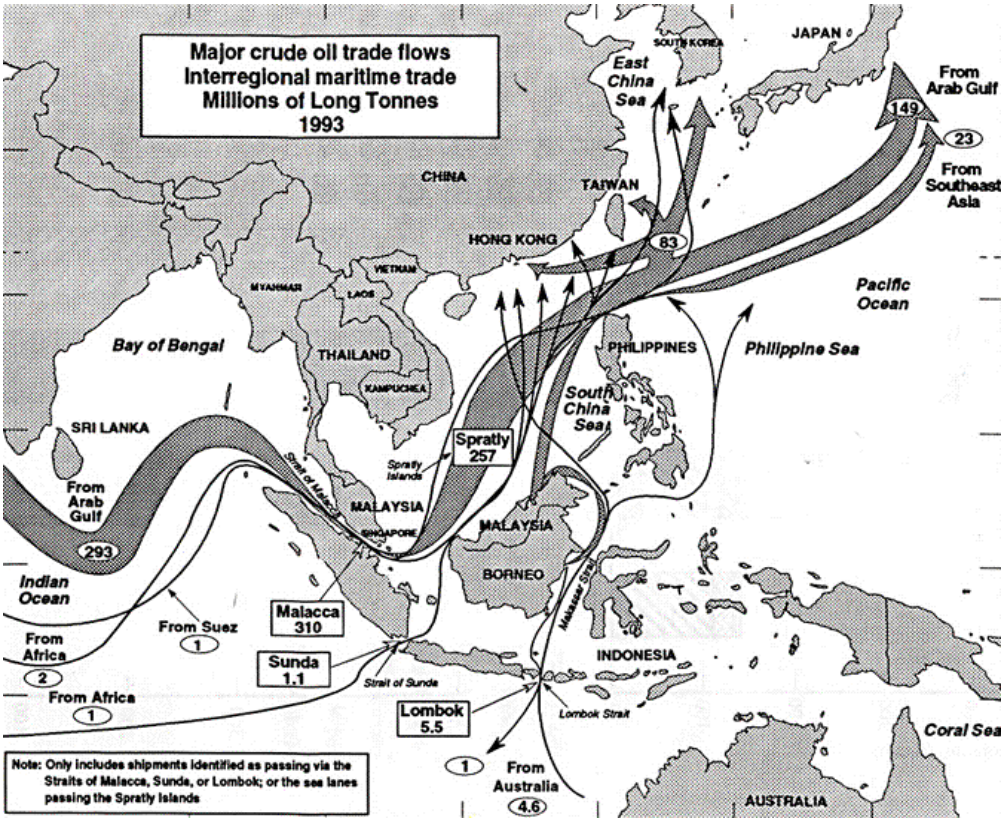

Fig. 2. Indonesian Archipelago SLOCs. Source: United States Energy Information Administration 2002.

The United States certainly has an interest in maintaining freedom of navigation through the areas vital sea-lanes of communication (Secretary of Defense 2001, 2). The Strait of Malacca, the sea-lane lying between Peninsular Malaysia and Indonesian Sumatra, is the primary trade route for between the oil rich areas of the Arabian Gulf and the economic powers of Northeast Asia. An interruption of the flow of the hydrocarbons from the Arabian Gulf through the area would be ruinous to the economies of Japan, Taiwan, and South Korea, and have significant negative impact on America's (President of the United States 2000, 18). In addition to the Arabian Gulf-Northeast Asia commerce, American merchant and naval vessels transit the area enroute from America's Pacific coast to the Indian Ocean and further onward to the Arabian Gulf. The United States has stated that the preservation of sea-lines of communication is critical to the national security, and global security (President of the United States 2000, 18). In turn, America is likely to act if any nation or extra-national organization threatens them. As long as the United States is a maritime and trading nation with global interest, the nation will have a stake in maintaining freedom of navigation, and insured access to the world's markets.

The Indonesian Archipelago has become a haven for terrorism, including some linked to the Al-Queda (Blair 2001a, 1). Every nation in the area has experienced some

form of Islamic terrorism in the immediate past. Indonesia with its 220 million plus Muslims, weak central government, rampant corruption, and porous borders is ripe for extremist activities. The Moro Islamic Liberation Front and Abu Sayyaf organizations are active in the Southern Philippines. Terrorism originating from the Archipelago is not only an internal or regional problem, but has had a significant impact on the rest of the world, including America. The area has historically been used as a base to plot attacks against American interests (Blair 2001b, 1). The 11 September 2001 attacks on America appear to have been at least partially organized in Malaysia. Singaporean officials thwarted a terrorist attack on the American Embassy and United States Navy visiting ships and personnel in December 2001. Kuala Lumpur, Malaysia and Jakarta, Indonesia have been used as transit points for terrorist on their way to the United States (Blair 2001a, 2). With America's stated goal of eliminating terrorism worldwide, as a focal point, America's interest in this area appears clear and undisputable.

Likely Missions

President Bush has dubbed the twenty-first century as "the Asian century." The *2001 Quadrennial Defense Review Report* clearly shifts the military's focus toward Asia, and the challenges the region presents. United States military engagement in Asia appears certain to increase in the foreseeable future. Likewise, it appears certain that the United States Navy's involvement in the Indonesian Archipelago will also increase. The *2001 Quadrennial Defense Review Report* directed the Navy to increase Navy presence in the area, and to explore the forward basing of surface combatants into the area (Secretary of Defense 2001, 27). What may not be clear are the likely missions the United States Navy will be called upon to conduct. An analysis of the area using the

traditional mission areas of sea control, power projection, and presence, as a framework, provides some insight.

In the area of sea control, the United States Navy is virtually assured of command of the blue-water portions of the world's oceans. The Indonesian Archipelago is not an exception. There is no near peer competitor for the United States Navy, nor is one likely to develop over the next twenty years. In Asia, only China, Japan, India and Indonesia have blue-water capabilities. And only China with its two Russian built Sovremmenny class destroyers, Hangzhou and Fuzhouz, has the capability to present a credible threat to an American carrier battle group. They are unlikely to directly challenge the Navy for control of the seas due to the United States Navy's overwhelming technological superiority. The possibility of large-scale navy-to-navy conflict appears remote. It is much more likely that the United States Navy will be called upon to conduct MOOTW such as, combating terrorism, DOD support to counterdrug operations, enforcement of sanctions, or enforcing exclusion zones (Chairman of the Joint Chiefs of Staff 1995, iv).

TABLE 2

INDONESIAN ARCHIPELAGO NAVAL CAPABILITIES

	FPB	FF/FFG	DD/DDG	CG	SS	SSN	CV/CVN
China	304	41	21		38	7	
India	36	28	8		19		1
Indonesia	38	14			2		
Korea (North)	76	1			28		
Korea (South)	88	32	8		9		
Malaysia	18	4			2		
Philippines	14	11					
Singapore	18				4		
Thailand	16	34					1

Vietnam	22	5					
U.S.	13	35	52	27		81	12

Source: Saunders 2001.

The most likely scenario has the United States Navy operating in the area to stem the flow of insurgents or supporting an embargo of weapons, drug, or oil, against one of the nations in the region. Admiral Dennis Blair (Commander and Chief, United States Pacific Command) testified to Congress "countering terrorism, weapons proliferation illegal drug trafficking, and piracy represent problems that require regional [Indonesian Archipelago] cooperation" (U.S. Congress Senate 2001f, 32). The war against terrorism that has taken United States Army forces to the islands of the Southern Philippines should serve as a clear and unambiguous indication of the potential for United States Navy involvement in the surrounding waters. Terrorist groups such as the Moro Islamic Liberation Front and Abu Sayyaf in the Southern Philippines, North Central Indonesia, and Northeastern Malaysia are known to use small vessels to trade weapons and materiel with other terrorist organizations in (Blair 2001a, 2). Admiral Blair summed up the problematic situation in the area when he stated "When you have three countries coming together with a big water border and not a lot of patrol capability, it's definitively a regional, if not international problem and the bad guys fully exploit it" (Blair 2001a, 2).

Power projection is the ability to rapidly and effectively deploy and sustain U.S. Forces in and from multiple dispersed locations (Chairman of the Joint Chiefs of Staff 1997b, 14). The American military is capable of projecting power to every corner of the world assuming it has access to the surrounding waters. According to the Department of the Navy, the primary purpose of the forward-deployed Navy is to project power from the

sea, to influence events ashore (U.S. Congress House 2001a, 2). While some in the Navy may consider the services primary contribution to power projection to be a function of the Tomahawk missile or carrier based aviation, it is not. Providing secure sealift is the Navy's primary and fundamental contribution to the joint fight. Historically, sealift has accounted for ninety to ninety-five percent of the cargo requirement during American military operations (U.S. Navy 2000, 24). The lessons learned from Operation Desert Storm, in which over ninety-five percent of war materials flowed via sealift, demonstrate the criticality of access to the world's littorals in time of crisis. Control of the littorals is a prerequisite to controlling the challenges of conventional land warfare and the projection of naval power ashore (U.S. Congress House 2001a, 2). The navies and non-national organizations of the region are not in a position to contest the United States Navy's free use of the open ocean. They are, however capable of challenging use of the littorals and of precluding the free flow of maritime trade, and military forces through the regions sea-lines of communication. It is doubtful that future adversaries will make the same mistake Iraq made in 1990, by not challenging the build up of forces until the outcome of the conflict was inevitable.

When the United States military is called upon to project and sustain combat power again anywhere in South or Southwest Asia, the Navy will be required to temporarily control the regions littorals as forces flow through. If the area of operations is in the Indonesian Archipelago itself, a less mature theater of operations, control of the littorals for access purposes is required for the duration of the operation. Any challenge to American military access is unlikely to come from a blue-water capable force. The United States Navy's technological superiority is simply too great for an adversary to risk

the loss of a major combatant in pursuit of an anti-access agenda. The challenge is likely to come from lower technology options such as mines, swarms of small craft, or simple piracy. The region's geography, with its 26,000 islands providing ideal operating bases for small craft, and the long, physically constraining Strait of Malacca, make it ideal for the employment of this type of anti-access strategy. With the documented historical ties between piracy and terrorism in the Archipelago it is logical that these measures will be used. In almost any contingency in South or Southwest Asia the United States Navy will be called upon to conduct the MOOTW missions of ensuring freedom of navigation and protection of shipping in the Archipelago (Chairman of the Joint Chiefs of Staff 1995, iv).

Overseas presence is the visible posture of U.S. forces and infrastructure strategically positioned forward, in or near key areas (Chairman of the Joint Chiefs of Staff 1997b, 14). American military presence promotes national influence, guarantees access to critical areas and promotes collective security (U.S. Navy 2000, 20). The United States Navy, as the nation's expeditionary service, is the embodiment of regional military engagement (Chairman of the Joint Chiefs of Staff 1997b, 14). The presence of a United States Navy warship off a nation's coast, or in one of its ports is a clear and unambiguous demonstration of America's national interest in the area. Multinational naval training develops interoperability and rapport between the coalition naval services. Nowhere is the necessity for the Navy's presence any clearer than in the East Asian Littoral. Admiral Blair (CINCPAC) delineated his priorities for presence and thus engagement when he declared to Congress:

By developing capabilities to work effectively as coalitions in complex contingencies (such as East Timor); as partners in countering terrorism, illegal drug trafficking, and piracy; in managing the consequences of chemical, biological or nuclear attacks, natural disasters and accidents; in search and rescue of mariners in distress; in providing humanitarian assistance the armed forces of the region improve their readiness. It provides a way [for the United States] to exert more influence in the region . . . and contribute to regional security. And, it provides the United States with competent coalition partners so that our armed forces need not shoulder the entire load. (U.S. Congress Senate 2001f, 33-34)

While not all of the focus areas delineated by Admiral Blair necessarily lend themselves to surface Navy ships, some certainly do. Countering terrorism, illegal drug trafficking, and piracy are all at least partially forms of sea control, and mission areas ideally suited for the surface Navy. Additionally, humanitarian assistance and the search and rescue for mariners in distress are core mission areas for the Navy.

