IV.   THREAT ANALYSIS

A.   OVERVIEW

The threat facing a naval expeditionary force in the year 2020 will be characterized by its unpredictability, volatility, and diversity. The crises that might confront the future ExWar Force range from humanitarian and disaster relief operations to a Major Combat Operation (MCO). The ExWar Integrated Project will design an ExWar Force that will be expected to conduct operations in the littoral areas of the world, "home to over 75% of the world's population and over 80% of the world's capitals" (NAVSEA, 2002, 18). They are the centers of economic activity and they provide the land-sea juncture that enables trade and international interaction. The implications of this environment for the ExWar Integrated Project are extraordinary and in many cases may require a reorientation concerning the conduct of naval expeditionary operations. This study will form the basis for the underlying strategic assumptions referred to in Chapter VII—Integrated Concept of Operation (CONOPS) as well as provide the context for certain system of systems and individual platform requirements.

1.   Capabilities-Based Approach

According to the *Quadrennial Defense Review* (DOD, 2001) developed under the supervision of the Secretary of Defense, Donald Rumsfeld, the new defense strategy will be "built around the strategy of shifting to a 'capabilities-based' approach" (DOD, 2001, 13). This concept attempts to address the fact that the United States no longer has the luxury of designing its force structure to cope with the capabilities of a well-defined, single opponent. The emerging threats posed by potential enemies can be grouped into four overarching categories: 1.) conventional forces; 2.) weapons of mass destruction (i.e. chemical, biological, radiological or nuclear effect (CBRNE) devices); 3.) area denial capabilities; and 4.) asymmetric/unconventional attack.

B.   GEOPOLITICAL ENVIRONMENT

During the Cold War the international system was neatly segregated into geopolitical blocks of clearly defined ideologies. Since the fall of the Soviet Union and the collapse of the communist alternative to free-market capitalism, the world has become more fluid and unpredictable. Some see the U.S. as the sole remaining superpower, but a unipolar world system can be very unstable. A variety of world actors—be they states or transnational terrorist organizations—are often tempted to challenge the perceived supremacy of the U.S. along asymmetric lines.

As the events of 11 September 2001 have demonstrated, there is diminishing protection afforded by geographic distance (Rumsfeld, 2001, 4). Economic globalization and the dramatic increases in travel and trade across national borders have created new vulnerabilities for hostile actors, such as Al Qaeda, to exploit by perpetrating attacks on the U.S. homeland (Rumsfeld, 2001, 4). There is a danger that states hostile to the U.S. and its allies could significantly enhance their capabilities by integrating widely available off-the-shelf technologies into their weapons systems and armed forces (Rumsfeld, 2001, 6). For example, dual use technologies have aided the proliferation of weapons of mass destruction and ballistic missile technology. Furthermore, the commercial use of space has also expanded to potential enemies the opportunity to exploit the information capabilities of space based systems as well as attempt to deny the use of space to countries who are growing more and more dependent on it—such as the United States. The new economy, lauded for its creation of the "information superhighway," has also proven to be a wealth of information for enemies of the U.S. Potential enemies located inside or outside the United States have an increased opportunity to cause massive disruption by employing methods that deny access to the world wide web or corrupt computer databases vital to the functioning of the economy or national defense.

The *National Security Strategy* (Office of the President, 2002) calls for the maintenance of military strength in an effort to dissuade potential adversaries from pursuing a military build-up program designed to equal or surpass U.S. military power (Office of the President, 2002, 30). Nevertheless, the potential exists for regional powers

or non-state transnational actors to develop sufficient capabilities to threaten U.S. interests in all areas of the globe (DOD, 2002, 4).

