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The intended focus of this paper is to examine current maritime security operations (MSO) and the specific challenges our maritime security forces face combating terrorism within the vast and evolving maritime domain. This paper challenges the current approach to maritime domain awareness, suggesting that the reader focus on failed states and their proximity to maritime domains and critical maritime infrastructure, rather than on the maritime domain as a subset of a failed state. This would provide a better focus for effective maritime security operations, and further the development of domain awareness.

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NAVAL WAR COLLEGE
Newport, RI

Maritime Security Operations:
A New Global View and Whispers of Mahan

By

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

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Abstract

The attacks on "9/11" highlighted critical vulnerabilities in our national security and economic infrastructures that have resulted in increased security measures at our airports, seaports and borders. In spite of the numerous directives and measures to increase our safety, no greater vulnerability exists than through the vastness, complexity and ambiguity of the *maritime domain.*

The intended focus of this paper is to examine current maritime security operations (MSO) and the specific challenges our maritime security forces face combating terrorism within the vast and evolving maritime domain. This paper challenges the current approach to maritime domain awareness, suggesting that the reader focus on failed states and their proximity to maritime domains and critical maritime infrastructure, rather than on the maritime domain as a subset of a failed state. This would provide a better focus for effective maritime security operations, and further the development of domain awareness.

Table of Contents

List of Illustrations

"America, in this new century, again faces new threats. Instead of massed armies, we face stateless networks; we face killers who hide in our own cities. We must confront deadly technologies. To inflict great harm on our country, America's enemies need to be only right once. Our intelligence and law enforcement professionals in our government must be right every single time,"

President George W. Bush
December 17, 2004

Introduction

September 11, 2001 saw the first air attack on American soil since the Japanese air attack on Pearl Harbor in December, 1941. Never before had the United States witnessed such an attack by unconventional means: hijacked, fuel-laden U.S. commercial aircraft used as "precision-guided" bombs, targeting civilian and military populations and centers of financial and political power. These "fourth generation" forms of warfare manipulate civil and societal infrastructure through any and all means possible.

The attacks on "9/11" highlighted critical vulnerabilities in our national security and economic infrastructures that have resulted in increased security measures at our airports, seaports and borders. In spite of the numerous directives and measures to increase our safety, no greater vulnerability exists than through the vastness, complexity and ambiguity of the *maritime domain.* Though other vulnerabilities still exist, "the maritime domain in particular presents not only a medium by which international terrorist organizations (ITO) can move, supply, and generate financial support, but offers a broad array of potential targets that fit their operational objectives of achieving mass casualties and inflicting catastrophic economic harm."[1] With the increasing prospect of terrorists exploiting the maritime domain for financial support or the logistical maneuver of terrorist personnel, conventional weapons, or weapons of mass destruction, the increased security of the global maritime domain must remain a paramount objective for our maritime security forces.

To demonstrate the maritime domain's vulnerability to terrorist exploitation, fast-forward to another attack where terrorists have obtained a chemical, dirty, or even nuclear bomb, smuggle it in "one of 230 million cargo containers that move through the world's ports each year,"[2] and detonate it in a vital choke-point, a strait, or in one of the world's 34 mega-ports. The tremendous loss of life and devastating global economic impact from the attacks on 9/11 could appear minimal by comparison.

In response to this increasing threat to our national security through the maritime domain, the President in December 2004 charged his Secretaries of the Department of Defense and Homeland Security to "lead the Federal effort to…better integrate and synchronize the existing department level strategies and ensure their effective and efficient implementation."[3] But almost four years after United States and Coalition forces entered the fight in the Global War on Terror, *Maritime Security Forces*[A] are still struggling with its strategy and tactics, where to focus its efforts, and whether asset intensive maritime interdiction operations are having an effect. Because of the very nature of the terrorism; the indistinguishable enemy of non-state actors, hiding in the sanctuary of the global maritime domain, it is understandable that counterterrorism maritime-strategies and tactics remain extremely difficult and determining *measures of effectiveness*[B4] next to impossible.

Thesis

The intended focus of this paper is to examine current maritime security operations (MSO) and the specific challenges our maritime security forces face

[A] Maritime Security Forces are considered all land and sea forces associated with Maritime Security Operations; US Navy, Marine Corps, Coast Guard and naval Coalition assets.
[B] Measures of Effectiveness are defined as indicators of success, measured over time that is deemed an essential aspect of achieving the objective.

combating terrorism within the vast and evolving maritime domain. This paper challenges the current approach to maritime domain awareness, suggesting that the reader focus on failed states and their proximity to maritime domains and critical maritime infrastructure, rather than on the maritime domain as a subset of a failed state. This would provide a better focus for effective maritime security operations, and further the development of domain awareness. Additionally, to provide a basis for measures of effectiveness and to further support the thesis of expanded maritime domain awareness, this paper analyzes the current relationship between maritime security operations and the Global War on Terror with respect to its seeming impact on insurgent attacks in Iraq and the Middle East maritime domain.

