

*Defense Science Board
Task Force*

on

SEA BASING



August 2003

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For Acquisition, Technology, and Logistics
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DEFENSE SCIENCE
BOARD

15 August 2003

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE (ACQUISITION,
TECHNOLOGY & LOGISTICS)

SUBJECT: Final Report of the Defense Science Board Task Force on Sea Basing

I am pleased to forward the final report of the DSB Task Force on Sea Basing. The Task Force was asked to assess how basing expeditionary forces at sea can best serve the nation's defense needs through at least the first half of the 21st century.

The report concludes that sea basing will be a critical future joint military capability for the United States. It will help to assure access to areas where U.S. military forces may be denied access to support facilities. To develop such a complex, enduring and far reaching capability as sea basing, the Task Force believes it is essential to undertake a spiral development effort—one that accounts for evolution from current capabilities to tomorrow's needs. In addition, the development process must incorporate experimentation to identify and correct development concerns and to train sea basing leaders for the future.

The Task Force set forth twelve issues the Department must address in undertaking implementation of a sea basing capability. Three that are especially important to "make sea basing happen" are the development of a heavy-lift aircraft, advanced cargo handling capabilities, and ships whose design incorporates all the requirements of the seabase system-of-systems.

I endorse all of the Task Force's recommendations and encourage you to review the Task Force report.

William Schneider, Jr.
DSB Chairman

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DEFENSE SCIENCE
BOARD

14 August 2003

MEMORANDUM FOR THE CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Final Report of the Defense Science Board Task Force on Sea Basing

The geography of the United States, as an island power with the need to project military power across two great oceans, has made amphibious warfare a core competence in the American way of war—one that will continue to be critical in protecting U.S. national interests.

Future warfighting concepts of operations call for light, rapidly deployable, maneuver forces supported by remote fires. These forces will rely on intermediate staging bases in or near the theater of operations to support troops, logistics and combat fire support. Yet, in the future, access to such bases is likely to be more problematic, as recent events in Kosovo, Afghanistan, and Iraq have underscored. Basing forces, logistics, and support at sea offers a reliable, flexible environment from which to operate when secure, fixed bases are not available and exploits the strategic maneuver space inherent in sea based operations.

This Task Force was asked to assess how basing expeditionary forces at sea can best serve the nation's defense needs through at least the first half of the 21st Century. Specifically, they were asked to consider operational requirements, the assets that are required, the role of new technologies, and the effects of "jointness." In exploring these issues, the Task Force examined a broad range of alternatives, including innovative concepts employed in the commercial sector that might have application to military operations.

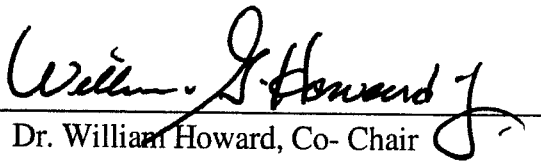
In the course of its deliberations, the Task Force reached the following conclusions:

- Sea basing represents a *critical future joint military capability* for the United States. It will help to assure access to areas where U.S. military forces are denied access to support facilities.
- Future sea basing needs are *well beyond* today's Navy and Marine Corps operating capabilities.
- The complexity and difficulty of sea basing requires a *coordinated, spiral development effort* to address identified issues and create a joint sea basing "system-of-systems."
- The United States should *realistically test* its sea basing capabilities to work out problems and develop leadership skills in all Services.

In addition to these conclusions, the task force identified twelve issues—discussed in detail in this report—that must be addressed to make future sea basing a reality. These include issues

related to management, planning, the development of new capabilities, and resource requirements.

The seabase epitomizes the shift in emphasis from blue water to littoral operations—the maneuver space of the future where likely adversaries will exercise their power to deny access and control commerce. The littorals have great military promise; care is needed to plan and develop tools for successful operations within them. The sea base can make an important contribution toward this end.


Dr. William Howard, Co- Chair

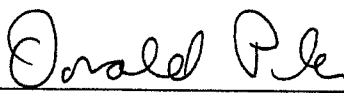

ADM Donald Pilling, USN (Ret), Co- Chair

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FOREWORD

Forcible entry from the sea has played an essential role in virtually every major U.S. military operation, from the “shores of Tripoli,” to the Mexican War, the Civil War, the Spanish American War, World War II and the Korean War. Sea-based operations, practiced by both the Army and Marines, have undergone continuous evolution, culminating in the amphibious assaults that played a decisive role in the European and Pacific theaters in World War II and in Korea. The geography of the United States, as an island power with the need to project military power across two great oceans, has made amphibious warfare a core competence in the American way of war.

With the end of the Cold War, the world has entered a period of uncertainty. The United States has national interests in many of the world’s potential areas of conflict. It must have the capability to project its military power to deal with a full range of military contingencies.

Over the past eight years the Defense Science Board has conducted a series of studies on the tactics, logistics and technology of land warfare in the post Cold War era. Its recommendations have emphasized light, rapidly deployable, maneuver forces supported by remote fires – in other words, the replacement of mass by responsive, precision firepower and maneuver. Others have foreseen a similar future where brigades perform functions that once required corps or divisions.¹ These scenarios of future war rest on having intermediate staging bases in or near the theater of operations to support troops, logistics and combat fire support.

Recent events in Kosovo, Afghanistan, and Iraq have underlined, however, that the availability of such bases is, more often than not, uncertain due to physical or political factors that delay, limit or prevent their use. Moreover, modern weaponry, such as precision

¹ Robert Scales, *Yellow Smoke, The Future of Land Warfare for America’s Military*, Rowman and Littlefield Publishers, Inc., 2003.

cruise and ballistic missiles which will become widely available in the future, threaten to make fixed bases vulnerable to attack. The assumption of readily available, secure land bases is now open to serious question.

Seabases, while certainly not immune from attack, can provide the United States with a capability suited to future military needs: most likely areas of future conflict are within reach of the sea. Seabases are mobile, complicating adversary defense operations and providing options for U.S. military forces. Seabases are sovereign, not subject to alliance vagaries, and seabases can be scaled to support activities larger than brigade-sized operations.

Forcible entry from modern seabases, however, represents a substantially greater challenge than the amphibious operations of World War II and Korea. Large-scale amphibious assaults across beaches will face increasingly difficult challenges in the future. Instead, forces will initially leapfrog beaches. They will employ air and precision surface assault to penetrate and drive far inland to secure a lodgment, and then move to directly attack military objectives. At present, naval surface fire support lacks the reach and precision to support such movement inland. Thus, combat fire support must come from organic artillery and aircraft. The weight and volume of logistics required to support such inland forces will require high volume, heavy lift air capabilities, at least until U.S. forces have made the shore safe for resupply.

In any case, the seabase must represent a haven where operational forces can reconstitute for further action, as well as receive supplies. Perhaps most important, forces based at sea must have the staying power to persist until heavier forces can arrive – there must be no period of vulnerability following the initial assault.

A seabase is not just a ship, not just prepositioned materiel, not just helicopter assault – it represents a complex capability. One must think of a seabase as a hybrid system of systems consisting of concepts of operations, ships, forces, offensive and defensive weapons, aircraft, communications and logistics, all of which involve careful planning, coordination and exercising to operate smoothly.

The seabase must be robust enough to operate in a wide range of sea conditions and be able to receive supplies from the sea without the support of in-theater, land bases.

Such a seabase capability does not now exist, although some precursor amphibious capabilities are presently in place. Full sea basing requires development of important new operations, defense, logistic, and force integration capabilities to enable forcible entry from the sea under a wide variety of conditions. This study identifies many of those capabilities.

A central authority must orchestrate the development of sea basing concepts, systems and concepts of operations. History suggests that sea basing has never been exclusively limited to Navy and Marine operations. The Air Force and particularly the Army must participate in the development and use of this joint military operational capability which lies at the intersection of traditional special operations forces, Marine and Army operations. Sea basing represents a crucial option for future warfare by all the Services and an important element in the transition between early entry and follow-on operations. A joint program authority must lead the effort.

Experience in Kosovo, Afghanistan and Iraq has made clear the need for flexible, persistent, sovereign basing; the challenges that must be overcome are apparent. Land warfare will continue to depend on advanced bases – the sea is the most reliable, flexible environment from which to operate in the opening phases of combat. The current program of record for ship development can still be made consistent with a coherent sea basing architecture – the program has not progressed too far for this to be possible. Now is the time to develop sea basing capabilities that will continue this critical American competency.