1.   Regional Security Developments

a.   *Asia*

In spite of U.S. efforts to maintain the military superiority called for in the *National Security Strategy* (Office of the President, 2002), Asia is gradually emerging as an area of military competition as China seeks to take its place among the great powers. As the National Security Advisor, Dr. Condoleeza Rice points out, "the United States needs to continue to worry about the potential rise of hegemonic power with interests, values, and intentions that are hostile to American and allied interests" (Rice, 2000, 2). "It would be wrong to think of China as an enemy, but it is not wrong to think of China as a challenge" (Rice, 2000, 4). Relations with China took a turn for the worse in 1989 when the national government suppressed a pro-democracy movement in Tiananman Square in Beijing. Then in 1996, China fired several ballistic missiles at Taiwan in an effort to intimidate its leadership and challenge the U.S. guarantee of protection for Taiwan. The United States responded by sending Seventh Fleet assets, to include the *USS INDEPENDENCE (CV 59)* battle group, into the area to patrol the Taiwan Strait. Finally, the Chinese scored a major intelligence coup in 2001 by confiscating a U.S. EP-3 spy plane which was forced to land on Hainan Island after a Chinese jet fighter collided with it in mid-air. Since then, U.S. military planners have continued to monitor China closely and consider it to be a potential threat.

East and Southeast Asia offers the promise of increased economic trade and the peril of instability caused by extremist internal political movements and an internationally isolated dictatorship. Indonesia, for example, is a federation of diverse peoples that could violently unravel at any point. Al Qaeda cells and other terrorist groups have been found in many countries in the area including Indonesia, the Philippines, and Singapore. North Korea is building and selling long-range missiles, has chemical and biological weapons, and has admitted to having a nuclear weapons program

in violation of an agreement it signed with the United States in the early 1990s (Office of the Secretary of Defense (SECDEF), 2001, i). The East Asian littoral—from the Bay of Bengal to the Sea of Japan—represents a particularly challenging area for the Seventh Fleet. The distances in this area are vast and the density of U.S. basing in this region is less dense than in other critical regions around the globe (DOD, 2001, 4). This geographical situation places a premium on securing additional access and infrastructure agreements, and on developing systems capable of sustained operations at great distances with minimal theater-based support (DOD, 2001, 4).

The Middle East, Central Asia, and South Asia are bastions of unrest and violence which threaten the energy resources that Western Europe and East and Southeast Asia depend on. The governments of some of the states in this region are susceptible to violent overthrow by radical, extremist groups with anti-western attitudes. Many of these same states have sizeable conventional forces and either have already obtained or have acquired the ability to obtain weapons of mass destruction (WMD). Those states in the region with a declared anti-U.S. and anti-western foreign policy are developing ballistic missile capabilities (or purchasing them from China, North Korea, and others), supporting terrorist organizations with global reach, and expanding their military capabilities in an effort to threaten their neighbors and potentially deny U.S. military forces access to the region (DOD, 2001, 4). Iran, with foreign assistance, is buying and developing long-range missiles and is seeking nuclear and biological weapons capabilities to complement its arsenal of chemical weapons (Office of the SECDEF, 2001, i). There is also evidence to suggest that Iraq may have reconstituted its WMD program in breach of several United Nations Security Council resolutions (Office of the SECDEF, 2001, i).

b.   *Europe*

Europe is essentially at peace. Central Europe, isolated from the rest of Europe during the Cold War, is slowly being integrated into the political and military institutions that have enabled the West to sustain unparalleled wealth and prosperity since the end of

World War II. The Balkan wars, however, have taken their toll on south-central Europe. The region is quiet for now, though far from being truly stable.

An opportunity exists for greater cooperation with Russia though there are caveats to this assertion. Russia is still in a state of transition from a central-command political and economic system to a free-market system capable of taking advantage of Russia's abundance of natural resources and enabling the former Soviet republic to reemerge as a credible political and economic power. As the successor state to the old Soviet Union, Russia retains a lot of pent up resentment and animosity towards the United States. It still views the newly independent former Soviet republics in Eastern Europe and Central Asia as its legitimate sphere of influence. On occasion, Russia has pursued a foreign policy directly at odds with U.S. interests such as strengthening economic ties to Iraq and selling nuclear reactors to Iran. Nevertheless, Russia shares some important security concerns with the United States. Nuclear disarmament of several formal Soviet republics remains a priority for both Russia and the United States. Both Russia and the United States are vulnerable to attack from international terrorist groups and both nations are cooperating at unprecedented levels to confront the terrorist threat. Finally, the Russians have also pursued closer economic ties to the West as illustrated by its desire to sit in on G-7 summits. The Russians have also won observer status in North Atlantic Treaty Organization (NATO) and the right to be consulted should NATO undertake military action to defend its members' security interests.