Understanding the Global Maritime Domain and Security

For maritime security forces to better understand the evolving maritime domain of the 21st century, the dynamics of globalization have to be included. More than any other supporting condition, globalization relies on the G*lobal Maritime Domain* to integrate nations and economies. President Bush highlighted in the *National Strategy for Maritime Security*: "the oceans, much of which are global commons under no State's jurisdiction, offer all nations, even landlocked States, a network of sea-lanes or highways that is of enormous importance to their security and prosperity."[5] "More than 80 percent of the world's trade by volume and about half the world's trade by value travels by water. Further, 90 percent of the world's cargos are transported in containers."[6] Unfortunately, international terrorist's organizations "…have twisted the benefits and conveniences of our increasingly open, integrated, and modernized world to serve their destructive agenda."[7] The global maritime domain's strengths have become a recognized critical

vulnerability by international terrorist organizations, and already we have witnessed on numerous occasions the terrorists' willingness to exploit the global maritime domain not only through piracy, smuggling or legitimate cargos, but most notably through the bombing of the USS Cole in October 2000 and the French tanker Limburg two years later.

Some of the biggest challenges facing maritime security forces today are; understanding the dynamics of the maritime domain and determining where to focus limited security assets in the vastness of the global commons. Fundamental to a better understanding of the evolving domain dynamics, and for a more efficient and effective focus, maritime security forces need to look beyond the current definition of maritime domain awareness. Globalization has acted as a catalyst in breaking the borders of the current maritime domain. Maritime security forces need to re-focus their efforts through *Global Maritime Domain Awareness.*

Though this statement appears obvious, the current definition is too limiting in scope and does not address many crucial external factors. Currently, the maritime domain is defined as "all areas and things of, on, under, relating to, adjacent to, or bordering on a sea, ocean, or other navigable waterway, including all maritime related activities, infrastructure, people, cargo, and vessels and other conveyances."[8] In the National Strategy for Maritime Security, the President directed that maritime security forces "have an essential understanding of all activities, events and trends within any relevant domain – air, sea, space, and cyberspace…"[9] The current direction given is suitably broad and encompassing for comprehending what exists within the domain and its interoperability

with maritime or energy infrastructure, but does not address other evolving, sometimes intangible factors that currently influence the global maritime domain.

The global maritime domain cannot be defined within a vacuum and should be viewed as inextricably linked to critical maritime geography and the social, political and economic dynamics of the region. This expanded perception will provide a more efficient focus for maritime security forces.

Expanding the View for Better Focus

When integrating the social, political and economic dynamics into the current global maritime domain, it can be useful to take a historical perspective from Alfred Thayer Mahan's "General Conditions that Affect Sea Power" to demonstrate historically how critical factors that influence a nations sea power are relevant to some of the factors that influence today's global maritime domain. Mahan stated the following six conditions that influence a nation's sea power:

- Geographical position
- Physical Conformation
- Extent of Territory
- Number of Population
- National Character
- Character and Policy of Government[10]

Though Mahan's conditions were speaking to a nation's critical strengths with relation to sea power, these same conditions can become significant liabilities when assessing the vulnerability of a region's maritime domain(s). When addressing this evolving view of the maritime domain, of particular relevance are Mahan's stated conditions of geographical position, physical conformation, national character and character and policy of government. These conditions are relevant with respect to the stability of a state or region and its influence, through the use or misuse, of the associated maritime domain(s).

The conditions that provide strategic advantages to sea power nations can also provide states sponsoring terrorism and terrorist organizations the same advantages enabling them to exploit the existing maritime infrastructure to conduct logistical support or hostile operations. Viewing the above conditions with respect to the proliferation of terrorism and the threat to critical maritime infrastructure, failed states with maritime access should be the first step of regional focus for combatant commanders and maritime security forces.

Failed States

So what constitutes a "failed state" and why should failed states be a focus of regional combatant commanders and maritime security forces? An accepted definition of failed states is "…countries in which the central government does not exert effective control over, or able to deliver vital services to significant parts of its own territory due to conflict, ineffective governance, or state collapse."[11] Further, I consider a state with a legitimate functional government to be "failed" if that state harbors or sponsors terrorism or terrorist related activities, or the state is incapable of controlling its maritime domain. Moreover from a global maritime security cooperation perspective, the failed state focus enables maritime security forces to promulgate the President's direction to identify those states that are willing to combat terrorism, but may not have the means. On an operational level, a concentration on failed states allows maritime security forces to "…focus [their] efforts and resources on the areas most at risk."[12]

Recently, failed states have become potential safe havens for international terrorists. As Brookings Institute scholar Susan Rice points out, terrorist organizations can "take advantage of failing states' porous borders, their weak or nonexistent law

enforcement and security services, and their ineffective judicial institutions to move men, weapons and money around the globe." The significance to maritime security forces is that failed states which "… create environments that spur wider regional conflicts with significant economic and security costs to neighboring states…"[13]can also have a negative influence or impact on associated maritime domains. When through the activities of international terrorist organizations or through the activities of failed states, maritime domains that are exploited to support terrorism through piracy, smuggling, or other illicit activities to the extent that it is having or possesses the potential to negatively impact or destabilize the region through the associated maritime infrastructure, they should be considered a "*Failed Maritime Domain.*"