EXECUTIVE SUMMARY

Sea basing is a critical capability for the United States in a world where flexible, quick-response military action will be required in areas far from fixed bases available or suitable for American military use. The seabase replaces or augments the fixed, in-theater airports and seaports, on which past military operations have focused and depended, with a maneuverable facility at sea – a mobile base of operations, command center, logistics node and transportation hub. A commander can place a seabase where and when he chooses to exploit enemy weaknesses and employ the element of surprise, confusing enemy defensive preparations. A seabase can be a center for reconstitution and redeployment of forces in succeeding stages of complex operations.

As a base for maneuver forces, it represents a far more serious threat than that of precision fires only, whether delivered by aircraft or cruise missiles. The force at sea threatens adversaries with destruction, invasion and ultimately loss of power.

The sustaining power of the seabase can maintain the pace of military operations so that operational pauses characteristic of past expeditionary forcible entries disappear. The need to pause for supply and regrouping following entry and before moving to operational objectives is no longer necessary. Thus, the period of vulnerability, during which enemy forces organize and mount defenses, disappears.

Although this study focuses on independent, brigade-scale, full combat configuration and use of sea basing, the concept is flexible. Seabases can be scaled to fit the needs of specific operations, allowing their use in a spectrum of applications, from humanitarian relief and non combatant evacuation operations to employment in large, full-war scenarios. Seabases could have defensive as well as offensive uses – they can augment or replace shipping facilities in the continental United States (CONUS) that have been damaged by

terrorist or military action. They are a tool readily adaptable to the operational needs of each Service.

This report concentrates on the ship-to-objective-maneuver role of the seabase, since that is its most transformational application. However, the seabase will support other concepts of operations, including amphibious, over-the-shore assaults.

A key aspect of the future seabase lies in its dynamic capabilities. The seabase is more than bringing forces to the fight on ships; it allows for movement, surprise, tactical flexibility and full-spectrum support.

A seabase will be far more than a flotilla – it will consist of operational concepts, weapons systems, ships, aircraft, logistics, information systems, cargo handling and transportation networks that must be carefully managed to operate together as elements in a complex “system of systems.” Ships and aircraft must be designed to accommodate each other, lift capabilities must be sized to serve the needs of the operations supported by the seabase, cargo transfer methods must work in rough seas encountered in likely operational areas, and the flotilla forming the seabase must have defensive capabilities to deal with threats encountered in real world operations.

Developing the seabase requires persistent, top-down leadership throughout a continuing evolution of concepts of operations, ships, aircraft, weapons and transportation systems. Logistics and operations must be merged into a single, flexible capability responsive to commanders’ needs. The complexity and difficulty of developing the “system of systems” that will enable robust sea basing necessitates a coordinated development effort to ensure a consistent set of goals, requirements and priorities. The Task Force sees this as a joint effort to produce a capability for joint use – a Department-level responsibility that involves all Services. Achieving both interoperability and intermodality transfer demands a seamless, rapid and efficient design that is fully joint.

Sea basing discussions tend to focus on the base itself and the operations it supports. The seabase actually consists of a chain of

capabilities that extends from CONUS to advanced bases, the seabase and the battlefield. Success of sea-based operations depends on the integrity of activities in each link of the chain, a substantial part of which will be carried out by contractors and non-military personnel. CONUS, inter-theater and intra-theater links are critical to sea basing success, just as are force deployment and sustainment on the battlefield. Seabase development must encompass the operation of the entire system.

Twelve issues, discussed in detail in this report, must be addressed to make future sea basing a reality. We refer to them as the “dirty dozen.” The twelve issues are:

- **Management**

1. *Meaningful participation by the Army and Air Force in forming a joint capability*

- **Planning**

2. *Sustaining troops ashore*
3. *Protecting the force ashore*
4. *Countering threats to operations in littorals – mines, sea-skimming missiles, submarines, small boats*
5. *Concepts of operation*

- **New Capabilities**

6. *Cargo transfer at sea*
7. *A long-range heavy lift aircraft that can be based at sea with capability to support forces ashore and transport troops*
8. *Ships of appropriate design*
9. *A shared data communication system with sufficient bandwidth, redundancy and robustness*
10. *A logistics support system that handles all Service materiel interchangeably*

11. *Intra-theater lift* operational at sea state 4

▪ **Resources**

12. *Development speed and funding* for construction of a modern sea basing capability

Among the issues on this list, three stand out as especially important needs that must be developed: 1) *the capability to handle cargo in rough seas* characteristic of many likely areas of operations, 2) a *heavy-lift aircraft* (>20 ton) with theater-wide range that can be based at sea, and 3) *ships* whose design incorporates all the requirements of the seabase system of systems. These developments are difficult, but not impossible to achieve. They will require a substantial research and development effort and investment to produce robust capabilities. They are necessary to “make sea basing happen.”

This study addresses future sea basing capability. Starting points for many elements required to form the future seabase already exist. A development plan must account for evolution from current capabilities to the means to meet tomorrow’s needs. The development process must also incorporate experimentation to identify and correct problems as development proceeds and to train sea basing leaders. This “spiral development” process is critical to success in an effort as complex, enduring and far reaching as sea basing. Additionally, periodic forcible entry exercises will help develop the expertise in the changing needs of littoral warfare faced by each of the Services.

Throughout this report, the terms “seabase” and “sea basing” refer to a future expeditionary concept of a base at sea with ability to enable and sustain operations up to Marine Expeditionary Brigade, equivalent size Army unit or larger – a substantial expansion of today’s amphibious operational capability. Similarly, other terms used in this study, and listed in the table below, connote future developments. This list forms a useful overview of the critical issues identified by the Task Force.

Abbreviation	Expanded Form
Airlift	Heavy-lift, long-range airplanes
Communications	High-capacity hundreds of miles link
Lighters	High-speed, heavy-lift, SS-4 capable boats
Load Transfer	Ability to transfer loads between all surface ships at SS 4+
Warehousing	Capability of selective access to shipboard cargo
Mines & Missiles	Capability of clearing mines, defending against missiles
Sealift	High-speed, heavy-lift, long-range ships
Management	An organizational structure to get the work done

In summary, the task force concludes the following:

- Sea basing represents a *critical future national military capability* for the United States. It will help to assure access to areas where U.S. military forces are denied access to support facilities.
- Future sea basing needs are *well beyond* today's Navy and Marine Corps operating capabilities.
- The complexity and difficulty of sea basing requires *a coordinated, spiral development effort* to address identified issues and create a joint sea basing "system of systems."
- The United States should *realistically test* its sea basing capabilities to work out problems and develop leadership skills in all Services.

The seabase epitomizes the shift in emphasis from blue water to littoral operations – the maneuver space of the future where likely adversaries will exercise their power to deny access and control commerce. The high seas are no longer the center of contention. The littoral regions offer a maneuver space of great utility to American forces of all Services. They are also increasingly dangerous areas as sophisticated, inexpensive, defensive weapons become widely available. The littorals have great military promise; great care is needed to plan and develop tools for successful operations in them.

INTRODUCTION

Changes in the global environment – to include new and distributed regional threats and an increased focus on the Pacific Ocean arena – have shifted attention from the open oceans to the littoral regions as an important battle and maneuver space of the future. This in turn draws attention to the warfighting capabilities and missions that can be performed by expeditionary forces, as having “boots on the ground” will certainly be required in some contingency situations.

Yet despite the importance of expeditionary capabilities, it is likely that these missions will be increasingly difficult to accomplish, primarily because of concerns with access to overseas bases and the lethality of littoral defenses. Thus, the concept for sea basing as a core element for future expeditionary warfare is of great interest to the Department of Defense.

At the request of the Under Secretary of Defense for Acquisition, Technology and Logistics, the Defense Science Board established a Task Force to assess how sea basing of expeditionary forces can best serve the nation’s defense needs.² More specifically, the Task Force was asked to:

- Consider the operational requirements, the assets required, the role(s) of new technologies, and the effects of “jointness”
- Examine the future relationships of the Amphibious Ready Group, with embarked Marine Expeditionary Unit, Carrier Battle Group, Maritime Prepositioning Ship Squadron, Marine Expeditionary Brigade, Surface Action Group and the Combat Logistics Force in establishing the Enhanced Network Seabase

² The complete Terms of Reference is contained in Appendix A. A list of Task Force members, along with presentations received by the Task Force, are in Appendices B and C, respectively.