c.   Americas

The Western Hemisphere remains mostly at peace, however, economic turmoil is taking its toll on democratic states such Argentina and Venezuela. The United States government continues to be suspicious of Cuba. The greatest threat to instability in the region, however, appears to be coming from the Andean region by the alliance between leftist rebels and drug cartels against the Colombian government. The Bush administration has stepped up military and economic support for the Colombian government in its effort to confront the rebellion and eliminate the drug cartels.

d. Africa

The biggest threat posed from Africa is the potential for massive human movement cause by disease, famine, and natural disaster. There are many states that are not strong or stable enough in Africa to deal effectively with these crises. The United States and other nations may have to undertake military operations to rapidly treat the worst humanitarian cases. An underlying concern with Africa, as with parts of Asia, is the increasing challenges and threats emanating from the territories of weak and failing states (DOD, 2001, 5). The absence of effective governance over vast areas of Asia and Africa has proven fertile ground for the headquarters and training camps for transnational terrorist organizations such as Al Qaeda. Then again, there are more stable regimes that continue to pursue irresponsible foreign policies. Libya and the Sudan are known state sponsors of terrorism. Also, Libya has chemical capabilities and is trying to buy long-range missiles to deliver these weapons (Office of the SECDEF, 2001, i).

2. Spectrum of Conflict

Instability in the regions discussed above could potentially spawn ethnic, economic, social, and environmental stresses that accentuate violence. In a unipolar world there will be less constraints on this outpouring of violence and the United States will be increasingly called upon to uphold the order of the international system. Belligerents will range from modern, well-equipped military forces to non-state, poorly funded extremist groups. The future ExWar Force must posses the capabilities to engage professional militaries, paramilitary forces, terrorists, criminal organizations, drug and contraband traffickers, gangs, and mobs (NAVSEA, 2002, 17). The increasingly shaky grounds upon which nation-states stake their legitimacy will complicate the environment in which military operations might have to occur. Very often separatist movements that employ terrorist tactics against U.S. and allied interests might be perceived as totally justified by the other side. A revision of current doctrine and rules of engagement will be in order to ensure that the U.S. military effectively operates within this emerging

spectrum of conflict. Figure IV-1 illustrates the spectrum of conflict the future ExWar Force will likely face.
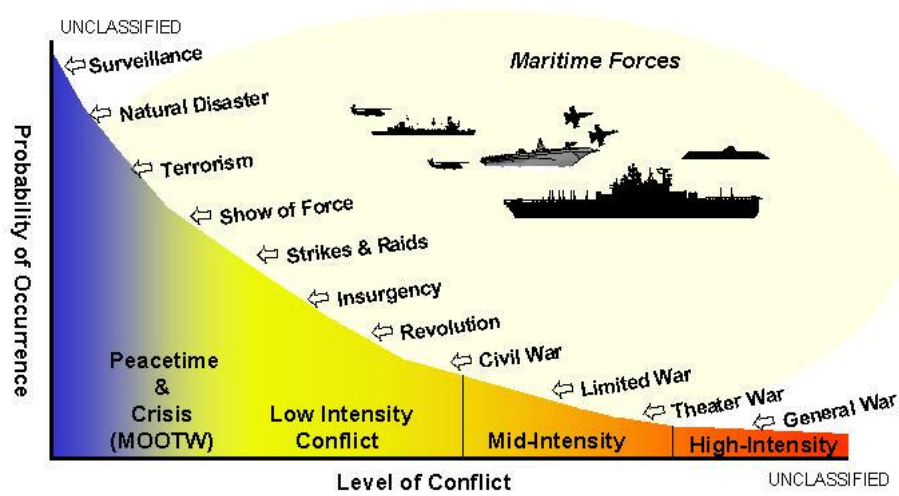