Failed Maritime Domains

While failed states provide an initial regional focus for maritime security operations, failed states with associated failed domains provide an enhanced focus. Perceiving a landmass and its associated maritime region as a 'failed state" allows a regional focus that may include near-shore maritime operations. But inevitably, the focus of these operations is directed landward. Assessing a maritime region as a failed maritime domain in itself allows an enhanced maritime focus that enables a more efficient concept of operations for distribution of scarce maritime security forces and sea bases to areas of probability where terror or terror related activities will likely occur. Additionally, the above refined focus provides more specific guidance to the direction promulgated in the National Strategy for Maritime Security to: "…detect, deter, interdict and defeat terrorist attacks, criminal acts, or hostile acts in the maritime domain, and prevent its unlawful exploitation for those purposes."[14]

Because of a failed state's inability or unwillingness to control its maritime domain, failed maritime domains can become the new sanctuaries that enable terrorists or terror related activities to operate with impunity. Maritime security experts note that international terrorists organizations have shown increased "…interest in developing technologies, tactics and techniques for conducting maritime terrorist operations. This [evidence] was confirmed by the recovery of video tapes in Afghanistan for…terrorist groups to study in depth both offensive and maritime operations by governments…"[15] Terrorists are currently exploring the potential possibilities offered in existing failed maritime domain infrastructures; using ports as hubs for logistical or financial support or as staging areas for future attacks, as well as using legitimate shipping as a cover to transport illicit cargos. Moreover, analogous to land-based terrorist training camps located within a state, failed maritime domains could offer terrorists similar benefits and training opportunities; available maritime assets, an experienced maritime population for recruitment, and a maritime training-ground for complex planning and rehearsals for future attacks where the battlefield is not urban, or rural, or desert, or mountain, but the sea itself.

There are several regions where failed states have associated failed maritime domains with current terror or terror-related activities that should be the focus for maritime security forces. The African continent has two regions; the West coast in the vicinity of the Gulf of Guinea and Bight of Benin, and the east coast from Tanzania north to Somalia. In the Middle East region, the maritime area of interest ranges from the southern coast of Yemen northeast to the coast of Pakistan and the North Arabian Gulf. In the Indonesian region, failed domains run from the southern and southeastern coast of

Kalimantan, north to the southwest coast of Philippine archipelagic waters and through the Straits of Malacca. In the Central/South America region, failed domains exist on the Pacific and Caribbean coasts of Panama and Colombia.