- Examine implications for platform costs and capabilities

The Task Force was also directed to consider the following questions as it examined the broadest range of sea basing alternatives:

- What is the naval environment expected to be for the next 20-50 years?
- What is the role of naval forces in enabling access for joint forces through the world's littorals?
- What assets and technologies are needed to establish a robust and capable Enhanced Networked Seabase?
- How does the timing of the acquisition of the technologies, platforms and systems which replace legacy systems build up full capability from what it is now?
- As new hardware is acquired, should the function each legacy platform performs remain the same or are there opportunities to relocate functionality to improve effectiveness, efficiency or economy?
- Are there other doctrine, organizational, training, materiel, leadership, personnel or facilities aspects that affect the development of a robust sea basing capability?

The following chapters document the results of the Task Force deliberations. The report begins with an overview of the geopolitical and military environment in which the future seabase would operate. It then presents a sea basing concept for the future and an assessment of the value of an operational seabase. With that as background, the report explores the key capabilities needed to realize an operational sea basing capability. The final section contains the conclusions and recommendations that emerged from the Task Force effort.

GEOPOLITICAL AND MILITARY ENVIRONMENT

Geopolitical and Military Imperatives

- The United States confronts increasing challenges to projection of its military power
 - U.S. military increasingly based in North America (although Naval expeditionary forces remain forward deployed)
 - Decreasing access to overseas fixed land bases for political and military reasons
 - Political constraints
 - The United States was denied use of some of its bases during the Cold War
 - Increasingly so over the past decade
 - The refusal of Turkey to grant access in return for \$6 billion and loan guarantees a harbinger of the future

Today, America's military power lies predominantly in North America. This poses a strategic problem quite similar to that which confronted U.S. military planners at the onset of America's participation in World War II—how to project that immense military and economic power across the great oceanic distances of the Atlantic and Pacific that separate the nation from its strategic interests without many intervening bases.³

The political reality of the post-Cold War era is that U.S. allies are less dependent on the United States for their security than during the days of the Soviet Union. In fact, in the current war on terrorism, the United States has become more dependent on allies and friends for

³ This discussion of geopolitical and military imperatives underlying the need for a more robust sea basing capability is drawn from Appendix D, *Thoughts on Sea Basing in the Twenty-First Century*.

intelligence and cooperation in addressing a global, distributed threat than it ever was during the Cold War. Nevertheless, even during the Cold War the United States found that its interests and those of its Allies did not necessarily coincide. As a result, there were occasions where the United States was denied use of bases, air space, and ports.

The 1990s saw numerous refusals by Middle Eastern states to allow U.S. forces the use of land bases on their sovereign territory. More recently, the air campaign against the Taliban regime in Afghanistan underscored the problem of access. Despite the expenditure of vast resources in building up the infrastructure of land bases in the Middle East, the United States discovered that many of its Arab Allies refused the use of that infrastructure for combat aircraft participating in the campaign against Afghanistan. The reluctance of France and Germany to support U.S. policy over Iraq was a signal that the United States can no longer rely on European support for many of its policies. Such attitudes will inevitably translate at some time in the future to an unwillingness to provide access to America's bases in Europe during the course of a major crisis.

Geopolitical and Military Imperatives

- Political costs of land basing
 - U.S. paid stiff political price for continued basing of its forces throughout the Middle East in the 1990s
- Military constraints on land basing
 - Increasingly precise cruise and ballistic missiles available to adversaries
 - Special forces, commando, and terrorist threats also increasing
 - Large footprints ashore = large, immobile targets
- Bottom Line
 - More capable seabases will provide means to project power with less political cost and reduced vulnerability

The strategic and political costs of basing too much of America's military power on foreign bases can be significant. Those costs have to do with the negative political impact such bases have had in the past, and will likely have in the future, on local attitudes towards the policies of the United States.

During the Cold War, U.S. bases on foreign soil did cause considerable friction, but such friction was, for the most part, bearable to Allied political leaders. However, since the Cold War the situation has changed dramatically. The existence of a substantial American presence on land bases in the Middle East has contributed to political unraveling in that region and provided a propaganda base for those opposing America's presence.

Moreover, the competition between missile developments and defensive systems will be a key operational challenge over the next several decades. Large-scale missile attacks will be able to overwhelm protective systems, despite considerable defense improvements. American bases abroad will become vulnerable to

these weapons.⁴ In the near future, potential enemies of the United States will possess capabilities, either developed by indigenous industries or purchased abroad, to attack stationary targets, particularly large ones like airfields and ports. Moreover, one cannot eliminate the possibility of attacks on air bases by Special Forces or guerrillas.

U.S. forces based on land in areas like the Middle East are targets at all times. It is only a matter of time before terrorists strike again at high visibility targets similar to Khobar Towers or the Marine Barracks in Lebanon. American maritime forces are likely, at some time, to be the target of terrorist attacks as well – the suicide attack on the *USS Cole* is a case in point. Yet forces based at sea are less vulnerable overall than those based on land. Thus, more capable seabases will provide the means to project power with less political cost and reduced vulnerability.

A new world of threats will surely evolve as our defenses improve. U.S. security will rest on having a full spectrum of strategies and capabilities at hand. Among these will be the ability to act unilaterally and rapidly. The broad seabasing concepts outlined here provide freedom of action and decisiveness when coupled with light, agile, lethal forces supported by synchronized fires, maneuver, sustainment and protection.

⁴ U.S. Commission on National Security/21st Century, *New World Coming: American Security in the 21st Century*, Supporting Research and Analysis, Washington, DC, 15 September 1999, p. 52.

Geopolitical and Military Imperatives

- The Strategic Imperatives
 - The Hart-Rudman Commission

Even if we retain the necessary bases and port infrastructure to support forward deployed [land-based] forces, they will be vulnerable to strikes that could reduce or neutralize their utility. Precision strikes, weapons of mass destruction, and cruise and ballistic missiles all represent threats to our forward presence as stand-off ranges increase. So, too, do they threaten access to strategic geographic areas.

The emerging operational world is likely to see increasing numbers of cruise and ballistic missiles, perhaps with precision and stealth capabilities, that could present a significant challenge to U.S. forward operating land bases. This is a threat not just to air bases, but one that will confront all the Services over the coming decades. As a result, all the Services should have a vital interest in involving themselves in sea basing.

Geopolitical and Military Imperatives

- Future seabases would possess flexible capabilities to enable a wide spectrum of operations from humanitarian activities to war
- Likely future operations will be within range of the sea, including the “Asian Crescent” from North Korea to the Middle East, South America and Africa
- Sea basing ***must enable joint operations***
 - Efforts toward jointness must not hold up Marine / Navy progress
 - Sea basing efforts should aim at integrating service capabilities

The emerging threats and vulnerabilities suggest that U.S. military forces should increasingly rely on sea basing in one form or another. New capabilities and technologies created by the revolution in communications, computers and other areas, offer considerable possibilities for the development of advanced concepts for sea basing. But new technologies alone do not drive the need for new thinking and approaches to sea basing. Rather, it is the strategic and political framework that underlies the need to project U.S. military power from the sea and suggests the need for sea basing to become something more than just the property of the Navy and Marine Corps.