Figure IV-1: Spectrum of Conflict (NAVSEA, 2002, 17)

C.   PHYSICAL ENVIRONMENT

Sea lines of communication have effectively gotten longer since the end of the Cold War. The downsizing of the fleet and corresponding reduction in overseas bases has meant fewer ships are at sea for longer periods of time. For any potential expeditionary operation, "joint planners should once again consider ready access to bases to be a luxury" (Work, 2002, 18). The often forgotten components of the navy, the Combat Logistics Force (CLF) and Naval Force Auxiliary Ships (NFAS), assets of the Military Sealift Command, are heavily taxed to ensure vital ammunition, fuel, and other provisions are available to naval combatants around the world. The bottom line is, assuming forward bases for provisioning and maintenance remain unavailable, the 21st Century ExWar Force will have to rely on logistics shipping like never before.

In addition to the jungles of the Philippines, Vietnam, and the Caribbean, in which American forces slogged through and fought in the past, future battle grounds will likely include "urban jungles" along the African and Asian littorals. The phenomenon of "failed states" and the implied threat to world order they pose occurs primarily on these two continents—although there always remains the possibility of the political

disintegration of certain regimes in South America. Nevertheless, most of the instability appears to occur in two types of climates: the tropical jungles of Asia and the desert regions of North Africa and the Middle East. Each poses their own climatic challenges for equipment that must operate in these regions.

D.   THREAT

1.   Threat Overview

Threat perception and analysis are critical to the decision process concerning both force structure and technological development. The capabilities of the ExWar Force envisioned by the ExWar Integrated Project will be based on existing and potential threat environments that may exist by the year 2020. It is very likely the future naval expeditionary force will be forward deployed and rapidly deployable in a chaotic international environment. The emerging threats are significant in that the level of sophistication in tactics and acquisition of weaponry by potential enemies will require an extraordinary degree of training, planning, and preparation as well as enormous flexibility on the part of an expeditionary force. Many scenarios could involve large segments of civilian and non-combatant populations. Weapons may range from very primitive to highly sophisticated. The ability of almost every potential adversary to obtain and employ modern weapons will greatly increase. The lethality of the weapons will be enhanced while the reaction time in which to defend against them will be drastically reduced. The proliferation of weapons of mass destruction and the probability of their employment will add new and critical aspects to the situation facing the future ExWar Force. While preparing to meet the various threats posed by governments and individuals, a future naval expeditionary force must also be prepared to react to a full array of natural disasters and human suffering alluded to in the previous discussion on the spectrum of conflict. Of singular significance will be the enhancements, derived from a "capabilities-based approach," that will need to be accounted for in the platforms and equipment employed by the ExWar system of systems.

2. Emerging Threats

a. Conventional Forces

The two nation-states that come closest to posing a potential threat from a conventional stand-point are Russia and China. With the collapse of the Soviet economy, however, Russia has been forced to deeply draw down its once mighty conventional forces. This military policy has forced the Russians to rely even more heavily on nuclear deterrence. The Russian defense budget is a fraction of what the Soviet Union spent on defense (Office of the SECDEF, 2001, 54) in the last few years of its existence. As a result, Russia no longer poses a large-scale conventional military threat to NATO (DOD, 2001, 4). From a maritime perspective, there are less than 100 ships in the Russian navy today, down from nearly 300 combatants in the Soviet fleet in 1985 (Congressional Budget Office (CBO), 2000, 14). Surface combatants are hardest hit by industrial base decay and declining military budgets. Nevertheless, Russia has the second largest navy in the world (CBO, 2000, 13), and Russia has put a high priority on the maintenance of its fleet of attack and ballistic missile submarines. Russia appears to be committed to building at least one new submarine per year (CBO, 2000, 14). Still, it will be quite some time before Russia's conventional forces can be reformed and rebuilt; this outcome is tied to Russia's ability to transform its decrepit, Soviet era industrial base into something more efficient and capable of meeting its self-defined security needs.