While the missions listed above are couched in the context of the Indonesian Archipelago, they are equally germane in the rest of the world, especially in the littorals. The dearth of blue-water optimized navies, capable of challenging the United States Navy for command of the open ocean is not an Asian specific phenomenon. There is no navy in the world, nor is there likely to be one for the next two decades that possesses those capabilities. Counter-terrorism missions are possible almost anywhere, and underway today, in the Indian Ocean and the Mediterranean Sea. The Navy is providing ongoing DOD support to counterdrug missions in the Caribbean Sea, Pacific Ocean, and

Arabian Gulf. In fact, the MOOTW missions of; combating terrorism, DOD support to counterdrug operations, enforcement of sanctions, enforcing exclusion zones, ensuring freedom of navigation, protection of shipping, and show of force operations are likely to be the preponderance of the Navy's deployed missions, for the foreseeable future.

Platform Comparison

If the United States Navy is going to conduct MOOTW in the littoral environment, the service needs to develop and maintain the force structure to complete the task. The following provides a description of the two broad types of surface ships, currently in use by the Navy. The first platform discussed is the Cyclone class patrol coastal, which is representative of the general genre of fast patrol boats, in use by most of the world's navies. It is the only fast patrol boat in the United States Navy's inventory. The second platform discussed is the Perry class guided missile frigate, which is very representative of the world's blue-water combatants in size, weapons capabilities, and mission.

TABLE 3

FFG-7/PC-1 GENERAL CHARACTERISTICS

	FFG-7	PC-1
Length (feet)	453*	179**
Width (feet)	45	25
Draft (feet)	25	8
Displacement (tons)	4,100	387
Propulsion engines	2 (gas turbine)	4 (diesel)
Horsepower	41,000	14,600
Propellers	1	4
Speed (knots)	29	35+
Crew size	215***	28****

Sources: *Chief of Naval Information 2002a, 1. **Chief of Naval Information 2002b, 1. *** Enlisted Personnel Management Center 2001, 5.6. ****Enlisted Personnel Management Center 2002, 5.1.

Cyclone (PC-1) Class Patrol Coastal

The lessons learned from Operation Earnest Will, during the tanker wars of the late 1980s, were the genesis of the Cyclone class patrol coastal. Iranian Revolutionary Guard Corps Navy (IRGCN) patrol boats, armed with small arms and rocket propelled grenades were attacking commercial shipping as it passed through the Strait of Hormuz and in the Arabian Gulf. Specifically targeted were the very-large crude oil tankers, which carried forty-three percent of the world's, and seventy percent of Japan's oil. In response the United States, reflagged several Kuwaiti tankers and assigned the duties of escorting them to the United States Navy. The available force structure, an aging fleet of sixty-five-sixty-eight foot Vietnam era patrol boats and their blue-water counterparts, proved unsuitable. To fill this gap in capabilities, Naval Special Warfare Command (NSWC) designed and commenced construction of its fleet of thirteen patrol coastals.

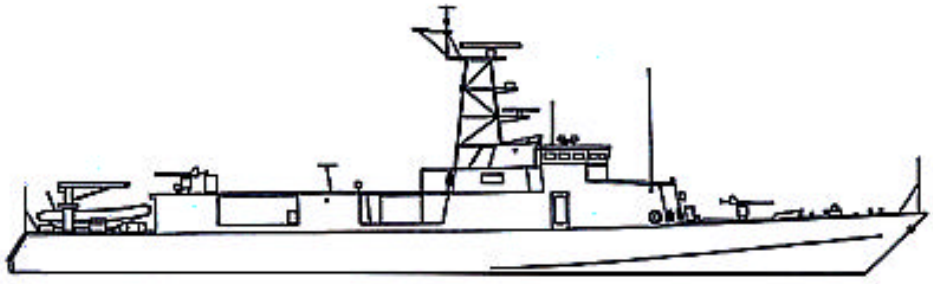

Fig. 3. Cyclone Class Profile. Source: Naval Historical Center 2002.

The first ship of the class, USS *Cyclone* (PC-1) was commissioned in 1993. The last ship of the class, USS *Tornado* (PC-14) was commissioned in 2000. Four of the PCs

are stationed in Coronado, California, and assigned to Special Boat Squadron One. The remaining nine are based in Little Creek, Virginia, under the operational control of Special Boat Squadron Two (Chief of Naval Information 2002b, 1). The lead ship of the class, *Cyclone* (PC 1), was decommissioned and turned over to the U.S. Coast Guard on 28 February 2000. The mandate to decommission *Cyclone* was provided by Congress who upon authorizing the construction of *Tornado* did not authorize a crew to man it. Upon decommissioning *Cyclone*, the crew stood up as the precommissioning crew for *Tornado.*

The 387 ton Cyclones are 179 feet long, 25 feet wide at the beam and draw 8 feet of water (Special Operations.Com 2001, 1). It has a cruising range of 6,800 nautical miles at 8 knots, and 2,900 nautical miles at 12 knots (Naval Surface Warfare Center 2000, 3). The ship is capable of speeds in excess of 35 knots. High-speed transits, however, have a dramatic effect on cruising range, consuming up to 3.9 percentage of total fuel per hour at maximum speed (Naval Surface Warfare Center 2000, 3). They have four propellers, driven by four diesel engines, capable of generating 14,600-horse power (Special Operations.Com 2001, 1). The relatively high horsepower to weight ratio make the Cyclones extremely responsive and maneuverable. The Cyclone silhouette is low and sleek when compared to blue-water combatants. It has less than six feet of freeboard. The structure is composed of obtuse angles and sloping sides to reduce radar cross-section. Thermal and acoustic signatures are reduced using waterline or underwater exhaust ports, instead of conventional topside exhaust stacks.

The Cyclones carry enough fuel, stores, and supplies for a normal underway period of ten days. The ships are capable of underway replenishment. Although the fleet

does not prefer the astern or dead in the water refueling methods, they are the only options realistically available to the PCs. The ships are designed to be fully operational through sea state three, and be able to survive through sea state five. They are equipped with fin stabilizers, but, during extended periods of high sea states, crew fatigue becomes a significant issue. Each ship is equipped to carry a NSW 11-meter Rigid Hull Inflatable Boat (RHIB), and two or more Combat Rubber Raiding Craft (CRRC). The 11-meter RHIB has a range of over 200 nautical miles, and is capable of speeds in excess of 46 knots.

The Cyclones are lightly armed when compared to foreign fast patrol boats of similar size. If confronted by almost any blue-water surface combatant, they are, defensively, at a serious disadvantage. Additionally they are almost totally defenseless against modern air threats. The ships are not equipped with an air search radar system, and rely on handheld stinger missiles and the Mark 52 decoy launching system for protection. Their main armament consist of a Mark 38, 25 millimeter chain gun forward and a Mark 96 stabilized gun mount aft (Hooten 2001, 829).

The Mark 38 machine gun system is an unstabilized, manually pointed, deck mounted 20 millimeter cannon with semi-automatic and automatic modes. In the automatic mode, the rate of fire is approximately 175 rounds per minute, with a maximum effective range of 2700 meters (Gandis 2001, 376). The Mark 96 stabilized mount includes the same 20 millimeter gun as the Mark 38 and a Mark 19 automatic grenade launcher. The Mark 19 grenade launcher fires 350 40 millimeter grenades per minute out to a range of 2,200 meters (Gandis 2001, 182). It can fire a variety of ammunition including armor piercing and high explosive. The stabilized mount allows

the operator greater accuracy, and the ability to choose between the two guns with the use of a toggle switch. In addition to the fixed mounts the Cyclones have five fixed pintels for mounting a variety of crew served weapons including; twin M2 .50 Caliber machine guns (combine rate of fire 1,100 rounds per minute, max effective range 2,000 meters), GAU-17A 7.62 millimeter mini-gun (6,000 rounds per minute, 1,500 meter maximum effective range), and the Mark 19 grenade launcher (Gandis 2001, 357,361). These weapons are designed to provide significant close range defense against patrol boats, swimmers, floating mines, and various targets ashore including, enemy personnel, lightly armored vehicles and terrorist threats.

TABLE 4

FFG-7/PC-1 COMMAND AND CONTROL CONFIGURATIONS

	FFG-7	PC-1
Surface search radar	AN/SPS-55, Furuno	Sperry 2500-314S, Sperry 2500M-27X
Air search radar	AN/SPS-49	none
Passive Sensors	AN/SLQ-32	Bobcat, Maritime Forward Looking Infrared (MARFLIR)
Data Link Capable	LINK-11, GCCS-M	GCCS-M
Cryptologic Configuration	none	Privateer
Sonar	AN/SQS-56, AN/SQR-19	Wesmar SS 460-8rgb
AAW weapons	SM-1 (MR), CIWS	Stinger
ASUW	RGM-84 *Harpoon*, Mk 75 76mm gun system, AGM-119 *Penguin*	Mk 38 25mm gun system, Mk 96 25mm/40mm gun system, GAU-17A, small

		arms
Decoy System	Mk 36 Decoy Launching System	Mk 52 Decoy launching System

By fast patrol boat standards, the Cyclones have an extremely robust command and control suite. They are capable of communicating on most naval communications circuits (VHF, UHF, HF, SHF satellite). Each ship is equipped with the Global Command and Control System--Maritime (GCCS-M) and SIPRNET. The Cyclones are equipped with two commercial surface search radar and systems, but no air search radar. Each ship possesses the WESMAR SS-460 sonar system which provides excellent mine avoidance capability. Additionally each Cyclone is configured with a cryptologic suite. Onboard systems are capable of electronic intelligence, signals intelligence, and communications intelligence (Hooten 2001, 829).

The Cyclones are by far the cheapest commissioned ships in the United States Navy. Each ship was delivered at an average cost of $30 million (36 million, adjusted to Fiscal Year 2002 dollars) (NAVSEA 2002,1). Total ownership cost for the ships average 5.5 million dollars per year. This relatively cheap cost, when compared to the FFG-7's $71 million ownership cost, resulted from the use of commercial, off the shelf, technology and the ship's small crew size.

Oliver Hazard Perry (FFG-7) Class Guided Missile Frigates

The Oliver Hazard Perry (FFG-7) class guided missile frigates were envisioned in the early 1970s as a low cost platform to primarily to provide open-ocean escort of amphibious ships and convoys in low to moderate threat environments in a global war

with the Soviet Union. They could also provide limited defense against anti-ship missiles extant in the 70s and 80s (Chief of Naval Information 2002a, 1). The first ship of the class, USS *Oliver Hazard Perry* (FFG-7), was commissioned in 1977. The last ship of the class, USS *Ingraham* (FFG-62), was commissioned in 1989. Sixteen FFGs are assigned to the Pacific Fleet, while twenty are assigned in to the Atlantic Fleet. Eighteen ships of the class have been decommissioned without replacement (Chief of Naval Information 2002a, 2). A Cold War legacy platform, they are scheduled to remain in the Navy's force structure through the year 2015. They will serve both as part of the carrier battle group and on independent deployments to conduct counter-narcotics, and show the flag operations.

The 4100 ton Perrys are 453 feet long, 45 feet wide at the beam and draw 25 feet of water (Chief of Naval Information 2002a, 2). The ships are capable of twenty-nine knots for extended durations. Each ship has one controlled reversible pitch propeller, driven by two General Electric LM-2500 gas turbine engines. Each ship is designed to carry two SH-60 LAMPS MK III Seahawk helicopters and one 7-meter RHIB. The Perrys enjoy a virtually unlimited duration at sea assuming underway replenishment.