Three definitions of “joint” appear in joint publications:

- “Joint (DoD) connotes activities, operations organizations, etc., in which elements of two or more departments participate”
- “Joint Warfare is team warfare”

- “Joint Matters means matters relating to the integrated employment of land, sea, and air forces, including matters relating to – (1) national military strategy, (2) strategic planning and contingency planning, and (3) command and control of combat operations under unified command.”⁵

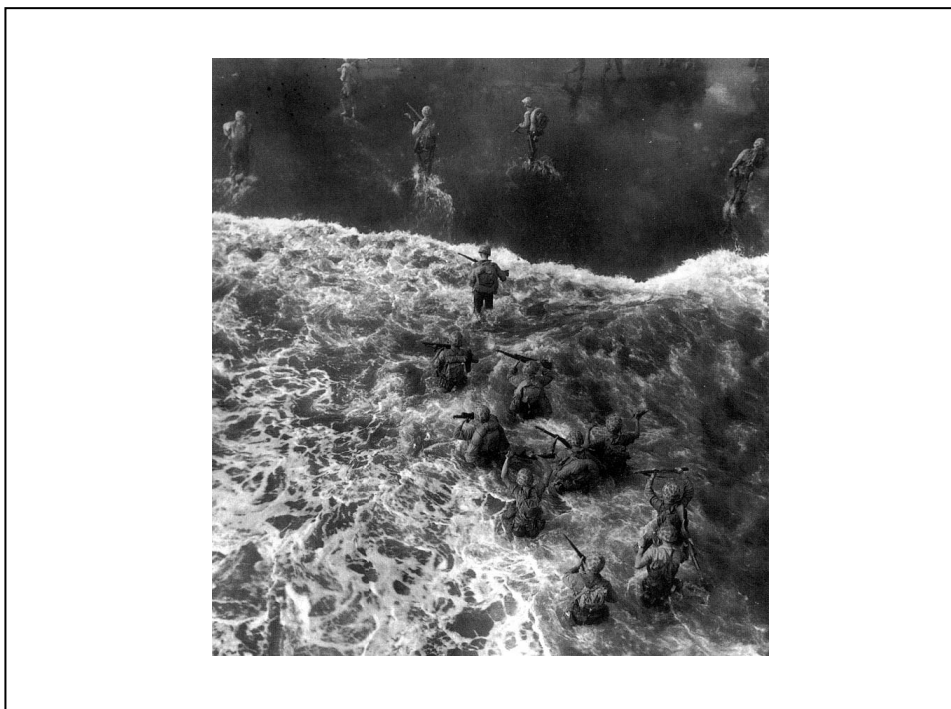
In sea basing terms, jointness means four things:

- The ability of the seabase to serve as the joint force commander’s location
- Its ability to serve as a dynamic base of operations for forces of all Services
- Its ability to handle the logistics of all four Services plus special operations forces
- Its ability to support and sustain operations from the sea of all four Services

In effect, sea basing must become a truly joint concept with capabilities that allow for the projection of the full panoply of American military power against the enemies of the United States.

⁵ See Murray, Williamson, *Lessons Learned: The Learning Part*, draft paper.

A SEA BASING CONCEPT FOR THE FUTURE



Amphibious warfare, a traditional U.S. military competence, is the forerunner of future sea-based operations. The World War II Pacific Victory was based on assaults over the beaches of numerous islands and atolls. Future sea basing envisions a broader, more flexible operational capability to support major land operations, over-the-shore or well inland. The future seabase enables forcible entry operations with sustained thrust, focused directly on inland objectives without the need to first reduce coastal defenses.

What's Different about Sea Basing?

- The United States has historically conducted forcible entry expeditionary operations across the shore
- In the future, in-theater land bases or traditional amphibious operations may no longer be feasible due to political considerations or enemy defensive capabilities
- A seabase represents a **sovereign, maneuverable capability** for rapidly projecting U.S. offensive and defensive power, as well as assembling, equipping, supporting and sustaining scalable forcible entry operations without the need for land bases in the joint area of operations
- **Sea basing expands current amphibious capabilities** in both scale and scope to enable rapid-response, deep, joint, prolonged operations

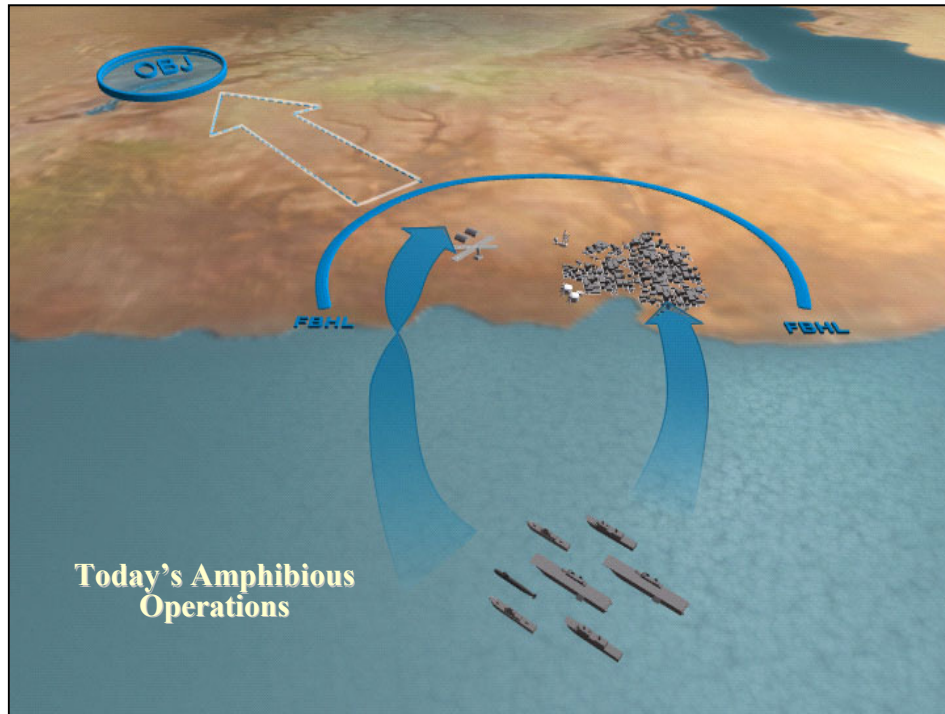
Sea basing, for the purposes of this report, represents a *future capability* with antecedents in amphibious operations. A seabase is a system of systems enabling personnel, materiel, fires, and command and control to come together rapidly, integrate, and be projected as a flexible force capable of undertaking a broad spectrum of over-the-shore operations. Such operations could range from humanitarian relief, operations other than war, and conflict prevention to brigade-sized or larger combat operations. Even larger operations could be enabled by the addition of more seabases or by the ability to flow additional forces through the seabase. A seabase may serve as an integration point for joint as well as coalition forces.

Sea basing is more than simply traditional amphibious assault operations. It entails the projection of land forces substantially beyond the beachhead, independent of in-theater land bases. A seabase also needs to sustain such forces for prolonged periods.

Sea basing can be defined as: The capacity and/or capability to project rapidly sustainable military power ashore from the sea. Such capabilities must be flexible and adaptable to a wide range of

contingencies. They must also be capable of meeting and overcoming an increasing number of threats. Sea basing is inherently joint: it includes the integration of new ISR capabilities as well as precision fires to enable ground forces to achieve operational objectives. The ability of seabases to project power ashore can be substantially extended by military power from land bases, but in the emerging future it must be capable of operating by itself against substantial enemy capabilities until those capabilities have been destroyed or rendered harmless.

The elements of the future seabase concept that this report envisions encompass a broad range of operations. This report concentrates on the most difficult type of operations – brigade-scale forcible entry from the sea, as it is the most demanding use of seabases. In doing so, however, the Task Force does not intend to deny the use of seabase components for the accomplishment of other missions across the operational spectrum.



Today's amphibious operations focus on assaults over the shore and into seaports, to establish footholds ashore permitting the build-up of sufficient combat power to conduct operations against inland objectives. This concept of operations (CONOPS) requires an operational pause for supply and reorganization, thereby losing momentum through a decrease in operational tempo.

Today's Amphibious Operations Capability

- Worldwide USMC/USN forward presence with three Amphibious Ready Groups
 - Responsive forces for MEU/SOC missions
 - Little capability for sustained land combat
- 2-plus Brigade amphibious lift capability
 - Limited stand-off from beaches
 - Requires large logistical footprint ashore
 - Little naval surface fire capability; heavy reliance on air
- 3 Brigade equipment sets on Maritime Prepositioning Force
 - Require unopposed environment
 - In-stream offload at sea state 2

Today's amphibious capability provides the nation great utility across the spectrum of conflict. Amphibious Ready Groups (ARGs) execute forward-presence operations. Nine additional ARGs, in transit, refit or training, backup the forward-deployed force. An ARG normally consists of three ships: a large-deck amphibious assault ship and two smaller amphibious vessels. ARGs carry Marine Expeditionary Units Special Operations Capable (MEU(SOC)) and deploy from the east and west coasts as well as the western Pacific. The MEUs are combined-arms task forces based on infantry battalions. Logistics groups and composite fixed- and rotary-wing aircraft squadrons round out the units. Commanded by a colonel, a MEU is capable of special operations such as emergency evacuations, but is not designed for sustained combat ashore.