China is an emerging power that is placing a high priority in the steady development and expansion of its conventional forces. With unprecedented annual economic growth and access to massive human resources, China is seeking to challenge the conventional superiority of the United States in the Southeast Asian region. Therefore, "it is focused on becoming a world-class industrialized power through a countrywide modernization effort, which includes economic, technological, and military components of national power (Office of the SECDEF, 2001, 13)." By virtue of it being the largest country in the world in terms of population, it can potentially field an army of enormous size. Its modernization of land-based weapons systems will parallel its expected economic growth. China's submarine fleet has not increased much in quantity

over the last dozen years, but it has increased a great deal in quality as new Chinese-built submarines and purchases of Russian subs were added to the fleet. Furthermore, China is actively seeking a blue-water navy though, so far, the Chinese have not made a decision to acquire aircraft carriers and the Chinese have about half as many surface combatants (with far less capability) as the United States (CBO, 2000, 14). Of note, however, are China's efforts to improve its amphibious assault capabilities. China has recently revived production of its Yuting class amphibious ship which can carry 250 troops, 10 main battle tanks, four landing craft, and two helicopters (CBO, 2000, 16). As of yet, however, China does not pose the same level of threat that Soviet conventional forces posed at the height of the Cold War.

There are other nations interested in building up conventional forces. At the top of the list are India and Pakistan. India, being the larger of the two countries, has a larger army and is seeking to expand its navy. The expansion of India's navy would be in an effort to exercise influence in South Asian waters in order to counter the growing influence of China in the region. On land, India desires a sizeable conventional force as a credible deterrent to both China and Pakistan.

Maritime Threats: Severe damage to warships by cruise missiles was made readily apparent in the War over the Falkland Islands in the early 1980s and the Tanker War in the Persian Gulf in the late 1980s. Although the United States Navy has spent a lot of time and effort in developing anti-cruise missile defense capabilities for its ships, these systems have only proven effective against limited attacks. In addition to cruise missiles, many nations are continuing to make advancements in ballistic missiles with ranges as far out as 1,000 NM (Harney, 2000, 10). These ballistic missiles might be capable, with effective terminal guidance mechanisms, of sinking groups of warships at sea (Harney, 2000, 10). Furthermore, advances in multi-color imaging infrared guidance systems could prove capable of defeating decoys, jamming efforts, and stealth technology currently employed on U.S. Navy ships and aviation assets (Harney, 2000, 11). In fact, jamming techniques could prove to be a useful area of concentration for potential enemies of the United States. For relatively little investment, states can deploy electronic warfare assets capable of jamming GPS-based navigational and weapons systems employed by the United States Navy (Harney, 2000, 11). In addition, all forms of

precision-guided munitions can be jammed (Harney, 2000, 12). The ever-increasing reliance of the United States military on electronics-based systems could be easily converted into a liability by a smart, cunning foe unless the proper defenses are fielded.