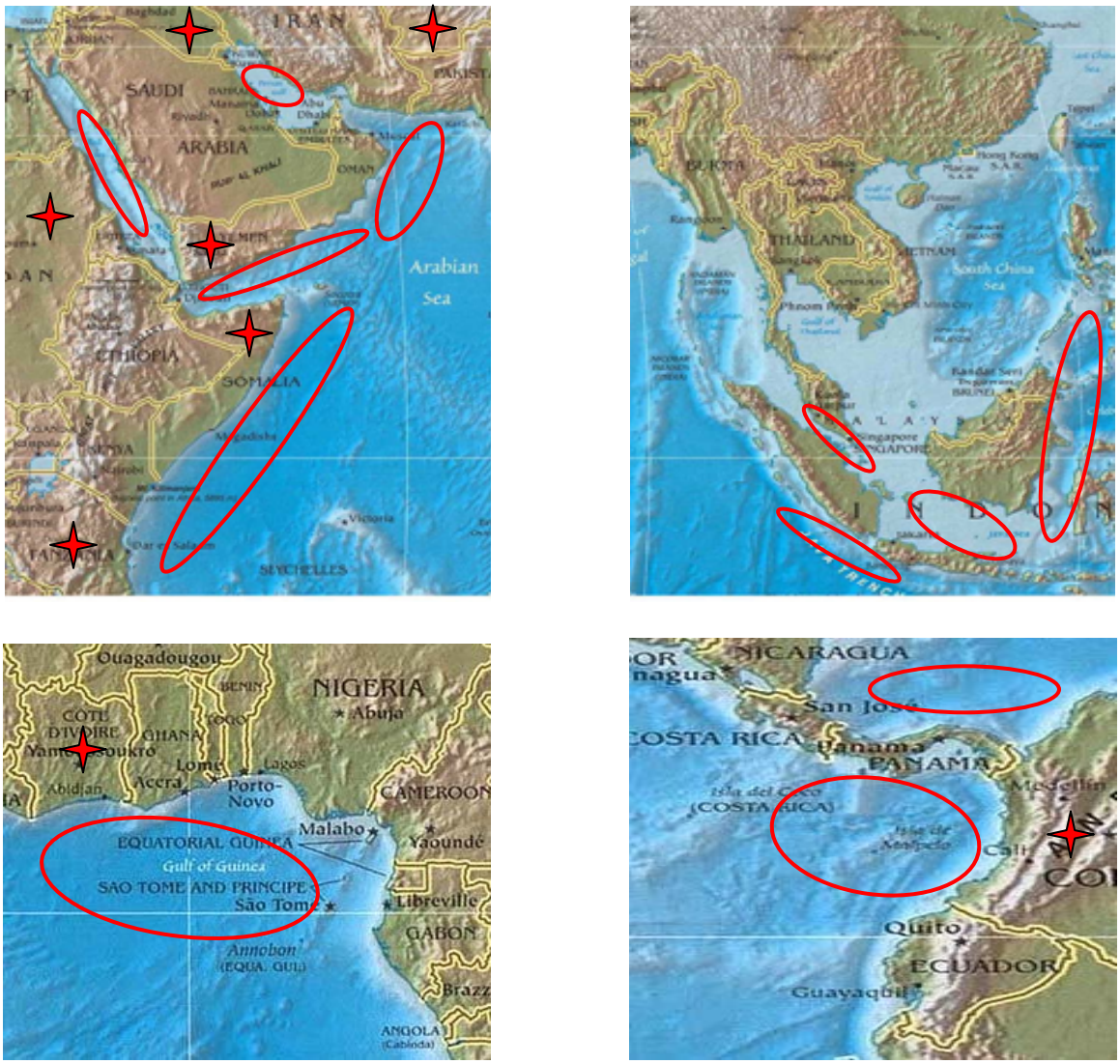


Fig. 1. ***Failed Maritime Domains of Interest***[16] = ***Failed State*** = ***Failed Domains***

Fig. 1 illustrates current failed maritime domains of interest in relation to failed states, but as shown, not all the failed domains are associated with failed states. Though the failed maritime domains located in the Indonesian region do not have associated failed states, they are considered failed because of the significant increase in crime and

terror related hi-jacking, smuggling and piracy, due to the associated state's maritime security forces' inability or unwillingness to provide sufficient security to transiting maritime assets. Further, the failed maritime domain in the vicinity of the Gulf of Guinea and Bight of Benin is a mounting global concern because of the regions growing oil production capability.

A common dynamic influencing the failed domains of interest are the increasing acts of piracy and smuggling of terror related cargos. Though piracy and smuggling have existed in these domains for centuries, there are rising concerns because of the emergent link between terrorist organizations and piracy and smuggling. The International Maritime Bureau reported 445 incidents of piracy in 2003, while 370 occurred in 2002. In 2004, the number of piracy attacks decreased to 325, but the attacks were more violent and more sophisticated than previously. Further, the International Maritime Bureau reported a dramatic increase in kidnapping and ransoms, while deaths among vessel crews increased 45 % from 2003 to 2004. The sophistication and violence of the recent piracy acts are strong indicators that terrorists may be involved. While previous attacks were generally carried out by poorly-armed and relatively disorganized gangs of boarders, current terror related piracy tactics have revealed swarm type tactics, equipped with AK-47's and RPG's, demonstrating a well armed and somewhat structured organization. Evidence has also revealed attacks predominantly targeting dangerous-cargo carrying vessels, indicating a level of sophistication and a possible future attack method. Additionally, similar to terrorists learning to fly commercial aircraft, physical evidence has revealed individuals learning to navigate dangerous-cargo maritime vessels.

Smuggling is also prolific in the failed maritime domains of interest, and may represent another possible source of funding for terrorists and terror related organizations. Though smuggling has been a long-established way of life in these domains for centuries, recent intercepts have revealed cargos other than the traditional cigarettes, alcohol and other black-market goods. Recent intercepts have found undocumented individuals (potential insurgents), weapons caches, explosives, and vehicles prepared for or containing improvised explosive devices (IED's).

Though failed states and associated failed maritime domains require the attention of maritime security forces, C*ritical Maritime Domains (CMD)* are regions with strategic maritime importance that should be of greater, and potentially the greatest focus of regional combatant commanders and maritime security forces.

Critical Maritime Domain

Critical Maritime Domains are domains that contain vital sea lanes, points of convergence, straits, mega-ports and other critical nodes such as vital energy infrastructure that if disrupted would have a catastrophic regional or global economic impact or equal loss of life. There are many critical nodes of maritime infrastructure that if attacked could have a catastrophic impact to the immediate region, but there are currently eight critical maritime domains, which if disrupted or attacked, could have global implications:

1. Panama Canal
2. Suez Canal
3. Bab-el-Mandeb
4. Al Basra Oil Terminal
5. Strait of Hormuz
6. Strait of Malacca
7. Sunda Strait
8. Lombok and Makassar Straits