An amphibious Marine Expeditionary Brigade (MEB), capable of a greater range of special and combat operations, embarks in the ships of an Amphibious Task Force (ATF). The current 36-ship amphibious force has the resources to embark two brigades of approximately 13,100 Marines each. Brigades are task-organized forces and can vary in size. The notional brigade is built around an

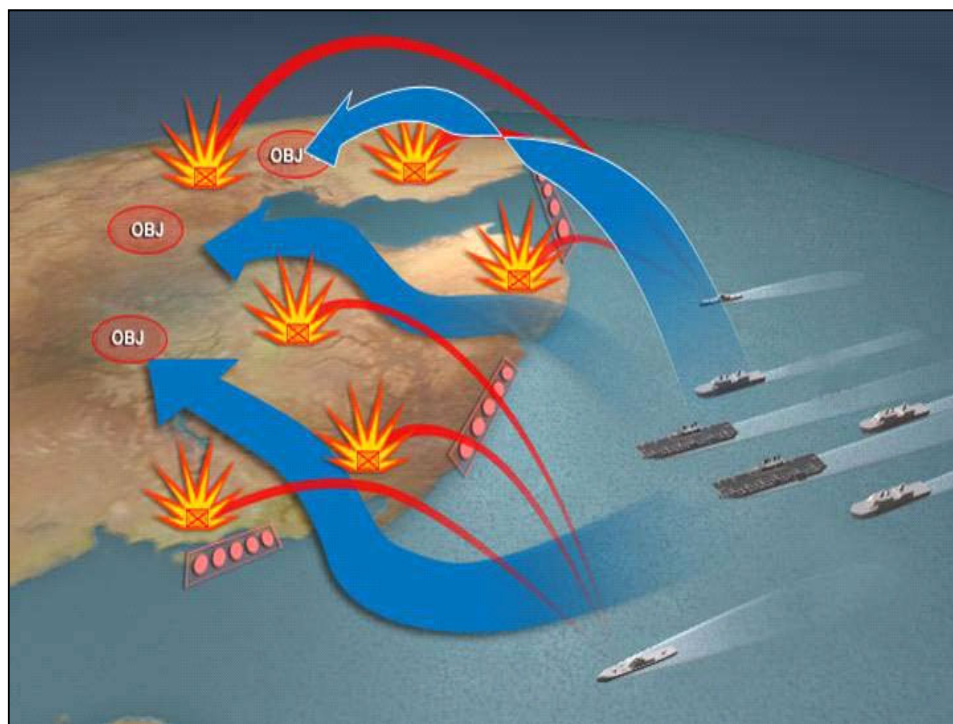
infantry regiment. The aviation combat element (ACE) is a Marine Air Group consisting of several fixed and rotary-wing squadrons. A robust combat service support element, a brigade service support group, accompanies the force. The brigade is capable of sustained land combat, but relies heavily on the early introduction of its expeditionary airpower for fire support. Current doctrine for amphibious operations requires a substantial logistics presence on the beach to support the brigade as it moves inland.

The ships of the Maritime Prepositioning Force (MPF) represent an important addition to the amphibious force. These commercial ships, manned by civilian crews, are organized in three squadrons, each of which carries equipment and sustainment for a Marine Expeditionary Brigade. The squadrons are based in the Pacific, the Indian Ocean, and the Mediterranean. Capable of offload in sea state 2, these ships deliver equipment in-stream or pier-side to a Marine brigade arriving at a secure port or airfield.

Today's amphibious forces have great flexibility. They can land at places and times of their choosing and can achieve strategic and/or tactical surprise; but they have significant limitations as well. Some amphibious ships must remain close to the beach to discharge and support the assault, which makes them vulnerable to shore-based attack and shallow water mines. The assault echelon brings most of its logistical support ashore, which slows the pace of military operations, while creating tempting targets and limiting mobility. The MPF ships possess capabilities for in-stream or selective offload. In-stream offload is limited by sea state and other factors, but the entire ship may be offloaded in-stream in benign conditions.



Operations from a future seabase focus on direct assault on inland objectives (with no operational pause) followed by moves to capture seaports or safe shore lodgments for heavier follow-on forces. This shift in tactics is made possible by the logistics support, airlift and maneuver capabilities of the seabase. This shift in CONOPS reflects across the entire range of military operations.



Future sea-based expeditionary movements direct from the sea to objectives are supported by strike, close support and logistics from the seabase and elsewhere. Direct-to-objective operations mean forces bypass shore defenses and move immediately inland.

Future Sea-Based Capabilities

- Conceptually, a nominal seabase consists of
 - One Expeditionary Strike Group
 - A Carrier Strike Group
 - A Maritime Prepositioning Group, supported by a Combat Logistics Force
 - Specialized supporting vessels
 - Incorporated forces
 - Numbers may vary depending on the size and complexity of operations
- Proposed seabasing CONOPS call for employing equipment and logistics capabilities from advanced bases outside the theater of operations, within approximately 2,000 miles
- Seabases would enable sizable, rapidly deployable forces to operate independent of in-theater seaports or airbases
- Over the next two decades, U.S. sea basing capabilities could evolve sea-based operations in littoral regions supported directly from CONUS

As envisioned in the nominal plan, the ship component of a future seabase consists of an Expeditionary Strike Group (ESG), a Carrier Strike Group (CSG) and a Maritime Prepositioning Group (MPG) supported by a Combat Logistics Force (CLF). The Carrier Strike Group's primary responsibility is to provide deep strike, combat air support to forces ashore and protection from airborne threats such as enemy aircraft or sea-skimming missiles. The CSG also provides the airborne intelligence, surveillance and reconnaissance (ISR) needs of the joint force.

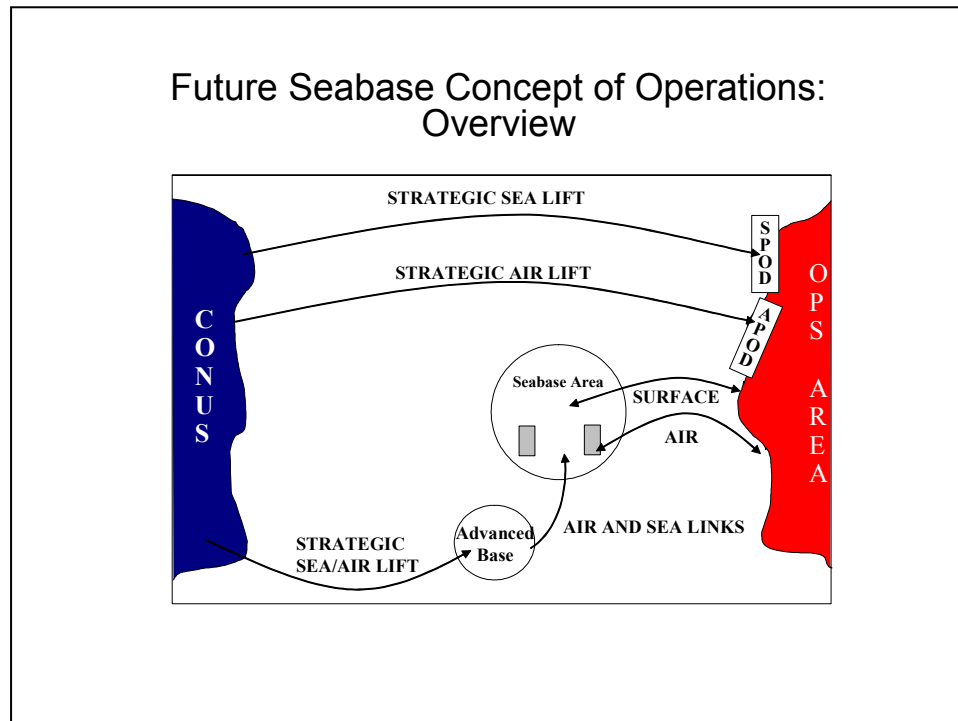
The ESG supplies the seabase land assault capability. It should allow for assembly of the assault force, the transshipment of logistics, lift (both sea and air), and a place to reconstitute and redeploy forces following combat. The Maritime Prepositioning Group provides the combat equipment for Marine Expeditionary Brigade that reinforces the Marine Expeditionary Unit based aboard the ESG.