b.   CBRNE

The U.S. conventional weapons superiority ironically encourages many states seeking to evade U.S. power and influence to invest more time, money, and effort into the development and acquisition of weapons of mass destruction—defined here as CBRNE. The outcome of the Persian Gulf War in 1991 proved to many potential enemies, such as Iran, Iraq, and North Korea, they could not win a conventional war against the United States. As a result, CBRNE weapons serve as a kind of insurance policy against American attempts to foil these countries' territorial and political designs. International terrorist groups, such as Al Qaeda, have also seized every opportunity to develop and acquire CBRNE weapons in order to inflict a large number of casualties in pursuit of their political agendas. Many chemical and biological weapons have become cheaper to produce and/or acquire than a large variety of conventional weapons. Throughout the decade of the 1990s, after the end of the Cold War, the availability of components, technology, expertise, and information regarding the production of these weapons had increased dramatically. Several state suppliers, or companies within those states, had shown an increasing willingness to do business in the CBRNE arena. In addition, information about such devices had become increasingly available on the Internet. Finally, with the demise of the Soviet Union, many scientists from the former Eastern Bloc countries with the technological know-how to build CBRNE devices sought employment in states with hostile intentions towards western democracies (Office of the SECDEF, 2001, 3). As a result, several arms control initiatives were undertaken in order to deal with these challenges. Today, however, it is questionable as to whether the inspection and verification regimes formed by arms control treaties such as the Chemical Weapons Convention, the Biological Weapons Convention, and the Nuclear Non-Proliferation Treaty are indeed capable of ensuring compliance with treaty obligations.

Therefore, much of the perceived security stemming from arms control measures is dubious.

Chemical and Biological Weapons: The United States military does have a limited defense against chemical and biological weapons, but these defenses only enable military forces to survive long enough to leave the contaminated area and decontaminate in a clean environment (Harney, 2000, 10). The United States does not possess the capability to be able to fight for extended periods of time in a contaminated environment. Also, it is exceedingly difficult to detect biological agents until well after exposure and, detecting certain chemical agents from stand-off positions is, again, difficult. In addition, the Russians have developed a new generation of nerve agents referred to as "Novichoks" which were designed during the Soviet era to defeat Western detection and protection measures. It is also much easier to hide the production of these chemical weapons within commercial chemical plants (Office of the SECDEF, 2001, 4).

Radiological and Nuclear-Effect Weapons: The United States will remain vulnerable to states that have acquired enough nuclear weapons in order to achieve a mutually assured destruction (MAD) capability (Harney, 2000, 10). Russia fits into this category; China is attempting to achieve it. Even if the United States deploys a national missile defense system, Russia will still be able to defeat it with current technology. The most robust systems architectures for national and theater ballistic missile defense currently under development include requirements that call for only a modest defense capability against small numbers of nuclear tipped Inter-Continental Ballistic Missiles (ICBMs). In addition, there are a variety of other mechanisms that can be used to deploy nuclear weapons without the use of ICBMs. Some states and international terrorist groups may be willing to use nuclear weapons against the U.S. and its allies—especially since nuclear weapons may one day be deployed covertly without necessarily being able to know who employed them. Finally, although most military systems are supposed to be hardened against a nuclear electromagnetic pulse (EMP), the actual degree of hardness is questionable (Harney, 2000, 12). Furthermore, most civilian systems that support military activities and many cost-off-the-shelf (COTS) components were designed with no hardening against EMP (Harney, 2000, 12).

c. Area Denial

There are number of tactics states can employ against U.S. forces to deny access to the littorals. A number of these tactics have already been mentioned under the "conventional forces" category. Operating in the littorals can potentially expose U.S. naval assets to missile attacks as many as 3 – 10 times larger than the more traditional blue-water missile threats (Harney, 1999, 8). To further illustrate the use of cruise missiles for area denial, imagine a scenario in which a massive missile attack from land-based launchers, say on the order of 1,000 missiles, is launched at a notional carrier battle group (CVBG) in the year 2020. A notional CVBG would consist of 1 Nuclear-Powered Fixed Wing Aircraft Carrier (CVN), 1 Guided Missile Cruiser (CG), 2 Guided Missile Destroyers (DDGs), and 3 Future Generation Destroyers (DDXs). According to a Naval Postgraduate School Red Team Ship Survivability study done in 1999, 1,000 missiles represented only 2-3% of a near-peer competitor's inventory and 10-20% of a regional competitor's inventory by the year 2020 (Harney, 1999, 18). The impact of this 1,000 missile attack - assuming the CVBG's anti-cruise missile missiles are 80% effective and that aircraft and close-in weapon systems (CIWS) are 100% effective - on the battle group means the notional CVBG is capable of killing, at most, 517 missiles with an additional soft kill of half of the remaining missiles (Harney, 1999, 18). If, in addition, only 80% of the missiles launched by the enemy function properly and CIWS were replaced by a 21-missile, rolling airframe missile launcher, (providing roughly 205 additional hard kills per CVBG), then 39 missiles would survive to hit the 7 ships—approximately 5-6 hits per ship (Harney, 1999, 18). Increased proliferation of cruise missiles is aided by the decreasing costs of building them. Cruise missile ranges will likely fill up the inventories of enemies occupying coastlines in the future. These missiles may have ranges of upwards of 1,000 NM.