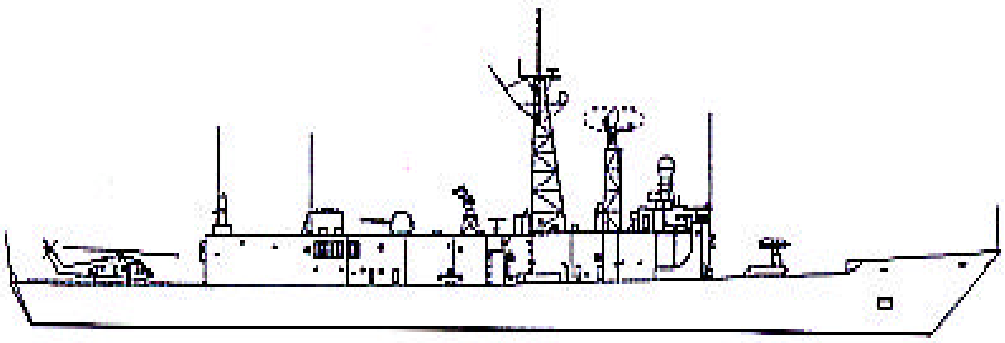

Fig. 4. Oliver Hazard Perry Class Profile. Source: Naval Historical Center 2002.

The Perrys are lightly armed when compared to the other United States Navy blue-water surface combatants. They are, however, similarly armed to a majority of the surface combatants resident in the rest of the world's navies. Designed to counter Soviet submarines during the Cold War, they possess a relatively robust Anti-Submarine Warfare (ASW) suite. The capable AN/SQQ-89 ASW combat weapons suit consist of the AN/SQS-56 hull mounted sonar system and the AN/SQR-19 tactical towed array sonar system. The hull-mounted sonar is of limited use in an ASW role, but does provide some mine avoidance capabilities. The towed array sonar is, however, state of the art in ASW weapons systems and provides excellent results. Their main armaments consist of a Mark 75 gun system and missiles fired from its single Mark-13 missile launcher.

The Mark 75 gun system fires a 76 millimeter round to ranges of up to ten nautical miles. It has a maximum rate of fire of 80 rounds per minute (Chief of Naval Information 2002c, 2). It has a computer-aided fire control system and has some capabilities against surface and slow lying air threats, and is efficient against relatively large, close-in surface threats. Due to its small caliber, and relatively short range, the 76 millimeter round is considered insufficient for naval surface fire support. The Mark 13 missile launcher is capable of firing both the Standard Missile (SM-1) and Harpoon Missiles. The Standard Missile (SM-1) as fired from the Perry's has a range of twenty nautical miles against a medium altitude air threat (Chief of Naval Information 2002f, 1). Its capabilities against a low flying cruise missile are considerably less. The RGM-84 Harpoon was designed to strike medium to large surface combatants in an open ocean

environment. It has a maximum range in excess of 60 nautical miles (Chief of Naval Information 2002e, 1). For last chance self defense the Perry's like most USN surface combatants is armed with the Phalanx Close in Weapons System (CIWS). The CIWS employs a 20mm gatling gun, firing at 4,500 rounds per minute, to destroy close range air threats (Chief of Naval Information 2002d, 1). The CIWS has, however, no capability against surface targets.

The SH-60 *Seahawk* LAMPS Mark III helicopter adds significant capabilities to the Perrys. The *Seahawk* is a twin-engine helicopter equipped with both radar and passive electronic sensor. It is used for anti-submarine warfare, search and rescue, drug interdiction, anti-ship warfare, cargo lift, and special operations (Jackson 2001, 768). They extend the range of the ship's radar capabilities, by providing an elevated platform for observing, identifying, and localizing threat platforms beyond the parent ship's radar and/or electronic support measure (ESM) horizon (Chief of Naval Information 2002g, 1). Additionally the helicopters may be equipped with the AGM-119 *Penguin* missile, providing a potent ASUW capability, to a maximum range of twenty-five nautical miles (Chief of Naval Information 2002h, 2). Each Perry is configured to carry and perform limited maintenance on two Seahawks.

The FFG-7 class possesses a command and control suite, which is rudimentary by United States Navy standards, but is on par or exceeds the rest of the world's navies. It is interoperable with other USN and allied navy ships and aircraft. Each ship is configured with the full range of communications capabilities. They are also Link-11 capable. Link-11 allows the Perrys to exchange near real time track data with similarly configured ships, aircraft, and shore stations operating in the same area. Each ship is equipped with

the Global Command and Control System--Maritime (GCCS-M) and SIPRNET. The Perrys were constructed with surface search radar and two dimensional air search radar. The Oliver Hazard Perry class had an initial procurement cost of $269 million per hull ($951 million adjusted to Fiscal Year 2002 dollars) (NAVSEA 2002, 1). Total ownership cost for the ships average seventy-one million dollars per year, or almost thirteen times that of the Cyclone.

Cost Comparison

The United States Navy's force structure decisions are driven by a variety of factors. Need, political necessity, and history all play significant roles. But, financial constraints have by far the largest impact on the Navy's current and future force structures. The Navy has reduced its fleet of surface combatants by sixty percent in the past fifteen years (Navy Historical Center 2002). This reduction was not driven by a loss of mission requirements; it was driven by the fiscal realities of the post-Cold War world. If the Navy were unconstrained financially, this thesis would be moot. The service would develop and deploy a robust force, of blue-water combatants and fast patrol boats, able to meet all of its operational requirements, all of the time. Unfortunately, this utopian world is not the one in which the Navy operates. Financial constraints are, and will continue to be, dominant in all Navy force structure decisions.

TABLE 5

FFG-7/PC-1 COST ANALYSES

	FFG-7	PC-1
Procurement cost (FY-02 $)*	$951,274,000	$36,177,000
Annualized procurement cost**	$38,050,960	$1,808,850
Personnel cost (MP-N)	$19,208,271	$2,497,123

OM-N***	$14,179,242	$1,200,000
TOTAL	$71,438,208	$5,505,973

Source: * NAVSEA 2002, 1. *** Chief of Naval Operations 2002, 1.
Note: **Procurement cost is given in FY-2002 dollars. Annualized procurement cost are based on the initial procurement cost annualized over the expected lifespan of the ships, twenty-five years for the FFG-7, and twenty years for the PC-1.

The Cyclone class patrol coastal and the Perry class guided missile frigates have been compared on a hull-for-hull basis throughout this chapter. In financial terms comparing the ships one-for-one is short-sided. The *Perry's* seventy-one million dollar per year total ownership cost is thirteen times that of the *Cyclones* (table 2 refers). So, in fact, a more valid comparison would be on a thirteen-to-one basis. The question is not, does the Navy need a blue-water combatant or a single FPB? Financially speaking, due to the relative cost of the two hulls, a more appropriate question is - does the Navy need a blue-water combatant or thirteen FPBs?

Historical Review

To determine each evaluated platform's utility in future littoral MOOTW missions, it is necessary to review their historical performance. Several current and historical missions are operationally similar to those expected in the future. The Navy has conducted all seven MOOTW missions with its surface fleet since the end of the Cold War. The MOOTW missions that fall under the broad category of sea control (DOD support to counterdrug operations, enforcement of sanction, maritime interception operations, and enforcing exclusion zones) have been underway more, or less, constantly during this period. They are currently in progress in the Arabian Gulf, Gulf of Oman,

Mediterranean Sea, and Caribbean Sea. Thus, these missions have the most detailed operational histories to review.

Maritime Interception Operations

The United States Navy has been involved in the MOOTW missions of enforcement of sanctions, maritime interception operations, and enforcing exclusion zones throughout the services history. Today, these operations are generally referred to simply as Maritime Interception Operations (MIO). The operations have not always mirrored what the Navy thinks of as MIO today. But, the basic premise remains the same. During MIO, in whatever form it has taken, the operations employ coercive measures to interdict the movement of designated items into or out of a specific area or nation (Chairman of the Joint Chiefs of Staff 1995, iii-3). At various times the basic operation has been called blockade, quarantine, embargo or just plain commerce raiding. The nature of the cargo has changed over the years. At times, it has been as basic as subsistence items for adversary's civilian population, at times as specific as weapons of war. The basic objective, however, has remained the same; to achieve the political goal of compelling a nation to conform to our nation's objectives, with the application of naval power (Chairman of the Joint Chiefs of Staff 1995, iii-4). Disrupting the flow of ships in and out of a nation's ports has proven to be a very effective way to cripple an enemy (Chairman of the Joint Chiefs of Staff 1997c, v-4).

This need to control the flow of maritime commerce has manifested itself in the; *General Letters-of-Marque and Reprisal* during the revolutionary war, anti-slave patrols of the early 19th century (1820-1861), the blockade of the Confederacy during the American Civil War, and at numerous other times during our nations history. In the fifty

years following the end of the Second World War, the United States Navy has conducted at least ten major Maritime Interception Operations. These operations have been conducted around the world, in places as varied as Korea, Vietnam, the Adriatic Sea, the Arabian Gulf, the Caribbean Sea and most recently in the Indian Ocean. While the geo-political composition of the areas varies significantly, each operation has shared common characteristics.

> Commercial blockade is essentially a method of exercising command [of the sea]. Its immediate objective is to stop the flow of the enemy's sea-borne trade, whether carried in his own or neutral bottoms, by denying him the use of trade communications. . . . By closing his commercial ports we exercise the highest power of injuring him which command of the sea can give us. (Corbett 1911, 184)

Maritime Interception Operations are, in purest sense, the enforcement of a sanction, by military means, in support of a political-military goal. The United States Navy has historically conducted MIO in an adversary's coastal waters, or in a geographic choke point leading to their port facilities. These waters often have extremely high shipping densities, and are at times shallow. The basic operation consists of detecting, tracking, boarding, and searching suspect vessels. The vessels can range in size from a small pleasure craft to very large crude carriers. On the larger vessels, a detailed search can be an extremely lengthy process. Historically, USN boardings have been conducted in a benign threat environment. With the exception of Vietnam and other isolated incidences, USN ships have faced only asymmetric threats (small boat, mine, small arms

fire). The Achilles heel of most embargoes has typically been a lack of assets to adequately cover the operations area. Navy ships generally cannot conduct simultaneous boardings due to lack of boarding assets and the geographic separation of the suspect vessels. Nor can they patrol a huge area without airborne support.

During the Vietnam War, the United States Navy along with its allies was tasked with controlling the roughly 1,700-kilometer coastline of South Vietnam as part of Operation Market Time. Naval forces were required to enforce a quarantine of the area preventing insurgency from North Vietnam and the transportation of war materiel, much like the situation that could develop in the Indonesian Archipelago. Complicating the mission were the roughly 60,000 small vessels that routinely transited the shallow coastal waters. In November 1968 alone, Market Time forces detected over 32,000 transiting vessels, with over 10,000 of those boarded (Cutler 1988, 133). Commander Naval Forces Vietnam reported that for the period from June 1966 to June 1968, 400,000 vessels were boarded. The overall average was 16,000 per month, although the figures vary from 6,000 to 29,000 boardings per month depending on weather conditions. The overall daily average was a little over 500 boardings per day (Cutler 1988, 134). As early as 1962, before Market Time was in full swing, the United States Navy realized that it did not have sufficient quantities of blue-water combatants to fulfill the mission, and those that were in the inventory were only marginally capable (Naval Historical Center 1986, 289). At the time the USN had no fast patrol boats in the inventory (Naval Historical Center 2002). In response, then Chief of Naval Operations, Admiral Arliegh Burke, ordered construction of a number of fast patrol boats, later known as the Ashville (PGM-84) class motor gunboats for operations in the Vietnam Theater of operations (Naval Historical

Center 1986, 289). By the end of the Vietnam War and Operation Market Time, over 200 FPBs of various classes, had been built and deployed to Vietnam. But despite their efforts and that of a significant portion of the Navy's blue-water fleet, the sea-lines of communication between North and South Vietnam were never completely interdicted. Even with the addition of the 200 plus FPBs, the scope of the operation and the volume of potential smugglers overwhelmed the combined blue-water fleets of the American and South Vietnamese navies.