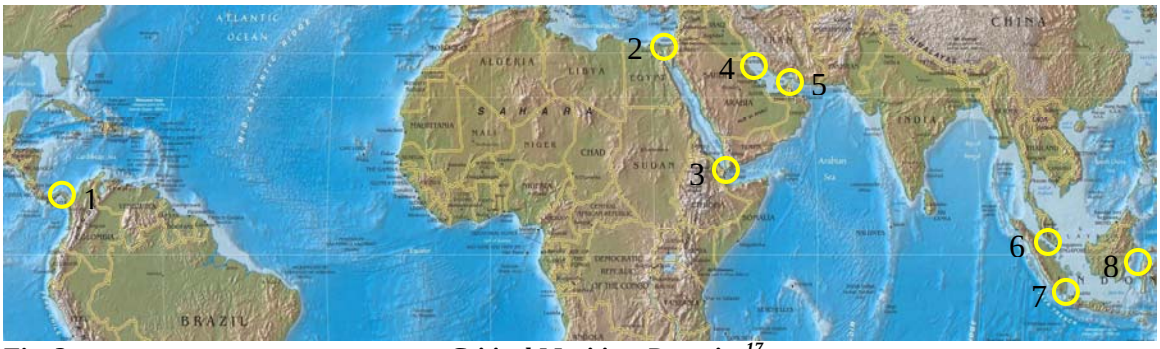


Fig. 2. ***Critical Maritime Domains***[17]

It is not difficult for international terrorist organizations to identify these critical domains as strategic centers of gravity, thus requiring the attention of maritime security forces. Of the eight critical maritime domains illustrated in fig. 2, the Strait of Malacca, Strait of Hormuz and al-Basra Oil Terminal can be considered of primary focus; the Panama Canal, Suez Canal and Bab-el-Mandeb secondary, and Sunda, Lombok and Makassar Straits tertiary. To provide an efficient focus for maritime security forces, it would be prudent to assigning a level of vulnerability to the critical maritime domains and label them as Levels I-III *Vulnerable Critical Maritime Domains (VCMD)*:

Level I VCMD

- Strait of Malacca
- Strait of Hormuz
- al Basra Oil Terminal

Level II VCMD

- Panama Canal
- Suez Canal
- Bab-el-Mandeb

Level III VCMD

- Sunda Strait
- Lombok and Makassar Straits

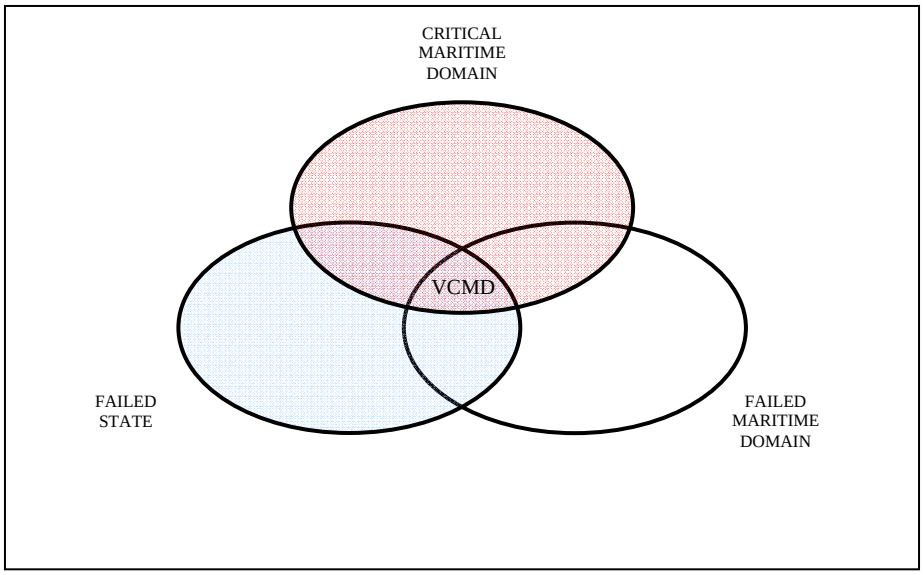


Fig. 3. ***Vulnerable Critical Maritime Domain***

A Vulnerable Critical Maritime Domain (VCMD) exists when a critical maritime domains lies within or adjacent to a failed maritime domain, see fig. 3. Not all critical maritime domains meet the same level of "vulnerability" because of the geographic characteristics of the domain, or the maritime domain(s) associated state(s) or region provide sufficient security or control over the critical domain's critical nodes, sea-lanes, and infrastructure. For example, though the Panama Canal is a critical maritime domain adjacent to a failed maritime domain, it falls into the category of Level II VCMD because of the Canal's more effective security structure. Additionally, because of the Panama Canal's lower geo-strategic maritime importance – the International Maritime Bureau statistics estimates approximately 14,000 ships per year pass through the Canal as compared to 50,000 ships through the Strait of Malacca – an attack would have less of an impact and may be perceived less of a target by terrorists.