But cruise missiles are not the only means an adversary can use against U.S. forces in the littorals. Ballistic missiles and electronic warfare tactics mentioned earlier are also an option. Mines represent still another alternative. Mine warfare will present an increasingly cost-effective option for denying the U.S. Navy access to the littorals. The presence, or even the suspicion of the presence of mines, can delay or divert a naval

expeditionary warfare force. In addition, modern torpedoes are capable of being fired at distances of more than 80 NM, tracking down targets by their wake turbulence, and outrunning even the fastest warship (Harney, 2000, 11). Large fleets of coastal diesel submarines, high-speed patrol torpedo boats, or maritime patrol aircraft armed with the latest torpedoes would be capable of inflicting significant damage against any naval force that came within range (Harney, 2000, 11). Furthermore, patrol craft do not necessarily have to take conventional military form to be effective. Such craft can be deployed as typical fishing vessels with real merchant fishermen, making it nearly impossible to discern the presence of enemy forces until after they have struck the first blow. The international laws of war and U.S. Rules of Engagement would make it difficult to strike pre-emptively on these seemingly innocent targets.

d.   Asymmetric/Unconventional Attack

Special Operations Forces (SOF) were deemed the early stars of the War on Terrorism as it played out in Afghanistan. But other nations can create their own SOF and do so with a smaller military budget than it would take to build a standing, conventional army. As effective as American SOF were against targets in Afghanistan, there is no reason to expect foreign SOF would be any less effective against soft targets in the United States (Harney, 2000, 13). The temptation to fight the United States using such unconventional means is overwhelming given the U.S. advantage in conventional warfare.

The world has seen fit not to militarize outer space. This may change in the future, however, as many nations become more and more aware of just how dependent the United States is becoming on space-based assets. Should an adversary develop anti-satellite weapons based on existing technology, that adversary could deny the United States use of its critical C4ISR infrastructure in key areas of the globe. It could also disrupt the American economy by destroying satellite communications—an area of interest for terrorist organizations interested in striking at vital centers of U.S. economic power. Targeting global positioning system (GPS) satellites would seriously impair the capabilities of the U.S. Navy in areas of the world without GPS coverage.

An analysis of the U.S. logistics infrastructure reveals a number of critical vulnerabilities that could be exploited by those enemies interested in pursuing an asymmetric attack. Pre-positioned forces located at a reduced number of overseas bases (reduced since the end of the Cold War) are concentrated in relatively poorly defended locations (Harney, 2000, 14). The United States does not have a sizeable merchant fleet with which to augment its sealift capability. It would take considerable time to activate a majority of its strategic reserve shipping—furthermore, finding personnel with enough know-how to crew these aging, reserve logistics ships is becoming increasingly difficult especially if these personnel would be needed on short notice. Chartered vessels under foreign flag may not prove to be reliable if their governments of origin do not support U.S. foreign policies. Because the United States has fewer overseas bases, sea lines of communication (SLOC) have, as a result, become longer. Often CLF ships and naval force auxiliary ships (NFAS) are forced to travel long distances relatively unprotected. International terrorists, local pirates, or foreign SOF could employ lethal or non-lethal methods to destroy or delay these ships and thereby interdict U.S. SLOCs to vital areas of interest. The ExWar Force system of systems must account for a way to protect these long, undefended SLOCs that are vulnerable to these threats.