Operation Sharp Guard and the maritime interception operations as part of Operation Desert Shield provide examples of the level of commitment required to successfully conduct this type of operation. Operation Sharp Guard (22 November 1992-18 June 1996) was the embargo of oil and weapons against Serbia and Bosnia-Herzegovina. During Operation Sharp Guard allied navies were required to control maritime access to all Bosnian and Serbian ports (NATO 2002, 1). The embargoed nations' Adriatic coastline consisted of 200-kilometers of relatively deep water (CIA 2001). The area has only has only one open ocean avenue of approach, through the Strait of Otranto. There are few islands and the coastline is not complex. Only medium-large commercial vessels were considered possible violators. No attempt was made to control small commercial and private vessels as they transited the Adriatic.

TABLE 6

OPERATION SHARP GUARD STATISTICS

Vessels challenged	74,192

Vessels boarded and searched at sea	5,951
Vessels diverted into port for search	1,480
Sharp Guard ship days at sea	19,699
Maritime Patrol Aircraft sorties	7,151

Note: All data presented in table is derived from the NATO's summary accounting of Operation Sharp Guard (NATO 2002).

As embargoes go, Sharp Guard should have been relatively easy. The area of operations is near ideal for surface combatants, and is in easy reach of land-based maritime patrol aircraft. Yet, both North Atlantic Treaty Organization (NATO) and the Western European Union (WEU) felt it necessary to dedicate a considerable portion of the combined fleets to the task. On average fifteen surface combatants were at sea every day in support of the operation (NATO 2002, 1). The average ship was required to locate, track and challenge almost four vessels per day, in addition to the vessels other duties. NATO estimates that not a single vessel was able to evade maritime interception forces during the lifespan of the operation.

In August 1990, with the Iraqi invasion of Kuwait, the United Nations imposed economic sanctions against Iraq. The resolution, United Nations Security Council Resolution (UNSCR) 661, and its successor UNSCR 665, prohibited the inport or export of all commodities from Iraq and Kuwait, with the exception of medical supplies and food (Department of Defense 1992, 62). On 17 August 1990, CINCCENT was directed to commence enforcement of the sanctions with a multi-national maritime interception force. Geography favored the multi-national force. Iraq and Kuwait have a combined

coastline of only 557 kilometers (Central Intelligence Agency 2001). All commerce bound to or from the embargoed nations had to pass through one of four ports; Umm Qasr and Khawr Az-Zuubayr Iraq, Al-Aqabah, Jordan and Kuwait City itself (Department of Defense 1992, 63). Each of these ports has a single, deep-water avenue of approach. In addition to the geographic constraints, Iraq, at the start of Desert Shield, fielded a merchant fleet of only 140 vessels, with only 42 of those being capable of overseas cargo shipment (Department of Defense 1992, 64). Outwardly this should have been a relatively simple operation, with its limited area of operations and a small set of potential violators. Yet, CINCCENT employed 165 surface combatants, from nineteen nations to meet the challenge during the seven months of the operation. The 165 ships of the multi-national force were able to meet the challenge, and commerce to Iraq ground to a halt.

TABLE 7

OPERATION DESERT SHIELD STATISTICS

Vessels challenged	7,500
Vessels boarded and searched at sea	964
Vessels diverted into port for search	51

Source: Department of Defense 1992, 78.

The success of MIO during Sharp Guard and Desert Shield can be directly attributed to the availability of sufficient surface combatants to provide adequate coverage to the area. The areas of operation were relatively small, and without a complex coastline. Each operations target set was also small, limited to large deep draft vessels on a specific profile. Yet, in Desert Shield it took a force of one-and-a-half times

the United States Navy's blue-water fleet to complete the mission. The Sharp Guard force structure was the equivalent of three Carrier Battle Group's (CVBG) surface combatants being at sea every day for four years. Likewise, the failure of Market Time to completely sever the Vietnamese SLOCs can be attributed to a lack sufficient number of suitable assets to patrol the area.

While Sharp Guard and Desert Shield had the advantages of a small operating area and limited target set, Market Time did not. Market Time patrollers had to contend with a coastline of 1,700 kilometers, over 3 times the size of the combined coastlines of Iraq and Kuwait. Due to the nature of their mission, they were unable to concentrate solely on commercial vessels in deep-water areas. Every vessel transiting the region, in brown-water, and in blue-water was considered a potential violator. Despite a crash fast patrol boat construction program, Market Time simply did not have sufficient assets, with the right capabilities to meet the challenge. In MIO numbers do matter.

Any MIO operation in the Indonesian Archipelago is likely to more closely resemble Market Time than either Desert Storm or Sharp Guard. Countering terrorism or terrorist backed insurgents appears to be the most likely MIO operation. The lessons of the Vietnam War show us that insurgents or terrorist do not need large deep draft vessels, which were the primary target in both Desert Storm and Sharp Guard, to transport their materials. North Vietnam was able to support the entire war in the south with twenty sampan (small wooden hulled fishing or merchant vessel common throughout the Indonesian Archipelago and South China Sea) shipments per month (Naval Historical Center 1986, 286). The thousands of islands, shoal waters, and extremely complex coastline of the Archipelago also favors the smuggler, providing easy hiding places, and

preventing larger blue-water capable ships from gaining access to all areas. Thus, MIO in the Indonesian Archipelago will require significant assets to prosecute the operation.

The United States Navy is currently conducting two versions of Maritime Interception Operations, Multi-National Interdiction Force (MIF) operations in the Arabian Gulf, and Leadership Interception Operations (LIO) in the Arabian Sea, Indian Ocean, Red Sea, and Eastern Mediterranean Sea. MIF operations have been underway continually in the waters surrounding the Arabian Peninsula since the invasion of Kuwait by Iraq in 1990. The current operations are the antecedent to the MIO efforts during Operation Desert Shield and Operation Desert Storm. Originally these operations conducted in the more open waters of the region in an attempt to enforce a total embargo against Iraq in support of UNSCR 661 and 665. UNSCR 661 barred Iraqi inport or export of all items except food, medical and humanitarian supplies. UNSCR 665, passed shortly after UNSCR 661, provided for maritime enforcement of the sanctions via a multi-national naval force. Following the war the sanctions remained in place, but were significantly modified by UNSCR 986. This resolution initiated an "oil for food" program, in which Baghdad could export a significant volume of oil in exchange for humanitarian supplies.

Arabian Gulf MIF consists of locating, tracking and boarding sea-going vessels attempting to transfer cargo in violation of the various United Nations sanctions. At times these boardings are conducted via non-compliant means (vessel's crew is non-cooperative and attempts active or passive countermeasures), and may result in the seizure of the vessel and its cargo as well as legal action against the vessel's crew and owners. Initially MIF operations were conducted in the open

waters of the Arabian Gulf and Red Sea. They are now concentrated in the coastal and relatively shallow waters of the Arabian Gulf off Iraq and Iran. This change was precipitated by tacit collusion between the Iraqi smugglers and Iranian Revolutionary Guard Corps Navy (IRGCN) officials, and the successes enjoyed by the Multi-National Force (MNF) in open waters. Smugglers found relative safe haven along the "Iranian smuggler highway," a strip of relatively shallow water along the length of the Iranian coast to friendly ports in the Southern Arabian Gulf or Gulf of Oman. The new route took advantage of a friendly Iranian government and the sanctuary provided by Iranian territorial waters (Hanley 1997, 1). In addition to the legal sanctuary provided by territorial waters, their new route took them through an area with treacherous coastal shoals and a concentration of small merchant/fishing vessels, locally known as dhows. The shoals and heavy maritime traffic combine to make navigation in the area extremely hazardous for deep draft vessels. Although the smuggling vessels destined for friendly ports in the Southern Arabian Gulf are required to leave Iranian territorial waters as they transited east-to-west across the Gulf, their window of vulnerability is extremely small.

In the decade since the conclusion of the Persian Gulf War the United States Navy's role in the multi-national force has increased. Kuwait, Canada, Belgium, New Zealand, Italy, Australia, the Netherlands, Argentina, Poland and the United Kingdom have all provided forces. During the last few years of the decade, the MNF became an almost exclusively Anglo-Kuwaiti operation.

As a result of the smugglers shift to the Iranian smuggler highway, MIF patrols in the open waters of the Central Arabian Gulf became ineffective. In order to

pursue operational objectives, the MNF was forced to change its tactics. MNF units were forced to patrol along the periphery of Iranian territorial waters in an attempt to locate smuggling vessels sailing inside international waters. Smugglers traveling inside Iranian territorial waters were immune to MNF actions. Vice Admiral Fargo summed up this fact, while he was Commander Fifth Fleet (C5F), by saying "We can see them out there, but we can't go after them." (Hanley 1997, 2). If approached, the smugglers escape was as simple as deviating from course and entering Iranian waters, or waters too shallow for the blue-water combatant to follow.

As a result of the September 2001 terrorist attacks on America, Commander, United States Naval Forces--Central Command (COMUSNAVCENT) extended the MIO patrol area into the Arabian Sea and Indian Ocean in search of Al-Queda and Taliban leadership trying to escape Afghanistan by sea via Pakistan. COMUSNAVCENT has referred to the extended operations as "Leadership Interception Operations (LIO)" (Perry 2002, 1). United States European Command (EUCOM) likewise established LIO patrol areas in the Eastern Mediterranean (Boydston 2002, 1).

TABLE 8

ARABIAN GULF MIO OPERATIONAL STATISTICS

	FFG-7	PC-1
Days on station	287	46
Smuggling vessels seized	1	7
Seizures per ship day	.0035	.1521

Seizures per ship year	1.3	55.5

Note: This statistical comparison is made using the FY 2000 MIF results as reported by the participating units. Days inport or transiting to and from station were not included in "days on station." Only days dedicated to MIO were included.

The ultimate of effectiveness of the overall MIF operation, and the United Nations sanctions, can only be measured in political terms. It is impossible to absolutely quantify the operation's effect on Saddam Hussein's government in Baghdad. It is, however, possible to provide adequate measures of effectiveness for the discretely military aspects of the operation. A study of the operational successes of the FFG-7 and PC-1 during FY 2000 (the last year in which data is available) paints a rather startling picture. The FFG-7 presence was significantly higher than of the Cyclones, reflecting the respective numbers inside the Navy's force structure. The Perry's presence did not translate to operational success. The Cyclones enjoyed a relative success rate 43 times that of the Perrys.

The obvious question is: Why did the Cyclones enjoy so much more relative success? The answer probably can not be summed with a single statement. The operating environment certainly plays a significant role. Like most littoral regions, the international waters along the Iranian coastline contain numerous shallow water shoals. As previously discussed, these shoals when combined with the heavy dhow traffic create an extremely hazardous environment for deep draft surface combatants. The Perry class frigates are relatively shallow draft surface combatants. Their draft of

twenty-four foot, however, precludes them from operating on many of the shoals. Their lack of maneuverability, also, makes operating at close ranges to the heavy dhow traffic hazardous. The Cyclones, on the other hand, are able to exploit their eight foot draft to operate in those areas. The Cyclones draft is, in fact, shallower than the typical smuggler. Their shallow draft, speed and maneuverability make them ideal for working in a shallow congested environment.

As in all military operations, surprise is a key element of MIF operational success. With the legal sanctuary provided by Iranian territorial waters always close at hand; an alerted smuggler can escape seizure by leaving international waters for the safe haven. MIO units must remain undetected as they approach potential smugglers. The Cyclone's small size, basic silhouette, and radar countermeasures combine to make it an inherently stealthy platform. Visual detection ranges, at night, can be less than 500 yards.