The Strait of Malacca, arguably the most strategic of all the critical maritime domains, is considered the primary *level I VCMD*. Through this narrow, shallow, 600-mile, heavily congested domain transits "approximately 25% of the world's trade, 50

percent of its oil and about an equal amount of liquefied natural gas… every year."[18] This critical maritime domain also includes Singapore, with the world's busiest port. A "Trojan Horse" tanker attack in Singapore's mega-port or a well placed tanker sunk in the shallows could effectively shut down the Strait of Malacca, forcing other shipping to use the Sunda Strait and the Lombok/Makassar Straits. The Straits of Malacca blockage alone would cost approximately half of the worlds shipping an extra three days transit, causing a tremendous strain on Pacific Rim energy consumers (oil and liquefied natural gas), delay container goods to market and force maritime insurance rates up, causing increased shipping rates, all resulting in a potential global economic crisis.

The other two *level one VCMD's* are of equal importance because of their tremendous impact on the global energy trade and economy. First is the al Basra Oil Terminal (ABOT), representing 80 percent of Iraq's economy. Second is the Strait of Hormuz through which passes15 percent of the world's oil. An attack or destruction of the ABOT would devastate an already financially-crippled Iraq, hindering its reconstruction efforts and causing further instability in the region and cost to the US/Coalition effort. Similarly, a loss of control of the Strait of Hormuz could impact the global energy trade and result in regional instability. The remaining five VCMD's, if attacked, could have global implications, but not to the same degree if one of the *level one VCMD's* were attacked.

Counter Arguments

It can be argued that current maritime security operations are already focused in some maritime domains deemed "failed," "critical" and "vulnerable critical." For example, there are maritime security operations currently being conducted around the

Horn of Africa and Arabian Gulf, and there is a permanent detachment of security personnel in and around the al Basra Oil Terminal. As such, there has been a seemingly low number of maritime terror or terror related incidents.

The Daunting Task

Carrier and Expeditionary Strike Groups, Coalition and permanently based maritime security assets maintain a continuous presence in the Arabian Gulf and Horn of Africa region conducting operations in support of Operations Iraqi Freedom and Enduring Freedom. When in theater, in addition to OIF and OEF commitments, Strike Group assets have additional tasking to conduct maritime security operations. This leaves a finite number of maritime security assets to cover over 1,000 natural gas and oil platforms, 25,000 miles of shoreline in fifteen different countries and over almost 200 ports facilities, most of which are inside "unfriendly" international waters. [19]

It would appear on the surface that the current focus and level of effort of maritime security operations are resulting in a relatively low number of maritime terrorist attacks or terror related incidents around the Horn of Africa and Arabian Gulf maritime domain. But when examining some operational data relating to recent terror related trends, the analysis provides another possible perspective. When comparing the 5th Fleet maritime interdiction operational data[20] conducted in the region from December, 2001 to January, 2006 and insurgent attack data from the Brookings Institute *Iraq Index*[21], the combined independent data showed an interesting correlation (see fig. 4). The maritime interdiction data shows a particular level of effort (number of boarding and queries) over

time as compared to levels of insurgent attacks[C] in Iraq. Viewing the data in relation to specific maritime terror events in the region also proved interesting.

What is interesting to note from the data is the increase in insurgent attacks in Iraq relative to the decrease in maritime interdiction operations levels of effort. It is difficult to prove that the increases in insurgency attacks are directly related to the decreased interdiction level of effort, but a possible correlation could be reached through an assumption that high levels of maritime intercept operations disrupt the logistics of insurgent operations in Iraq. A method to test this hypothesis would be to analyze the shipping transit times from states known to sponsor terrorism to ports in Iraq. Based on a time/distance approximation for vessels from dhows to large group III's, transit time from the Horn of Africa region to the Northern Arabian Gulf (approximately 1,800 nm) using an estimated speed range of five to ten nautical miles per hour, transit times can vary from seven to fourteen days. Assuming that the vessel made an offload in one of Iraq's five ports, adding an offload and ground transit time of a week, plus an insurgent or weapon "assimilation" time of about a week, the total time from ship to insurgent action could be 30-40 days. Using this approximate transit time, we can assume the graphed data would reflect a similar time difference between high levels of maritime interdiction operations and a subsequent drop in insurgent action; approximately 30-40 days. Fig. 5 may illustrate a few real-world examples of peak maritime interdiction operation and a subsequent decrease in insurgency attacks 30-40 days later.

Another method to examine a possible relationship between the MIO and insurgent attack data is through statistical analysis. A population correlation coefficient,

[C] A single insurgent attack is defined by an attack on Iraqi civil/military or coalition troops by a single insurgent, an action of a group of insurgents, or a single explosive device (my definition).

which measures the degree of relationship between two variables, is a statistical method that could prove useful, demonstrating a possible relationship between the MIO operational data and the insurgent data from the Brookings Institute. (See Appendix 1, table 1).