Potential enemies may opt to conduct an unconventional attack on societal centers-of-gravity. There are many states and international terrorist groups that believe the American public is susceptible to influence by terrorist attack or protracted, high casualty military operations. As a result of the American experience in Vietnam and the public hand-wringing that many officials from that era have gone through, many enemies of the United States believe, to this day, that Americans will not support high levels of casualties in military operations. This belief convinced Iraqi President Saddam Hussein that if he could engage the United States in a somewhat protracted "mother of all battles" during Operation Desert Storm that American public opinion would force U.S. military commanders to give up, pull out, and go home. Whether or not this observation of American society is true is beside the point. The fact is, that this belief, continues to motivate states and organizations hostile to the United States.

The international political and economic system the United States and western democracies established at the end of World War II has established many institutions and

treaties that attempt to foster cooperation between nations. These same institutions and treaties have been subjected to attempts by states with dubious motives to ensnare and bog down the U.S. with legal procedures and various forms of procedural intrigue. For example, states have used arms control treaties for political cover—publicly proclaiming their support for arms control policies while privately violating the very obligations of the treaties and agreements they signed. In the case of hiding behind international law, the Taliban in Afghanistan hid military resources at civilian hospitals and religious sites in an obvious attempt to leave coalition forces open to the accusation of the commission of war crimes if these sites were bombed.

3.   Remaining Challenges

Manned Portable Air Defense (MANPAD) systems such as Stingers and other Surface-to-Air Missiles (SAMs) remain a challenging issue for the ExWar Force. It is very likely these weapons, which are relatively cheap to obtain, will continue to proliferate. By 2020, transnational terrorist groups are likely to acquire these weapons in sizeable amounts making STOM and logistical support for future "Afghanistan-like" operations an extremely dangerous prospect. MANPADs can be fired at close ranges using optical guidance reducing the response time and tracking capability of installed anti-missile defense systems onboard aviation assets operating over land. Furthermore, MANPADs are virtually impossible to detect because they are portable; Suppression of Enemy Air Defenses (SEAD) is unlikely to eliminate this threat.

As mentioned earlier, there is a growing reliance in the United States military on electronics without serious attention to EMP effects and the hardening required to protect vital systems against such effects. There is increased interest worldwide in developing *conventional* EMP bombs which would give hostile states and terrorist groups the option of producing EMP effects without having to go nuclear. In fact, the United Kingdom may already have one. Information on designing weapons that produce EMP effects is readily available in scientific journals like *Popular Mechanics* and also available on the world wide web. In the civilian sector finance, trade, the internet, and automobiles are all examples of electronics-based technologies that are completely vulnerable to EMP attack.

Economic centers of activity have been on the list of targets for groups such as Al Qaeda. By the year 2020, states and terrorist groups will very likely have the capability to deploy EMP weapons against U.S. military and civilian systems that rely on electricity and electronics, and there is much work to be done to develop a means to respond to this threat. At a minimum, design concepts for the ExWar Force should be mindful of this threat.

E.   CONCLUSIONS AND RECOMMENDATIONS

A capabilities-based approach implies that the United States develop new technologies to deal effectively with the following emerging threats: 1.) conventional forces; 2.) CBRNE; 3.) area denial capabilities; and 4.) asymmetric and unconventional attack. In light of the previous discussion, the future ExWar Force will have plenty to contend with as a serious design effort gets underway to develop a system of systems that can accomplish expeditionary operations within the context of these emerging threats. There are many implied capabilities that can be gleaned from this analysis. Specific technologies may include, but are not limited to, advanced remote sensing capabilities, long-range precision strike, and transformed maneuver and expeditionary forces (DOD 2001, 14). This threat analysis will provide substantial input into the development of an overarching set of system of systems level requirements for the ExWar Force envisioned by the Integrated ExWar Project.