Counter Narcotics

DOD support to Counterdrug Operations is a MOOTW mission that the Navy is likely to pursue for decades in the Caribbean and the Eastern Pacific. While counter-narcotics (CN) activities are currently centered in the Southern Command area of responsibility, they have the potential to be exported around the world. The Mediterranean, Gulf of Oman and Indonesian Archipelago have all seen limited USN counter narcotics missions. The impetus for the worldwide expansion of CN operations appears to be the drug industry's connection with terrorism. Drug Enforcement Agency (DEA) administrator Asa Hutchinson testified to Congress about the explicit link between terrorist and the drug trade (U.S. Congress, House, 2001c, 1). President Bush

stated, “If you’re buying illegal drugs in America, it is likely that money is going to end up the hands of a terrorist” (Sammon 2002, 4). DOD officials quickly linked the CN operations and the nation’ war on terrorism after President Bush stated, “When we fight drugs, we fight the war on terror” (Sammon 2002, 4). He further states the nation’s is to reduce illegal drugs entering the nation by twenty-five percent in the next five years (Sammon 2002, 4).

DOD had been historically reticent to participate in CN operations as a result of the restrictions placed on the armed services by the Posse Comitatus Act of 1878 (PCA). The PCA effectively prohibited the use of the armed forces to execute the laws of the United States, including drug laws. The United States Coast Guard and other law enforcement agencies bore the entire burden of protecting our maritime boundaries against drug smugglers. This changed, somewhat, in 1986 when President Reagan issued National Security Directive (NSD) 221, which declared drug trafficking to be a threat to national security (Chairman of the Joint Chiefs of Staff 1998b, I-1). While NSD 221 did not explicitly task the services with certain CN activities, it did pave the way for increased participation by DOD assets in CN missions.

Fig. 5. Drug Transit Zones. Source: U.S. Interdiction Coordinator 1998, 3.

The Navy's role in CN operations was codified in 1989 when the Secretary of Defense issued guidance to DOD that identified drug trafficking as a national security problem for the United States and states that the military would have a critical role in defending the nation from the threat of illegal drugs (Chairman of the Joint Chiefs of Staff 1998b, I-1). He designated the countering of illegal drugs as a high priority national security mission (Chairman of the Joint Chiefs of Staff 1998b, I-1). Congress, in turn, passed the National Defense Authorization Act of 1989 (title 10, United States Code, Section 124), which designated the DOD the single lead agency for detection and

monitoring of aerial and maritime smugglers attempting to bring illegal drugs into the United States (Chairman of the Joint Chiefs of Staff 1995, iii-3). 10 USC 124 also gave the DOD significant relief from the PCA to conduct drug interdiction (arrest) with an embarked USCG law enforcement detachment. Maritime smuggling was, and is the primary method of smuggling drugs in the SOUTHCOM area of responsibility (Chairman of the Joint Chiefs of Staff 1998b, vi-3). Thus, the Navy has assumed a primary role in CN operations.

The Navy participates in both detection and monitoring and drug interdiction efforts. The goal of maritime detection and monitoring is to provide early notification to, and as necessary prolonged tracking of surface targets for appropriate interdiction assets, thus enabling them to conduct interceptions, searches, arrest of traffickers, and seizures of illegal drugs (Chairman of the Joint Chiefs of Staff 1998b, iv-1). Maritime interdiction efforts focus principally on deterring drug smuggling by monitoring sea borne smuggling routes, detecting and seizing drug smuggling vessels, and arresting their crews (Chairman of the Joint Chiefs of Staff 1998b, iv-1). Navy ships conducting interdiction usually have embarked law enforcement agency personnel, as delineated in 10 USC 379, to avoid the restrictions placed on them by the PCA (Chairman of the Joint Chiefs of Staff 1998b, B-4). To conduct its CN missions, the United States Navy regularly deploys surface combatants along the trafficking routes. Trafficking routes for non-commercial vessels extend from Columbia up the eastern and western coasts of Central America, from Columbia and Venezuela to the Lesser Antilles, and from the Bahamas into south Florida (Chairman of the Joint Chiefs of Staff 1998b, vi-3).

While drugs can be smuggled in almost any vessel, the use of "go-fast" has become the method of choice. Go-fasts are high-speed boats, usually 35 feet in length and often equipped two or more 250 horsepower motors and are capable of speeds of over 40 knots, sea state dependent (Hunter 2001, 78). They are constructed of fiberglass or wood, have a freeboard of less than three feet, and thus very hard to detect with radar at any significant ranges (Watts 1999, 3). They are usually painted or camouflaged a Caribbean blue color that proves an effective counter detection tactic, including from airborne observers. In one documented incident from 1998, a cued USCG helicopter passed within 100 yards of a stationary go-fast, in excellent visual conditions, and did not detect it (Watts 1999, 3). The predominant visual indication is usually the telltale white wake that extends behind the go-fast as it transits at high speeds. To limit the possibility of a go-fast's detection by its wake, the smuggling networks use a wide intelligence network designed to warn of surface ships or aircraft operating in the area (Chairman of the Joint Chiefs of Staff 1998b, iv-4). If a DOD patrol asset is detected, the go-fast will heave to, and remain undetected. If detected, the go-fast exploits its speed advantage (up to forty knots in calm seas) to run from the surface ship. Aircraft can follow the go-fast, but are unable to prosecute the interdiction or maintain station long enough to coordinate an intercept. Fuel capacity and the effects of high seas on the vessel and its crew is the go-fast's only Achilles heel.

The only proven method of countering the go-fast is for DOD assets to enter an area of operations and conduct a visual and short range radar search for transiting smugglers. The smugglers intelligence network must not detect the ships. Once a go-fast is detected, speed is the only relevant factor. The race is not as one-sided as it may

outwardly seem. The pursuing vessel has two distinct advantages over its prey. Unlike most Navy ships, the go-fast is required to stop and change fuel tanks. Stopping to change fuel tanks reduces the go-fast's average speed. The go-fast is unable to maintain its forty-knot speed in anything but calm seas. As a smaller vessel the go-fast is affected to a greater extent by the seas, than the mostly larger pursing vessels. Even with these two advantages the pursing vessel's challenges are significant. Critical to the successful interdiction of a go-fast is coordination between multiple assets, each with the capability of maintaining contact with the smuggler.

The United States Navy and United States Coast Guard have deployed a variety of ships into the SOUTHCOM AOR, including cruiser, destroyers, frigates, and every class of cutter to conduct CN operations. Each of the blue-water combatants brings a high tech radar system, and usually an embarked helicopter to the job. Yet, the United States Interdiction Coordinator (USIC), the executive agent for interdiction in the Office of National Drug Control Policy, assessed the Cyclone class patrol coastal as the most capable surface ship in both the detection and monitoring and interdiction role in the Caribbean's littorals (U.S. Interdiction Coordinator 1998, 13). USIC delineated the key attributes for a counter narcotics patroller as speed, maneuverability, communications, and the ability to place law enforcement team on a suspect vessel (U.S. Interdiction Coordinator 1998, A-1). USIC considers the Cyclones critical for intercepting go-fast and for maritime endgames in the coastal areas (U.S. Interdiction Coordinator 1998, 13). Maritime endgames include the interception, boarding, inspection, and potentially seizure of the suspect vessel.

This may seem like an odd assessment on USIC's part, but it is based on logic. The operational profile of the go-fast mitigates some of the inherent capabilities of the larger more complex blue-water combatants. The Navy's advanced, Doppler based, radars are rendered relatively useless by the go-fast's construction and operational profile (Watts 1998, 3). It routinely boils down to visual or short-range analog radar (less than three nautical miles) detection. The larger combatants are far more overt to the smuggler's intelligence network, and thus, less stealthy to their prey. In pursing the interdiction, and endgame the Cyclone's advantages in speed are obvious.

Like MIO, the number of assets available to the CN mission is critical to its success. The go-fast's operational profile precludes leveraging technology as a force multiplier. Continual presence is the only answer. The USIC is on record stating that it requires a minimum of ten combatants with at least five being fast patrol boats to maintain minimal presence in the transit zone. USIC further states that it needs at least twenty vessels, with at least ten FPBs on a continuing basis to reduce drug flow through the transit zone by ten percent (U.S. Interdiction Coordinator 1998, 8). This reduction of ten percent is still far below President Bush's stated goal of a twenty-five percent reduction in five years.

The Coast Guard has historically provided majority of maritime assets in the transit zone. The Navy routinely has deployed two or more blue-water combatants and two Cyclones in support of CN mission. The combined USN and USCG efforts have generally fallen short of USIC minimum requirements and never approached the twenty vessels needed to reduce flow through the transit areas by ten percent. The events of 11 September 2001 further exasperated the problem by siphoning off what little assets were

available for homeland security, especially FPBs. Virtually all USCG cutters that fall into the genre of FPBs have been pulled back to participated in Operation Noble Eagle, the defense of the homeland (Sullivan 2002, 1). The Navy has reassigned its entire fleet of Cyclones to homeland security missions (Commander Pacific Area 2001, 1). This leaves the Navy's two blue-water combatants (mostly Perry class frigates), platforms generally ill suited for the mission, as the only available assets.

The lessons learned from the CN missions in the transit zone have applicability outside SOUTHCOM AOR. They are equally germane in any attempt to exercise sea control against medium to small vessels any place in the world. It is irrelevant if the smuggling vessel is carrying drugs or small caches of weapons, the operational challenges remain the same. The Navy must maintain sufficient asset density, with the required capabilities to ensure success. High technology can't always provide a panacea against this threat. In a low technology, low threat environment numbers matter.

Homeland Security

There is another type of warfare--new in its intensity, ancient in its origin--war by guerrillas, subversives, insurgents, assassins; war by ambush instead of by combat, by infiltration instead of aggression, seeking victory by eroding and exhausting the enemy instead of engaging him. . . . It preys on unrest . . . (Kennedy 1988)

As a result of the terrorist attacks of 11 September 2001, the United States Navy like the rest of the nation's armed forces were called upon to fill a somewhat new role in homeland security. Army and Marine Corps ground combat forces were alerted. Air Force fighter aircraft commenced around the clock combat air patrols over our major

cities. The Navy sent surface combatants to sea to provide air and sea protection to our Atlantic and Pacific coast. In general, all these employments were an immediate reaction to the attack on American soil unfolding on television.

In the days that followed the terrorist attacks each service, and the government in general was forced to look at long term plans for its part in homeland security. For the most part the immediate actions taken on 11 September were rescinded; ground forces were stood down, round-the-clock combat air patrols ended, and the air defense ships came back into port. In place of these defensive measures, each service put into effect what it considers it's medium-long term contribution to homeland security. The Pentagon activated Army National Guard troops to assist with airport security. Air Force assets initiated fighter strip alerts designed to react in the event of another commercial aircraft with an in flight emergency. Pentagon officials assigned the Navy and the Coast Guard an even more daunting responsibility than securing the nations airports, securing our nations coastlines and seaports.

> Ports, harbors, and main channels are also susceptible to asymmetric attacks and are strategically important. They are susceptible because foreign vessels could deliver large amounts of explosives or other destructive agents to them. They are important strategically because the United States is dependent on them for its economic well-being and for transporting U.S. military forces to overseas theaters of war. (Center for Naval Analyses 2001, 3)

The United States is a vast maritime nation with 19,000 kilometers of coastline. Along those coasts, the nation has 386 major seaports and hundreds of power plants

refineries and hazardous waste facilities (Bayles 2001, 3). 68,000 tankers, freighters, and container carriers from virtually every maritime nation make ports of call into our ports each year transporting ninety-nine percent of America's inport-export tonnage (U.S. Navy 2000, 3). Prior to 11 September, commercial shipping entered and left the nation with relative ease. USCG and Customs officials boarded less than five percent of inbound international shipping. Government officials conducted inspections on only an insignificant percentage of these vessels' lading (Wood 2001, 2). Many in government saw our ports as an obvious security weakness. Others labeled them as a terrorist's fantasy. Congress to a first step at improving the security of these facilities and passed the $4 billion Port and Maritime Security Act of 2001(PMSA). The PMSA authorized $700 million for port security infrastructure upgrades and ordered significant changes in port operations (U.S. Congress House 2001, 8). In addition to the security vulnerabilities associated with commercial port facilities, our government looked at the Navy's homeports as a potential terrorist target.