Special operations forces, soldiers, and Marines would assemble, together with their equipment, on the seabase to match the mission's needs. This combination would enable rapid force projection over

the shore, force protection, logistics, and command and control. Additional Strike Groups, Prepositioning Groups, lighters, countermine systems and other specialized systems for joint operations and logistics handling may be added as required to support specific operations depending on the political and military context. The concept is flexible, however; small efforts, such as humanitarian or noncombatant evacuation operations (NEO) operations, may require only a few, small ships, whereas large operations would entail additional vessels.

While a seabase can operate with or without in-theater land-base support, current transport limitations require an advanced base within roughly 2,000 miles for support and sustainment. At present, Guam for the East Asian theater and Diego Garcia for the Middle Eastern theater could fulfill that role – though requiring considerable investment. Southeast Asia represents a problem – there is currently no advanced base. Singapore may be too vulnerable; northwest Australia may be the best possibility.

As lift capabilities improve, a long term goal for sea basing may be the ability to operate independently in major littoral areas of strategic significance around the globe supported directly from CONUS.



Future forcible entry operations may employ a variety of bases to support the forces engaged. In-theater seaports and airbases have traditionally provided logistics and other support to forces ashore—those forces perhaps already established by amphibious and air assaults. However, as the political context grows more ambiguous and new weapon threats arise, fixed bases on land will become difficult to sustain and utilize.

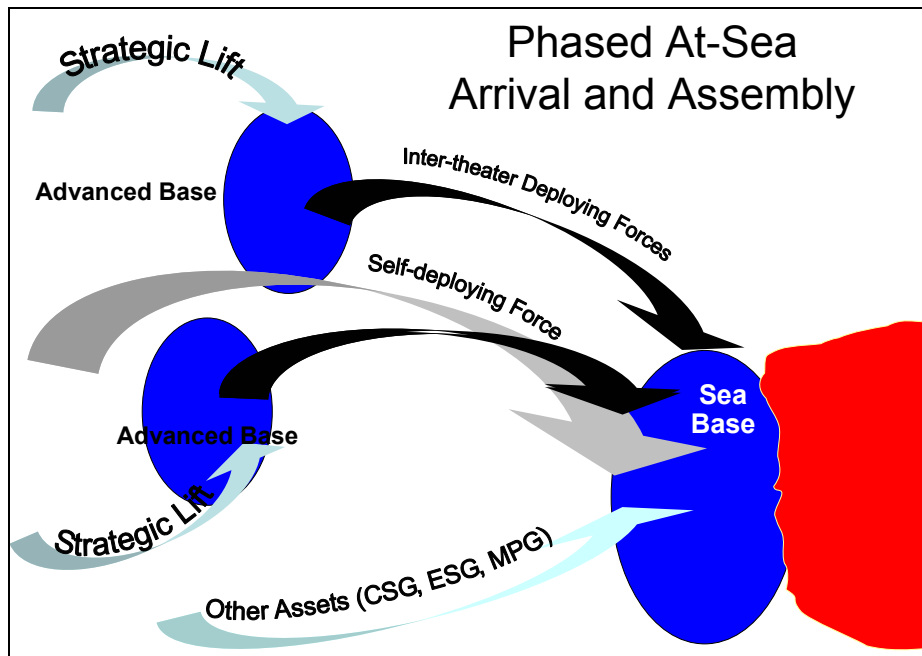
Seabases may also serve as stepping stones for expeditionary forcible entry operations. A seabase is the best way to support the early stages of combat and provide sustainment until, with the seizure of ports, heavier forces can arrive.

Seabases composed of today's ships, logistics and lift systems remain limited in their ability to operate independently of advanced bases. They lack the capacity to assemble sizeable forces for combat, carry sufficient materiel to support large-scale operations ashore, and sort and selectively offload logistics tailored to specific operations. Additionally, current ARGs and MPFs lack the airlift capacity necessary to sustain inshore forces for prolonged periods.

Because of these limitations, seabases will rely on advanced bases close enough to the conflict to provide assembly and timely transportation of forces to the base, a marshaling area for supplies brought by commercial vessels for re-supply, and a reconstitution refuge for troops spent after sustained exposure to combat. Troops and materiel destined for the seabase must transit from CONUS to the advanced base, next to the seabase and finally ashore.

In the longer term, sea basing systems may allow for direct shipment from CONUS to the base without transshipment through an advanced base. This improvement will reduce force closure time and increase seabase flexibility. Additionally, eliminating the advanced base adds the ability of the seabase to operate in regions where advanced bases may not be available.

The crucial point is that sea basing, with or without an advanced base, will allow more rapid movement of reinforcements and logistics through its various components to sustain the tempo and lethality of operations ashore.

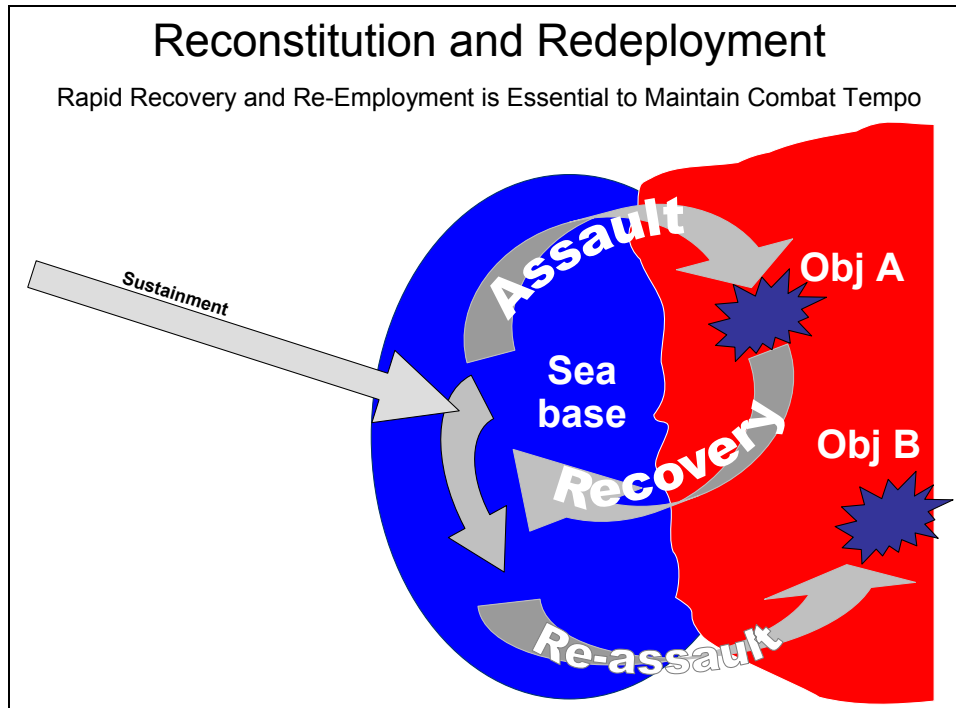


Phased at-sea arrival and assembly is a critical aspect of the future sea basing concept. For a sea-based operation, as a crisis develops, the initial response ESGs and CSGs arrive and constitute the seabase. The Maritime Prepositioning Group is sortied and self-deploying forces flow forward to the seabase while non-self-deploying forces move to advanced bases via strategic lift. From these bases, forces move forward by inter-theater connectors (such as high speed vessels, or RW/TR aircraft) to marry up with their equipment aboard the MPG en route to the theater. Sea based lighterage ensures smooth transfers within the seabase.

Implicit with this capability is the habitability that future MPF ships MPF(F) must provide for MPG personnel as well as the interface capability that all lighterage and intra-theater lift vessels must have with MPF(F).

The notional timeline for flow-in forces is:

- Aviation units ready within 72 hours of arrival at the advance bases
- Units ready within 24 hours of arrival at the seabase
- Flow-in echelon closed within seven days of initial movement



Combat tempo and responsiveness is increased through sea basing and direct assault on the objective with the ability to rapidly recover and re-employ forces, either in the same operation at a different location or in an entirely different operation. After it seizes its initial objectives, some or all of the force can be recovered to the seabase, maneuvered with the seabase and rapidly re-employed elsewhere.