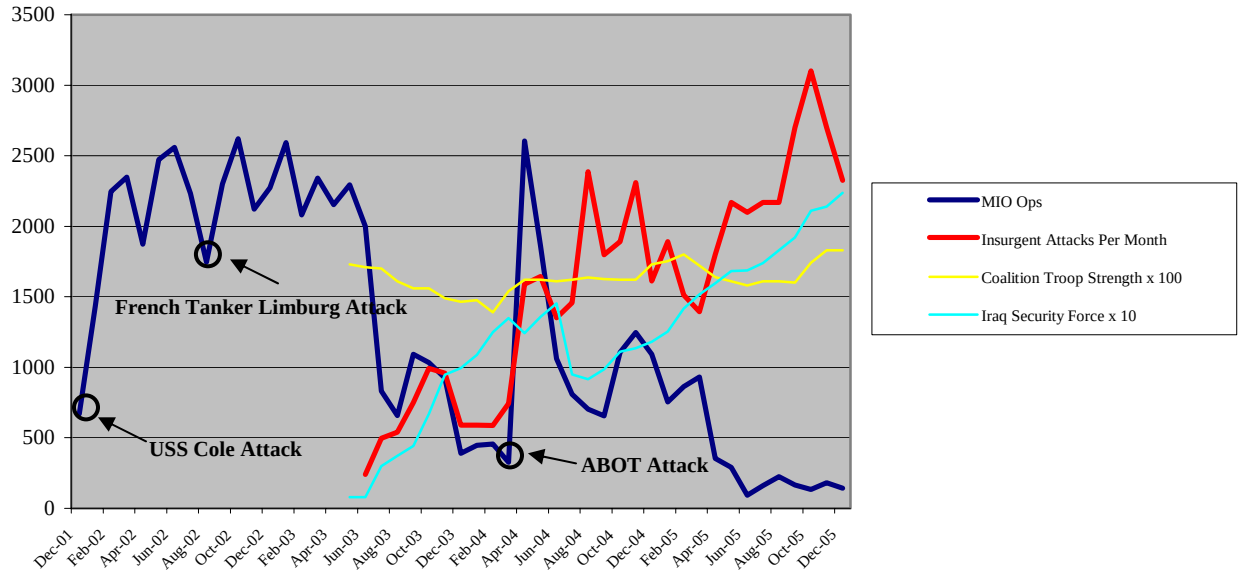
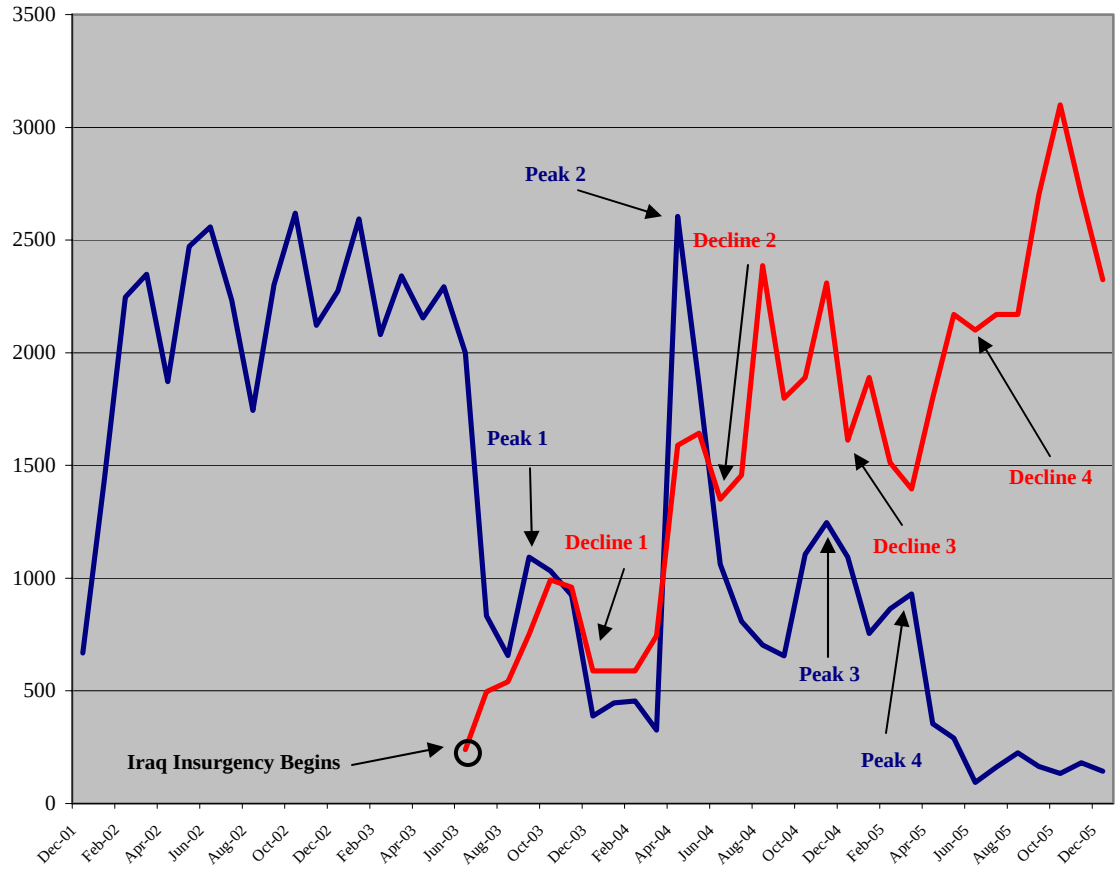


Fig. 4. Maritime Security Operations[22]

Though it is difficult to prove the correlation between maritime security operations level of effort and insurgent attacks, it is difficult to ignore the seeming direct cause-effect relationship. Evident in fig.4 is that insurgent attacks occurred regardless of coalition or Iraqi Security Force strength. What is also clear from fig. 4 is that major maritime domain attacks occurred when maritime interdiction operational tempos were at their lowest relative levels. As such, you can also see the subsequent increase in maritime security operations immediately following the attacks.