In the wake of 11 September and with fresh memories of the terrorist attack upon USS *Cole*, Pentagon officials became concerned for the safety of our warships. They were seen as vulnerable as they operated in the restricted waters in and around their homeports. In response Admiral Thad Allen, Commander, United States Coast Guard--Atlantic Area (LANT AREA) issued an emergency regulation that required ships coming within 500 yards of a naval vessel to slow to minimum speed required to maneuver. The regulation also prohibited any vessel from coming within one hundred yards (Wald 2001, 9). Pentagon officials in concurrence with the newly formed Office of Homeland Security decided that all major United States Navy ships as well as some other high

interest vessels (cruise liners, vessels with dangerous cargo (toxic, explosive), and others) would be escorted in and out of port to help ensure their security.

The job of enforcing maritime security regulations and inspecting the cargo of inbound commercial traffic has been historically a USCG and other law enforcement agency responsibility. This exclusion of the Navy and other military agencies from this mission evolved from both the Posse Comitatus Act of 1878, and a lack of a perceived mission on the Pentagon's part. All this changed on 11 September 2001. For the first time in recent memory the United States Navy assigned warships to patrol American territorial waters as part of Operation Noble Eagle. Together with the Coast Guard and federal, state, and local law enforcement, the Navy undertook the largest port security operation since the Second World War. Navy warships were ordered to provide anti-terrorism force protection (AT/FP) for U.S. Navy capital ships, escort designated high interest commercial ships in and out of U.S. ports (Operation Safe Transit), and conduct boardings for inspection of cargo and personnel (Commander Pacific Area 2001, 1).

The new operating environment posed significant problems for Navy leadership. In our war on terror, the American coastline possessed many of the same dangers that characterize foreign hostile shores. The Navy had to employ surface combatants capable of countering the small boat threat, while simultaneously dealing with the significant hazards to navigation and congested waters inherent in the restricted waters around our ports.

Norfolk, Virginia, located at the mouth of the Chesapeake Bay, is the world's largest naval base and one of our nations busiest commercial ports. Norfolk is considered a "deep water" port capable of accommodating American aircraft carriers and all but the

largest commercial vessels. The port is home to over one-third of the sea-going Navy. Many consider Norfolk one of our safest ports. Yet, the problems associated with protecting our capital ships as they transit to and from the naval base, and as they set moored in their berths, are significant.

> The harbor area of the port, and the main water passages leading to it are especially susceptible to asymmetric attacks. This is because due to their high amount of regular shipping traffic they are some of the few areas in the U.S. where a large amount of conventional explosives--or chemical, biological, or other destructive asymmetric agents--could be delivered by commercial and often foreign cargo vessels. (Center for Naval Analyses 2001, 28)

Most naval ships and all capital ships must transit in a 150-yard wide channel for almost 20 miles before reaching their assigned berths. The ships are extremely vulnerable while transiting the channel. They have very little maneuverability while inside the channel and none outside of it. The transit lanes bisect an area with an extremely high concentration of sea-going traffic. All the commercial traffic bound for/from the ports of Norfolk, Portsmouth, and Newport News, Virginia, as well as Baltimore, Maryland, share part or all of a common route. Significant numbers of pleasure and fishing boats ply these same waters, often operating in the main shipping channels. Combined they create a very congested maritime environment. While the smaller craft have the flexibility of sailing most of the bay, larger commercial and naval ships are restricted (by draft) to the main shipping channel. Any vessel constrained to the main channel is predictable, and thus vulnerable to attack. Close approaches by small pleasure and commercial craft on naval ships is common in the normal conduct of business. Joint Publication 3-07.2, *Joint Tactics, Techniques, and Procedures for Antiterrorism*, articulates this weakness by saying "Sea movement, especially aboard

military vessels may provide a false sense of security. Sea operations are certainly more secure than urban patrols; however, ships in harbor or anchored are visible high-risk targets" (Chairman of the Joint Chiefs of Staff 1998a, vii-6).

The current fleet of cruisers, destroyers and frigates is well suited to wage war on the open ocean. Each ship type could have easily filled any Noble Eagle role that allowed it to remain in the relatively deep waters offshore. They are, however, not suited to prosecute the war on terrorism in the littoral. Protecting the fleet's capital ships and high interest commercial ships from a small boat threat in the littoral requires a unique set of capabilities. First, and foremost, to serve as an adequate defense, the vessel must have the agility to operate in the flanks of the capital ship's transit lanes. This agility is best manifested in a vessel with; shallow enough draft to operate outside the deep draft channel, the speed to intercept any threat approaching the protected ship, and the maneuverability to operate at very close ranges in a congested maritime environment, sufficient sustainability to operate in all weather conditions for extended duration. Cruisers and destroyers are outwardly unsuited to the mission as their draft restricts them to the main shipping channel. The fleet's frigates have sufficient sustainability, and a limited capability to operate outside the main shipping channel. The frigates, however, lack both the speed (in shallow water), and maneuverability required to operate in the shallow confined waters inside the harbors. Neither the Navy's Atlantic nor Pacific Fleet commanders owned any ships capable of providing the full range of support needed for the Operation Noble Eagle activities. In order to meet the mission requirements, the fleets turned toward Commander, Naval Special Warfare Command (CNSWC) for help.

Both Atlantic and Pacific Fleet's answer was to request and receive operational control (tasking authority over) of the CNSWC's fleet of thirteen patrol coastals. In the fall of 2001, Cyclones were stationed off each of the continental United States' (CONUS) fleet concentration areas (Norfolk Virginia, Jacksonville Florida, Corpus Christi Texas, San Diego California, and Everett Washington). In addition, one patrol coastal was pressed into service on a rotational basis off Boston (Commander Atlantic Area 2001b, 2). While on station, the Cyclones were tasked with providing small boat defense, maintaining a buffer area, for capital ships as they transited in and out of port. In addition, Navy crews, with USCG augment conducted boardings and inspections of high interest merchant traffic prior to them entering port (Commander Pacific Area, 2001.1). The Cyclones used many of the same procedures worked out over a decade of joint USN-USCG counter-narcotics operations. The utility of the Cyclones in this role was not lost upon top Navy officials. Atlantic Fleet commander Admiral Robert Natter commented, "These ships will be used for coastal patrol and interdiction efforts with the Coast Guard. PCs [patrol coastals] are extremely versatile and can provide important additional capabilities to help defeat terrorism" (Commander Atlantic Area 2001a, 3).

The Cyclones were the only answer available for the Fleet Commanders. There is simply nothing else in the Navy inventory that can adequately fulfill the mission. The mission and the ships are almost a perfect fit. A fast, shallow draft, sustainable, heavily armed surface combatant for a mission that demanded all those characteristics. Admiral Allen (Commander, Atlantic Area) stated:

> The *Cyclone* class of Navy ships is particularly suited for the maritime homeland security mission. New threats require new thinking. These highly capable ships and Navy crews, along with the Coast Guard's unique authority and law

> enforcement expertise, provide a capable and versatile ocean craft that we need to fight terrorism in the maritime environment. (Commander Atlantic Area 2001a, 3)

Some naval leadership may question if the Navy really has a long-term role in homeland security. Others will argue that the maritime security is inherently a law enforcement mission, a mission, which DOD is precluded from participating in by Posse Comitatus. It, however, appears that the Navy will be heavily involved in this mission for the foreseeable future. The *2001 Quadrennial Defense Review*, released in the aftermath of 11 September refocused DOD efforts. It stated that the DOD had no higher priority than homeland security (Secretary of Defense 2001, 18). A special emphasis was restored on defending the land, sea, and air approaches to the United States against foreign incursions (Secretary of Defense 2001, 14). Accordingly, Secretary of the Navy, Gordon England directed that the service's vision statement *Forward…From the Sea* be updated to reflect homeland security and counter-terrorism as primary missions (Svitak 2001b, 1). Homeland security is not a new mission for the Navy. It should be thought of as the only mission. The Navy has, from our republic's inception, been tasked with providing for the common defense of Americans, America, and their interests.

The realistic question shouldn't be whether or not the Navy is going to have a homeland security mission, but what that mission will entail. Some in the Navy would argue that the service is responsible for defending the United States from a major sea-borne attack, while the Coast Guard is responsible for defending against lower end maritime threats. The Center for Naval Analyses, in preparation for the Navy portion of the *2001 Quadrennial Defense Review*, published a report, which stated the service's responsibility was to defend the homeland against the symmetric threats of: mines,

submarines, surface combatants and cruise missile launching platforms (Center for Naval Analyses 2001, 4). The Center for Naval Analyses reasoned that the Coast Guard's law enforcement powers, gave it the jurisdiction, and made it the only relevant force for littoral maritime security. "Low end security threats" (asymmetric threats-terrorist small boat attack, piracy, and threats to commercial interest), were relegated to the Coast Guard and other law enforcement activities, while the Navy would concentrate on the higher end. The Navy, thus, should only enter in the combating the lower end threat as an augment the Coast Guard during a state of emergency. This argument seems flawed and unrealistic.

Following this train of thought, the Navy should continue focusing on an unrealistic major sea-borne threat to the United States, while ignoring the immediate danger to our nation. At present, no peer competitor exists for the United States Navy. And certainly, no terrorist organizations have the capacity to launch the attack envisioned by the Center for Naval Analyses report. There is, however, clearly the threat of an asymmetric attack on or through our port facilities. The Coast Guard, as a relatively small force, has inadequate manpower and force structure to provide coverage to our 19,000 kilometers of coastline. The current national security environment appears to give the Navy no choice but to pursue homeland security, and focus on the low-end (asymmetric) threats.

To meet the mission's challenges the Navy will require the capability to operate in the shallows, in and around our port facilities. Besides the capability to operate in this environment, the Navy will require a robust population of assets. Assuming a three-ship rotation, the Navy will require at least twenty-one ships to provide counter-terrorism

escorts in and out of the seven CONUS homeports.[1] This number reflects only the number of ships required to provide escort for transiting United States Navy capital ships, and does not allow for additional duties.

Escort Operations

> Owning to the general common nature of sea communications, attack and defense of trade are so intimately connected that one operation is almost indistinguishable from the other. (Corbett, 1911, 262)

In addition to the homeland security missions of escorting American naval ships and designated high value merchant vessels in and out of port, the events of 11 September 2001 has solidified the need for escort operations overseas. Immediately after the terrorist attacks, the United States Navy, recognizing the vulnerability of its largest ships and merchant marine in confined waters, ordered that they be escorted through the waters of the Indonesian Archipelago (McMichael 2002, 10). The Navy is conducting the MOOTW mission of protection of shipping for its highest priority vessels with guided missile frigates through over 300 nautical miles of the Archipelago including the highly congested waters of the Strait of Malacca (Giordono 2002, 1). The escort is being conducted as a precaution against both piracy and terrorism. The lines between terrorism and piracy in the region are somewhat blurred. It appears that in the specific brand of Islamic terrorist indigenous to the Archipelago may use piracy and other normally criminal activities as a tactic.

Piracy seems out of place in the twenty-first century. It conjures up visions of sailing ships and Black Beard. But, it is alive and well in the Indonesian Archipelago. In 2000 there were 471 incidences of piracy against large merchant shipping worldwide,

fifty-five percent of that occurred in the Archipelago. Japan, the Philippines, Singapore and India all pursue naval operations to insure their national merchant fleets can navigate these waters safely. Modern piracy is not a ship-on-ship activity as in the days of Black Beard. Today's pirates use an array of small high-speed craft to board the vessels at sea, mostly at night, mostly near land. They usually target large, slow merchant vessels transiting at night through restricted waters. Their booty varies from cash and small, high value items to the vessel itself along with its cargo.