In order to achieve this, minimum logistics must be held ashore—a core capability of sea basing.

THE VALUE OF AN OPERATIONAL SEABASE

Why Seabase?

- Seabases would better enable rapid, substantial power projection from the sea
 - A counter to some area denial and anti-access measures
 - Expand the range of military options and complicate defense for potential adversaries
 - Minimize local/regional political sensitivities
 - Maneuver reduces vulnerability compared to large, fixed military presence ashore
 - Provides rapidly deployable, yet persistent capabilities
 - Closes the “vulnerability gap”
 - Less vulnerable to weapons of mass destruction
 - Likely to be the lynchpin for unilateral preventative action with both fires and maneuver operations
- Sea basing provides complementary and supporting joint force capabilities

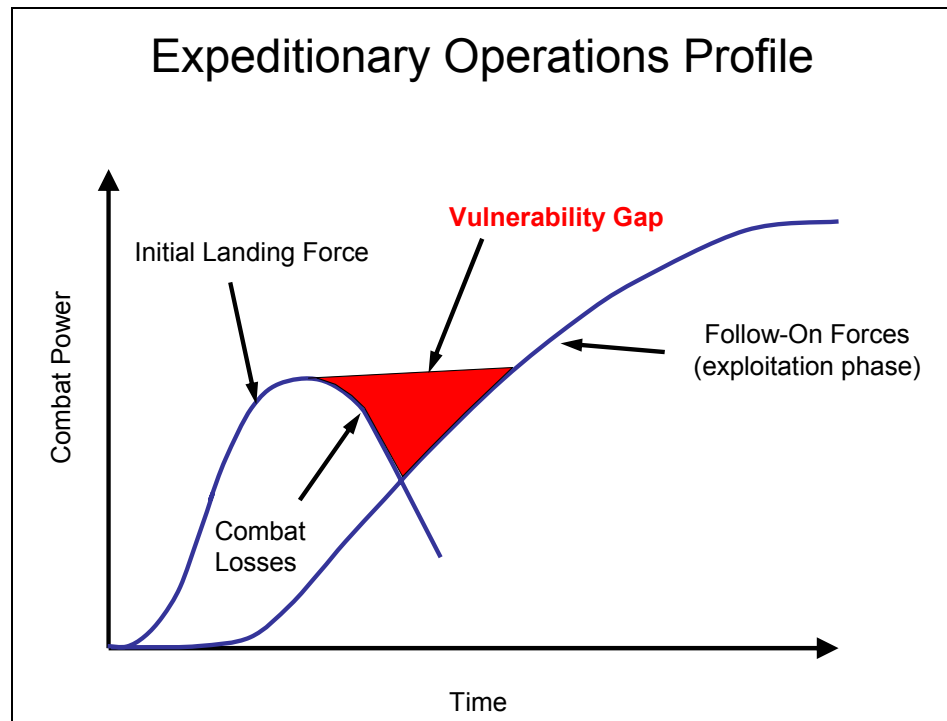
U.S. military forces have long recognized the advantages of striking from a seabase. The island-hopping campaigns of World War II would not have been possible, if naval forces had not learned to sustain themselves at sea and project and sustain power from the sea. The great fleet trains that supported Task Force 58 in World War II are the ancestors of the current and future seabase.

With the coming of the Cold War, U.S. forces came to rely heavily on a world-wide network of bases created to contain the Soviet Union. The nation soon learned, however, that access to and over these bases was not always assured. From Lebanon in 1958 to Turkey in 2003, U.S. forces have had to change operational plans and strategies because of denial of access by allies, who see such access as inimical to their national interest.

In recent years, the number of permanent overseas bases has dwindled, a trend likely to continue. As a nation with global interests, the United States cannot allow other nations to hold its forward presence and power projection requirements hostage. Sea basing provides a powerful alternative to land bases. It is likely to be the necessary lynchpin for unilateral preventive actions with both fire and maneuver operations.

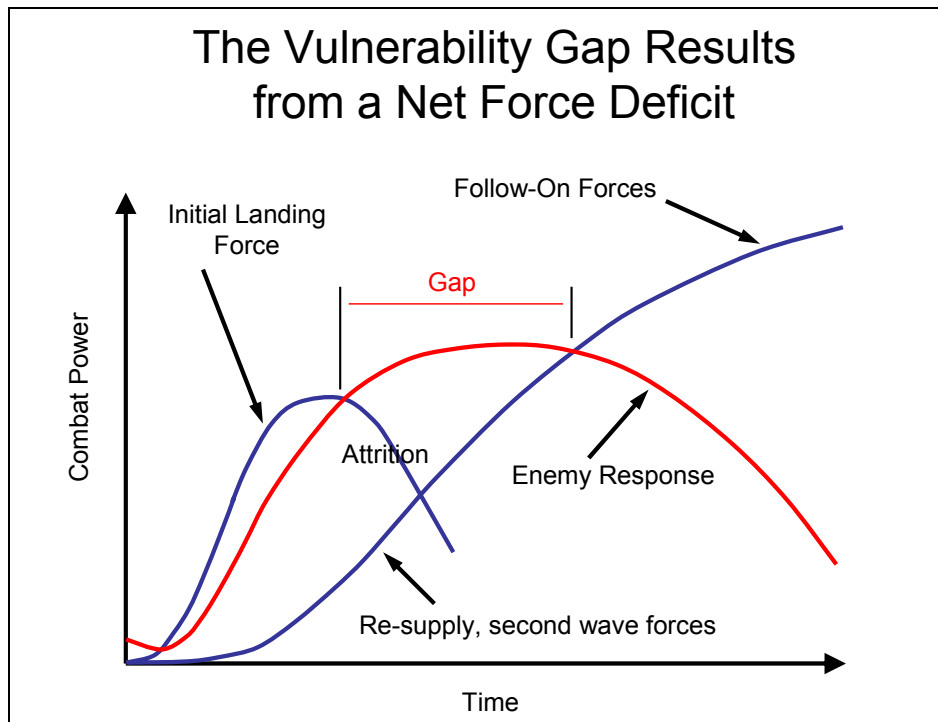
With additional seabase capabilities, the United States would solve much of its access problem. Moreover, a mobile seabase enhances force protection and reduces the effectiveness of various anti-access strategies. A seabase of the future would obviate the need for large and vulnerable logistic infrastructures ashore and provide a powerful deterrent to potential adversaries.

What is crucial to moving the seabase beyond its Navy and Marine Corps antecedents is the need for the other services to tailor their seaborne prepositioning concepts to those of the maritime prepositioning force. Moreover, the tailoring of at least part of the 101st to operate off a seabase, as it did during the Haiti crisis, would substantially increase the nation's ability to project power from the sea. The sea basing concept, however, extends well beyond the static use of carriers to transport and disembark forces – it encompasses dynamic deployment of forces to a mobile base, which then positions and supports them for best military advantage. The joint capabilities of the seabase ensure its usefulness for the entire extent of conflict from early entry to follow-on operations.



Expeditionary operations can be characterized by this chart. Initial forces are placed into battle quickly to limit and shorten the conflict, to employ the element of surprise, and/or to support threatened allied forces. After the initial assault and before the arrival of heavier, larger forces, the combat effectiveness of the initial force degrades due to fatigue, enemy action or surprise. During this period the initial assault force is capturing and rendering useful in-theater seaports and airports of disembarkation (SPODs and APODs) required by the follow-on force. This period following the peak of the initial assault can be termed a “vulnerability gap.”⁶

⁶ See Murray, Williamson, *The Implications of Access for Power Projection*, draft paper. The vulnerability gap and the operational value of the sea base are also discussed in Appendix E, *Operational Issues of Sea Basing in the Twenty-First Century*.