Through examining the MIO data and insurgency data from two completely independent sources, I believe that enough evidence exists through measurable results to

support the expanded focus of maritime domain awareness and the focus of maritime security operations to CMD's and VCMD's.



Peak = MIO **Fig. 5 MIO vs. Insurgent Actions[23]** Decline = Insurgent Attack

Conclusions

As stated in the National Strategy for Maritime Security, "The safety and economic security of the United States depends upon the secure use of the world's oceans,"[24] the role of maritime security forces are playing a crucial role in the Global War on Terror. However, maritime security forces face some serious challenges combating terror within the expanse of the global commons. Terrorists are patient and will not be easily deterred, and evidence has shown that terrorists will use any and all

means, exploiting advances in globalization and maritime infrastructure, transportation and commerce to further their destructive agenda. Even with an enhanced awareness of the global maritime domain, its vastness precludes the 100% security solution. But an enhanced awareness through a focus on failed maritime domains with their allocated critical maritime infrastructure, can better focus security efforts and enable maritime security forces to better identify and address terrorists or terror related organizations at their sources, keeping attacks "…as distant from our borders – including territories and overseas installations – as possible, to provide maximum time to determine the optimal course of action."[25]

Lastly, because of the nature of terror, determining measures of effectiveness for maritime security operations will remain a challenge. Similar to the expanded approach to maritime domain awareness, maritime security forces will have to look beyond the tangible when assessing measures of effectiveness. Maritime security forces will have to understand that "Progress will come through the persistent accumulation of successes – some seen, some unseen."[26]

Appendix One

Date	Queries	Insurgent Attacks	Coalition Troop Strength x 100	Iraq Security x 10
6/1/2003	2000	240	1710	80
7/1/2003	833	496	1700	300
8/1/2003	657	540	1610	371.7
9/1/2003	1093	750	1560	442
10/1/2003	1033	992	1560	668
11/1/2003	925	960	1490	948
12/1/2003	389	589	1465	996
1/1/2004	447	589	1476	1088
2/1/2004	455	588	1390	1250
3/1/2004	326	744	1540	1349.9
4/1/2004	2605	1590	1620	1242.5
5/1/2004	1858	1643	1620	1357.1
6/1/2004	1062	1350	1610	1453.1
7/1/2004	809	1457	1620	950.8
8/1/2004	703	2387	1637	914.7
9/1/2004	655	1798	1626	987.1
10/1/2004	1106	1891	1620	1110
11/1/2004	1246	2310	1620	1135.1
12/1/2004	1093	1612	1730	1180
1/1/2005	755	1891	1753	1253.8
2/1/2005	863	1512	1800	1417.6
3/1/2005	931	1395	1720	1516.2
4/1/2005	354	1800	1640	1594.9
5/1/2005	291	2170	1610	1682.2
6/1/2005	93	2100	1580	1686.7
7/1/2005	161	2170	1610	1739
8/1/2005	225	2170	1610	1829
9/1/2005	165	2700	1600	1921
10/1/2005	134	3100	1740	2110
11/1/2005	182	2700	1830	2140
12/1/2005	143	2325	1830	2237

MIO OPS vs. Insurgent Attacks Population Correlation Coefficient → -0.338406738

Coalition Troop Strength vs. Insurgent Attacks Population Correlation Coefficient → 0.473733157

Iraqi Security Force vs. Insurgent Attacks Population Correlation Coefficient → 0.771963372

Table 1

Appendix One

Table one demonstrates possible correlations between the MIO operational data and the data from the Brookings Institute. Applying the population correlation coefficient method to the data, it would appear that Coalition Troop Strength had no affect on decreasing Insurgent Attacks. When comparing the variables of the Insurgent Attack data and Coalition Troop Strength, $\rho = .473733157$, indicating a negative correlation to a decrease in insurgent attacks. Further, comparing the variables of the Insurgent Attack data and Iraqi Security Force Strength, $\rho = .771963372$, indicating a larger negative correlation to the decrease in insurgent attacks. What is interesting is the comparison between MIO and insurgent attacks. When comparing the variables of the Insurgent Attacks and MIO, $\rho = -.33840$, appearing that a possible positive correlation existed. In that, it appears that a peak in MIO resulted in a corresponding decrease in insurgent attacks 30-40 days later, supporting the insurgent logistic issue previously cited (see fig. 5 for illustration of this possible dynamic). Further, when MIO operations were at their lowest, insurgent attacks were at their highest.

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