Protection of shipping is accomplished by a combination of operations. Area operations are designed to prevent a hostile force from attaining a tactical position from which to attack friendly or allied shipping. This includes ocean surveillance and strike operations against offending bases or facilities. Threats not neutralized by area operations must be deterred or addressed by escort operations. Generally, escorts are associated with convoys, although individual ships or a temporary grouping of ships may be escorted for a specific purpose. (Chairman of the Joint Chiefs of Staff 1995, iii-14).

The tactical challenge of protecting the friendly shipping as it transits the congested waters of the region are much like those faced escorting ships in and out of American ports and more specifically like those encountered fifteen years ago during Operation Earnest Will. The Navy must be able to provide credible protection against the small boat threat. The small boat threat is one in which the United States Navy's blue-water combatant are ill suited to counter. Besides the obvious issues with speed, and maneuverability, they are not equipped to counter the threat. A FFG-7 does not have a single weapon system realistically capable of engaging a small boat. The FFG's Mark

75, 76 millimeter gun system requires a radar track on vessel, something that it probably will not have on a small boat, to complete a fire control solution. At times they are augmented with a single Mark-38, 20 millimeter cannon like that permanently mounted on the Cyclones. Even with this augment they are not realistically armed to defend themselves or much less an escorted vessel against a small boat. In any encounter with a small boat in the littoral the guided missile frigate should expect to become the prey, and not the protector of friendly shipping.

During Earnest Will the Navy realized the problems associated with using blue-water combatants in an escort role against a small boat threat. The blue-water combatants of the United States Navy are largely based on technology that has driven the cost of construction to unprecedented levels. Initial procurement on our fleet of Aegis cruisers and destroyers cost our nation close to one billion dollars per ship. While our surface combatants may not officially be capital ships in today's carrier based Navy, their cost alone places them into that category. The loss of a single one would be devastating to our nation and our Navy. Consequently, almost all of the ships in the United States Navy are far too big and expensive to risk in the littoral in the presence of any threat. Earnest Will proved the value to an FPB in the escort mission, and served as the genesis of the Cyclone class patrol coastals. In today's force structure only the Cyclones are capable of providing a credible defense against the small boat threat.

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[1]The United States Navy has ships home ported in the following CONUS locations: Groton, Connecticut; Norfolk/Little Creek, Virginia; Mayport, Florida/Kings Bay, Georgia; Ingleside, Texas; San Diego/Coronado, California; Puget Sound, Washington.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

> We arrive, then, at this general conclusion. The object of naval warfare is to control the maritime communications. In order to exercise that control effectively we must have a numerous class of vessels specially adapted to the pursuit. (Corbett 1911, 117)

As Sir Julian Corbett deduced in his 1911 classic of naval theory *Some Principles of Maritime Strategy,* this study concludes that the United States Navy should build and maintain a fleet of fast patrol boats specifically for littoral operations. It appears beyond refute that the United States Navy's primary arena of operations will be in the littoral for the foreseeable future. More specifically, the preponderance of naval littoral missions will fall into the broad categories of MOOTW and LIC. The post-Cold War shift from a blue-water to a littoral focus has changed some of its priorities and will continue to do so for years to come. The Navy's operational focus will remain in the littoral until a capable blue-water opponent develops; an event not likely to occur within the next quarter century.

Just as it did in Corbett's times, today, the characteristics of the world's littorals requires a relatively cheap and effective platform, like a FPB to exercise local control of the littorals. FPBs represent a low cost, high capacity platform that are more than capable of undertaking lower level missions in the littoral, which are inappropriate for destroyer or frigate tasking. The larger, more expensive, blue-water platforms are certainly capable of many of these MOOTW and LIC missions. It is, in fact, this capability, or capability excess that brings their appropriateness into question. Without question, capability and cost are directly related. In general, an increase in capability

precipitates a commensurate and sometimes exponential increase in cost. Thus, to utilize a capability excess is to incur an unnecessary cost.

This unnecessary cost incurred by the republic, when it dedicates billion dollar national assets to accomplish a mission which far cheaper platforms are at least as capable, and sometimes more capable of accomplishing is the crux of this thesis. If the United States Navy operated without fiscal limitations, this thesis would be moot. The Navy would develop and deploy a force structure capable of meeting all of its global commitments. Unfortunately, this is not the world in which the Navy operates. The Navy's level of operational commitments has not shrank since the end of the Cold War. Yet, fiscal constraints have reduced the Navy's fleet of surface combatants by forty-six percent over that period (Naval Historical Center 2002).

The current Chief of Naval Operations, Admiral Vern Cark, is on record stating that 116 surface combatants is a baseline force structure, below which the Navy could no longer meet its global commitments (Koch 2001, 1). A force structure of 116 is only marginally capable of meeting today's requirements, with no room for mission expansion. Yet, given today's future year defense plans, the Navy's fleet of surface combatants will drop to as low as 98 ships against the 116 surface combatant ship requirement (Koch 2001, 1). If the fleet drops to ninety-eight surface combatants, it will stand as the Navy's smallest force structure since 1910 (Naval Historical Center 2002). Of note, Admiral Clark predicts that the force structure will require an increase of twenty-five percent above the current baseline to meet future strategic requirements (Gildea 2002, 8).

More disturbing than the drop in the surface fleet's force structure, is the apparent lack of any cohesive plan to counter this shortage. The last Navy budget to fund a shipbuilding rate sufficient to sustain its force structure was in Fiscal Year 1992 (Towell 2002, 540). Even in the Bush administration's dramatically increased Fiscal Year 2003 Pentagon budget, there is a reduction in shipbuilding budgets of near one billion dollars. The Fiscal Year 2003 $8.6 billion shipbuilding budget request will allow construction of just five ships, against the eleven needed to maintain the current force structure. Thus, without a major increase in shipbuilding funds in future years or a change in shipbuilding programs, the downward spiral in the Navy's force structure will continue. Given this apparent disconnect between operations and force structure, it appears inevitable that the Navy will not be able to meet its global commitments in future years.

To counter this downward trend, and meet future commitments, Navy leadership must shift paradigms and adopt a more realistic approach to fiscal management. The Fiscal Year 2003 budget request asked for the construction of two Aegis equipped Arleigh Burke (DDG-51) class destroyers ($1.2 billion per ship), one Virginia class submarine ($2.2 billion), and one San Antonio (LPD-17) class amphibious ($604 million) ship (Donnelly 2002, 1). With the exception of the LPD-17, this budget request is clearly just an extension of the Cold War building plan. While the new Arleigh Burkes and the Virginia class submarines will obviously be very capable ships, one could ask if they are the most prudent uses of the Navy's limited financial resources. "The basis for the Navy's surface combatant program, as well as the underlying assumptions, is not clearly linked to the National Military Strategy" (U.S. Congress 1997, 31).

The Arleigh Burke's are optimized for fleet-on-fleet combat against a high tech foe in mid ocean. The last time an enemy battle fleet put to sea to conduct combat with the United States Navy was at the battle of Leyte Gulf, in 1945. Is it realistic to expect another in the near future? The Virginia, will be the first of a new class of submarines, and thus has a yet unproven design. It will be optimized for combat in deep waters against enemy surface and submarine forces. With the total absence of a potential aggressor capable of challenging the Navy in those regions; whom will it optimized against? Collectively the three ships will cost $4.6 billion and add to the United States Navy's ever growing, and unchallenged supremacy in the ocean's blue-water regions; but they will bring little added capability to the littoral. Additionally the exorbitant cost of these three ships precludes procurement in sufficient numbers to counter the ever-decreasing numbers of surface combatants.

The reason for this apparent disconnect are two fold. First, while Navy leadership continually espouses force transformation, and a shift of focus to the littoral they are clearly still fighting the Cold War. Second, there is a collective misunderstanding of alternatives to current force structure inside the Navy, and the benefits that a smaller, more numerous ship class could provide.

As much as official rhetoric touts the strategic focus of littoral warfare, it has not been translated to force structure decisions. The Navy continually espouses littoral warfare as its priority, and complains about a lack of assets to adequately pursue naval operations in the littoral. Yet, the Navy's ship building effort continues along a divergent path from these statements. By building large, high tech, high cost, blue-water optimized surface combatants, the Navy is forcing the lower end, more numerous, more littorally

adaptable ships from its inventory. The demise of the Cyclones serves as just one example. The Navy today is largely composed of platforms designed to fight the Soviet Navy, a powerful deep-water adversary. Since the end of the Cold War, and the theoretical strategic shift to the littoral, the Navy has attempted to adapt its Cold War force structure and doctrine to meet the new challenges. A majority of the Navy's efforts in this arena has been directed at redefining the capabilities and roles of the Cold War fleet rather than seeking alternatives that would allow for a more efficient use of resources. This is not surprising; in times of great change leaders without clear vision often cling to those things that worked in the past. Cold War naval theory, and not the current and projected operating environment, is the genesis of every Arleigh Burke being built.

> The Navy has not said how this shift in strategy to fighting in littoral areas would affect the size of its surface combatant fleet. However, it believes that the postulated threats and probable roles and missions assigned to its surface combatants require that the force consist of a large number of Aegis capable ships. (U.S. Congress 1997, 34)

Smaller ships, in general, and FPBs specifically offer much potential to the Navy's efforts to develop a force structure to meet future challenges. Unfortunately, bureaucratic politics and cultural biases against small ships in general make the FPB a hard sell in the Navy. The surface Navy has been entrenched in its love of big ships since the turn of the last century. Noted American naval theorist Captain Alfred Thayer Mahan espoused the virtues of the battle fleet in his seminal work contained in *The Influence of Sea Power Upon History.* Due in large part to Mahanian ideas the Navy shed its fleet of corvettes and frigates for larger ships of the line; the battleship Navy was founded. The United States Navy continued to concentrate its efforts during the interwar period (1919-

1940), to developing both a battleship force and tactics, even after the overwhelming potential of the aircraft carrier should have been clearly evident. The orientation toward Aegis equipped ships is the twenty-first century version of battleship mentality. For the most part Aegis is considered the panacea of surface warfare, with anything else substandard, and not up to the task. This has created an environment were small ships are viewed at best with caution, and at times with disdain. The general perception is that FPBs are incapable of contributing to the twenty-first century Navy. But this perception applies an unfair standard of blue-water fleet-on-fleet battle group operations as the norm to the FPBs.

If the appropriate standard of littoral MOOTW and LIC is applied to the FPBs, the perception should change. As clearly demonstrated in chapter 4 of this thesis, the FPB of today is a very capable unit, and has both a documented history and future potential for operations in the MOOTW and LIC environment. While certainly not well adapted to open ocean fleet combat they are more than capable of assuming the lion's share of the United States Navy's littoral missions, and providing both operational and financial relief to the Navy's blue-water fleet. This thesis does not propose wholesale replacement of the traditional blue-water combatants by fast patrol boats. The requirement for ships of this size and capability to conduct high-end naval operations is not in question. What is in question is the prudence in adapting and employing these high-end ships in lesser low-end roles. This thesis concludes, that on a limited basis some of the funds currently allocated for blue-water combatants should be reprogrammed into a FPB construction program, specifically for littoral operations.

The construction and maintenance of a small fleet of FPBs would allow the Navy to more effectively match operational capabilities with mission requirements. No longer would multi-billion dollar cruisers and aircraft carriers be required to conduct low-end MOOTW missions such as MIO or counter-narcotics. The integration of FPBs would allow the Navy to focus its blue-water fleet on its primary warfighting missions, open ocean sea control and power projection, extending the life expectancy of these already dwindling assets. FPBs built in sufficient numbers could easily assume the entire homeland security, protection of friendly shipping and counter narcotics missions. None of these missions requires the capabilities inherent in an Aegis equipped ship, or even an FFG. While frigates, destroyers, and cruisers have adequately performed the entire range of surface Navy MOOTW missions they are not the best ships for these task. Their sheer size in many cases is an impediment to operations as they lack the close quarter's maneuverability necessary for operating in restricted and congested environments. As discussed in chapter 4 of this thesis, the FPB, at times is clearly the superior platform in many of these low-end missions. The FPBs can conduct these missions at a fraction of the costs associated with the current mix of surface combatants, without a substantial increase in risk. FPBs can be procured at significantly less cost than a cruiser or a destroyer, and therefore a greater number of FPBs can be acquired within in a given funding level. This would appear to be at least a partial answer to the Navy's force structure dilemma.

Recommendations for Future Study

While this thesis validated the need for the United States Navy to build and maintain a small fleet of FPBs to operate in the littoral, it leaves several issues

unexplored that should be the subject of future study. Primary among these issues is the need to define the configuration of future FPBs and the number of hulls needed to meet the Navy's commitments in the littoral.

While the Cyclone class patrol coastal certainly has utility in today's Navy it is not optimal. It was designed as a specialized platform for special operations, with coastal patrol and interdiction given a secondary priority. Thus, with a change in mission from special operations to generalized support of MOOTW missions in the littoral, they have excess capabilities in some areas, while the ships are deficient in others. Other FPBs designs currently in operation in world's navies show potential for use in the Navy. The Norway's Skjold class FPB shows clear potential and should be studied. A study should be undertaken to codify those capabilities and characteristics needed to conduct littoral operations, given the projected operating environment and mission. Any study undertaken should stress cost effectiveness and avoid proposing a platform whose cost would make the ships fiscally impractical.

In conjunction with the study to determine the capabilities and characteristics of FPBs needed for use it the United States Navy, a study should be made to determine the number platforms needed to meet the service's commitments in the littoral. The lack of assets appears to be reaching a critical state that may preclude the Navy from meeting all current and future requirements. The added capabilities associated with the addition of FPBs to the Navy for littoral operations are significant. But, it is the ability to procure a larger number of these FPBs, than blue-water optimized ships, which will serve as the greatest benefit to the Navy.

APPENDIX A

FFG OPN ANALYSIS

BMCS	1	$114,962	$114,962.0	GMC	1	$94,841	$94,841
BM1	1	$95,699	$95,699.0	GM1	1	$101,598	$101,598
BM2	3	$87,390	$262,170.0	GM2	2	$91,787	$183,574
BM3	29	$79,069	$2,293,001.0	GM3	1	$83,813	$83,813
DCC	1	$98,638	$98,638.0	GMSN	1	$75,953	$75,953
DC1	1	$89,281	$89,281.0	GSE1	1	$107,069	$107,069
DC2	2	$80,577	$161,154.0	GSE2	1	$98,602	$98,602
DC3	2	$73,802	$147,604.0	GSE3	3	$91,482	$274,446
DCFN	1	$65,382	$65,382.0	GSMC	1	$112,171	$112,171
DK2	1	$80,456	$80,456.0	GSM1	2	$102,834	$205,668
EMC	1	$106,947	$106,947.0	GSM2	1	$94,708	$94,708
EM1	1	$97,901	$97,901.0	GSM3	5	$86,775	$433,875
EM2	3	$88,306	$264,918.0	GSMFN	6	$78,645	$471,870
EM3	2	$77,525	$155,050.0	HM3	1	$70,857	$70,857
ENC	1	$105,989	$105,989.0	HT2	1	$88,272	$88,272
EN1	1	$97,690	$97,690.0	HT3	1	$81,178	$81,178
EN2	3	$88,773	$266,319.0	IC1	1	$98,303	$98,303
EN3	5	$80,529	$402,645.0	IC2	1	$89,017	$89,017
ENFN	1	$72,394	$72,394.0	IC3	1	$80,158	$80,158
ETC	1	$106,379	$106,379.0	MA1	1	$82,848	$82,848
ET1	1	$96,782	$96,782.0	MR2	1	$82,913	$82,913
ET2	2	$86,568	$173,136.0	MSC	1	$99,211	$99,211
ET3	4	$76,914	$307,656.0	MS1	2	$90,516	$181,032
EW1	1	$94,589	$94,589.0	MS2	2	$81,728	$163,456
EW2	1	$85,134	$85,134.0	MS3	2	$73,935	$147,870
EW3	2	$76,652	$153,304.0	MSSN	2	$66,303	$132,606
FCC	1	$111,524	$111,524.0	OSC	1	$111,098	$111,098
FC1	3	$103,900	$311,700.0	OS1	4	$103,425	$413,700
FC2	6	$93,577	$561,462.0	OS2	6	$92,901	$557,406
FC3	2	$83,537	$167,074.0	OS3	2	$84,693	$169,386
			$7,146,940.0				$4,987,499.0

APPENDIX B

FFG MPN ANALYSIS

OSSN	5	$75,031	$375,155	YN1	1	$89,555	$89,555
PC2	1	$79,587	$79,587	YN2	2	$80,456	$160,912
PN1	1	$89,866	$89,866	EMC	1	$105,989	$105,989
PN3	1	$73,931	$73,931	MMCM	1	$124,295	$124,295
ITC	1	$101,270	$101,270				$480,751
IT1	2	$93,525	$187,050				
IT2	4	$84,837	$339,348	CDR	1	$175,228	$175,228
IT3	3	$75,964	$227,892	LCDR	1	$155,506	$155,506
ITSN	1	$68,284	$68,284	LT	4	$138,577	$554,308
QMC	1	$104,035	$104,035	LTJG	4	$120,232	$480,928
QM2	1	$83,549	$83,549	ENS	12	$104,459	$1,253,508
QM3	1	$74,826	$74,826				
SH1	1	$91,682	$91,682				
SH2	1	$83,300	$83,300				
SH3	1	$74,885	$74,885				
SHSN	2	$66,880	$133,760				
SKC	1	$100,283	$100,283	ENLISTED MPN			$16,588,793
SK1	1	$91,463	$91,463	OFFICER MPN			$2,619,478
SK2	3	$82,718	$248,154				
SK3	1	$74,489	$74,489	TOTAL MPN			$19,208,271
SKSN	1	$66,798	$66,798				
SM1	1	$91,971	$91,971				
SM3	2	$74,200	$148,400				
SMSN	1	$65,557	$65,557				
STGC	1	$100,880	$100,880				
STG1	1	$93,270	$93,270				
STG2	2	$83,521	$167,042				
STG3	5	$74,259	$371,295				
TM1	1	$91,595	$91,595				
TM3	1	$73,986	$73,986				
			$3,973,603				

APPENDIX C

PC OPN ANALYSIS

BM2	1	$87,390	$87,390
BM3	2	$79,069	$158,138
CTT2	1	$81,008	$81,008
DC1	1	$89,281	$89,281
EM1	1	$97,901	$97,901
EM3	1	$77,525	$77,525
ENC	1	$105,989	$105,989
EN2	2	$88,773	$177,546
EN3	2	$80,529	$161,058
ET2	1	$86,568	$86,568
GM1	1	$101,598	$101,598
GM3	1	$83,813	$83,813
IC2	1	$89,017	$89,017
IT1	1	$93,525	$93,525
IT3	1	$75,964	$75,964
MS1	1	$90,516	$90,516
OS2	1	$92,901	$92,901
QM1	1	$93,117	$93,117
QM3	1	$74,826	$74,826
SM2	1	$81,921	$81,921
LT (1110)	1	$138,577	$138,577
LTJG (1110)	2	$120,232	$240,464
CWO2	1	$118,480	$118,480
ENLISTED MPN		$1,999,602	
OFFICER MPN		$497,521	
TOTAL MPN		$2,497,123	

APPENDIX D

WORLD NAVY FORCE STRUCTURE

ALBANIA	0	19	100.0%	IRELAND	2	4	66.7%
ALGERIA	3	26	89.7%	ISRAEL	3	10	76.9%
ARGENTINA	9	14	60.9%	ITALY	30	7	18.9%
AUSTRALIA	10	15	60.0%	JAMAICA	0	3	100.0%
AZERBAIJAN	0	1	100.0%	JAPAN	52	21	28.8%
BAHAMAS	0	5	100.0%	JORDAN	0	3	100.0%
BAHRAIN	1	10	90.9%	KENYA	0	5	100.0%
BANGLADESH	4	38	90.5%	KIRIBATI	0	1	100.0%
BELGIUM	3	1	25.0%	KOREA (NORTH)	1	76	98.7%
BRAZIL	18	33	64.7%	KOREA (SOUTH)	40	88	68.8%
BRUNEI	0	6	100.0%	KUWAIT	0	10	100.0%
BULGARIA	1	12	92.3%	LATVIA	0	5	100.0%
BURMA	0	36	100.0%	LIBYA	2	12	85.7%
CAMBODIA	0	2	100.0%	LITHUANIA	1	2	66.7%
CAMEROON	0	2	100.0%	MALAYSIA	4	18	81.8%
CANADA	16	0	0.0%	MALTA	0	3	100.0%
CAPE VERDE	0	1	100.0%	MAURITANIA	0	3	100.0%
CHILE	6	17	73.9%	MEXICO	22	34	60.7%
CHINA	62	304	83.1%	MOROCCO	3	21	87.5%
COLUMBIA	4	11	73.3%	NETHERLANDS	15	0	0.0%
COOK ISLANDS	0	1	100.0%	NEW ZEALAND	2	0	0.0%
CROATIA	0	8	100.0%	NIGERIA	1	8	88.9%
CUBA	0	7	100.0%	NORWAY	3	15	83.3%
DENMARK	7	14	66.7%	OMAN	3	11	78.6%
DOMINICAN REPUBLIC	0	6	100.0%	PAKISTAN	8	8	50.0%
ECUADOR	2	11	84.6%	PAPUA NEW GUINEA	0	4	100.0%
EGYPT	12	27	69.2%	PERU	6	10	62.5%
ERITREA	0	4	100.0%	PHILIPPINES	11	14	56.0%
ESTONIA	1	0	0.0%	POLAND	4	20	83.3%
FIJI	0	1	100.0%	PORTUGAL	16	8	33.3%
FINLAND	0	10	100.0%	QATAR	0	7	100.0%
FRANCE	33	16	32.7%	ROMANIA	7	17	70.8%
GABON	0	3	100.0%	RUSSIA	73	89	54.9%
GEORGIA	0	4	100.0%	SAUDI ARABIA	5	13	72.2%
GERMANY	17	25	59.5%	SENEGAL	0	5	100.0%
GHANA	0	4	100.0%	SINGAPORE	0	18	100.0%
GREECE	16	36	69.2%	SOLOMON ISLANDS	0	2	100.0%
HONDURAS	0	1	100.0%	SOUTH AFRICA	0	6	100.0%
INDIA	16	36	69.2%	SPAIN	21	6	22.2%
INDONESIA	14	38	73.1%	SRI LANKA	1	15	93.8%
IRAN	3	16	84.2%	SWEDEN	0	22	100.0%
IRAQ	0	1	100.0%	SYRIA	0	16	100.0%

TAIWAN	28	13	31.7%	EUCOM	258	433	62.7%
TANZANIA	0	2	100.0%	CENTCOM	34	135	79.9%
THAILAND	16	34	68.0%	PACOM	250	809	76.4%
TONGA	0	3	100.0%	SOUTHCOM	54	133	71.1%
TRINIDAD	0	4	100.0%	UNASSIGNED	111	123	52.6%
TUNISIA	0	9	100.0%	ARC OF INSTABILITY	274	906	76.8%
TURKEY	28	33	54.1%	EAST ASIAN LITTORAL	240	791	76.7%
TAUALU	0	1	100.0%	KOREA(N),IRAN, IRAQ	4	93	95.9%
UKRAINE	0	3	100.0%				
U.A.E.	2	14	87.5%				
UNITED KINGDOM	31	0	0.0%				
URUGUAY	3	3	50.0%	UNITED STATES	114	13	10.2%
VENEZUELA	6	6	50.0%				
VIETNAM	5	22	81.5%				
YEMEN	0	4	100.0%				
YUGOSLAVIA	3	17	85.0%				

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