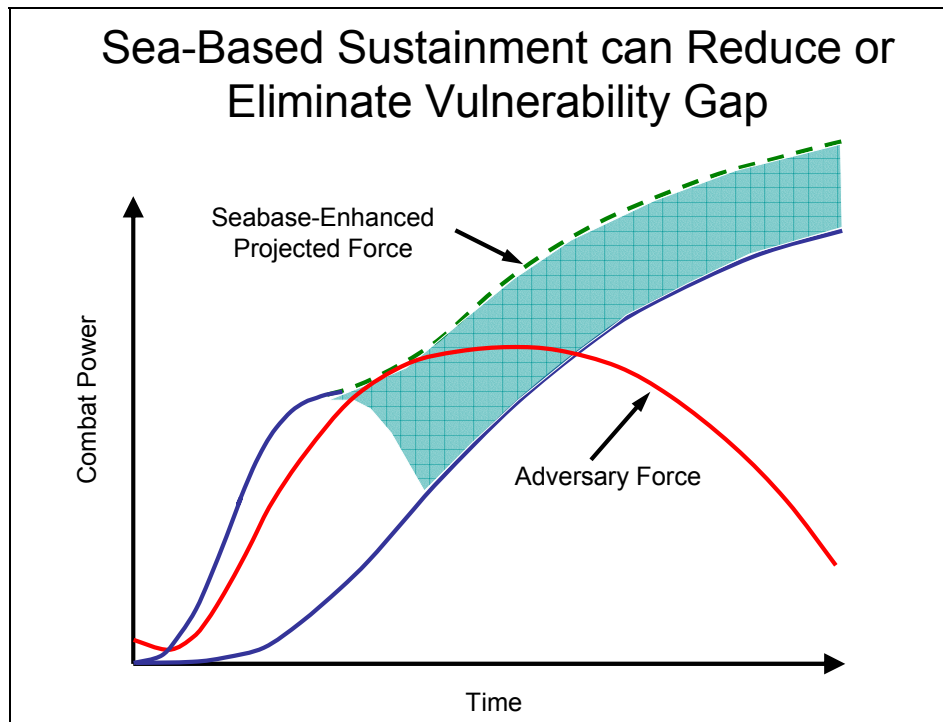


Over the past century, projection of military power from the sea, usually termed expeditionary operations, has followed a similar pattern, especially when attacking an opponent who possesses the ability to reinforce his troops. Even when there was every expectation that a landing might occur, the attacker has usually enjoyed the advantage of being able to choose the place and time of his amphibious operations. At Gallipoli, as at Salerno, Normandy and the Falklands, the defender knew amphibious operations were about to occur, but remained unsure as to the location and exact timing of the coming attack. Thus, even though strategic surprise might have been lacking, the attacking forces gained tactical and, in some instances, operational surprise at the onset of the battle.

The initial advantage of tactical surprise, however, usually proved difficult to convert into an immediate operational or strategic success. There were several reasons for this. First, the lassitude induced in achieving a successful amphibious lodgment made it difficult for the attacking troops to push on to take full advantage of their operational advantages. This was clearly the case in the Anzac landings during the Gallipoli campaign and in the failure to seize Caen during the

Normandy campaign. In other cases, cautious commanders have failed to take advantage of the opportunities that the initial landings offered; here Sulva Bay, during Gallipoli, and Anzio spring to mind. The Turks, in the former case, and the Germans in the latter, had virtually no troops in the immediate landing area. But because of the attackers' failure to seize the advantage of initial successes, the defenders were able to limit the impact of the initial landings. They were able to bring up sufficient reinforcements to establish a defensive front that hemmed the attackers into a bridgehead. Only in the Inchon landings were attacking amphibious forces able to gain almost immediately an advantage that led to a great operational victory.

Once lost, momentum can only be regained by the buildup of superior military forces and their sustainment. This usually involves a prolonged buildup period and the erosion of the enemy's strength by major military operations. In the course of the Normandy Campaign, Caen, which was defended by minimal German forces, did not fall for over a month, while it took Anglo-American forces two full months to gain operational freedom and defeat the Wehrmacht.



For initial forces, the seabase acts as a support base, both speeding initial deployment and sustaining the halt phase force so that its impact is prolonged, not transitory. Besides disrupting the enemy's equilibrium, future sea-based operations could, if needed, clear the enemy's beach defenses so that follow-on heavier forces could come ashore over the beach or through captured seaports or airports.

The seabase can continue to sustain its forces ashore even after the arrival of the follow-on forces thus enhancing the total combat power available to the Task Force Commander. There is no build up phase ashore – air and ground operations can begin simultaneously. The aim of the future seabase will be to prevent the period where the enemy can react and limit the operational success of initial landings.

ENABLING SEA BASING CAPABILITIES

Forcible Entry from the Sea Requires

- All functions performed on the seabase
 - Moving forces, materiel, and weapons from an advanced base (or CONUS) to the seabase
 - At sea reception, staging, onward movement, and integration
 - Getting the force to the objective and sustaining it
 - Sea, air and land platforms working in concert to project power to the objective (including ESG, CSG, MPG, CLF, air and sea links plus lighterage)
 - Defense suppression
- A **joint system** extending across interoperable platforms, netted together and sustained from the sea
- ***Much more than logistics – it's operations!***

The maneuverable nature of future seabases, independent of APODs and SPODs, expands the range of attack options. It would allow entry at a time and place of U.S. choosing. However, sustained, sea-based, forcible entries against future adversaries will represent more complex undertakings.

America's enemies will be able easily to defend shallow waters with inexpensive, hard-to-clear, mines; easily transportable, effective anti-ship missiles will replace shore-based artillery defenses of the twentieth century. In one scenario, expeditionary assaults might begin with inland, vertical envelopment of airmobile ground forces as much as 150 to 200 miles from the sea, deep into the enemy's territory. Portions of the land force have the option to fight their way back to the shore to clear the beach for heavier forces. Sea basing would allow positioning forces to best advantage.

The dynamic nature of the seabase allows as well for many other operational concepts, depending on the situation – a major advantage of the sea basing concept.

Sea-based operations will require close coordination of offensive, defensive, logistics, command and control, and supply systems. Furthermore, sea conditions in many areas will require complex sea, air and land supply transfer activities even with rough seas and high winds.

U.S. military doctrine requires that sea, land and air forces form joint task forces. Thus, the seabase must be designed with joint operations in mind. While the Army, Marines, and Navy may directly employ sea basing techniques, all services, including the Air Force, must operate in close cooperation. Land, air and joint command and control systems must all be integral to seabases.

The sea basing concept aims at expanding existing Navy/Marine Corps capabilities to encompass joint operations. The seabases of the future will serve the functions of air- and seaports. In other words, it will be an in-theater base for prolonged warfare operations. Such operations can involve the Air Force and particularly the Army, in addition to the Navy and Marine Corps; the brigade-sized operational focus of the conceptual seabase is at the “sweet spot” between the expeditionary operations traditionally performed by the MEB and 101st Airborne and larger military operations that involve divisions or corps.

Seabases are much more than logistical support bases – they will be mobile operational elements that enable rapid closure and forcible entry from the sea.

Sea basing to support fully joint operations will become an antecedent capability to establishing secure bases ashore. As conditions degrade from diplomatic and benign entry to paramilitary and then military opposed entry, sea basing becomes a “sine qua non” to forcible entry operations.



Sea basing is not just logistics.

Critical Seabase Capabilities

- Fully joint capable
- Maneuverable, dispersed – able to coalesce rapidly as needed
- Integrated command and control
- At-sea arrival, assembly, and transfer of materiel and personnel
- Selective, robust offload
- Conduct and sustain forcible entry and subsequent operations
- Facilitate movement ashore
- Force protection
- Re-suppliable throughout the follow-on force build up period in adverse weather
- Ability to reconstitute and redeploy the force
- Robust in challenging seas

To be effective, a seabase must possess the attributes listed above.

A seabase must be capable of supporting joint and combined force operations.

It must be mobile, both to allow speedy positioning at the best location to support land operations and to make the seabase difficult to attack. Since the seabase is comprised of many vessels, these elements of the base must have the ability to coalesce rapidly as needed in accordance with operational plans.

Task forces comprising the seabase must be tightly integrated, allowing for seamless communications, logistics and offensive and defensive systems.

The seabase must be able to transfer materiel as needed among ships comprising the base, air transport and commercial ships providing sustainment for the base and supported forces. The seabase will have to conduct materiel transfer operations under the adverse sea conditions likely to be found in the areas of operations.

Since much of the equipment required by assault troops must be prepositioned in the MPF well before a conflict, it is not possible to predict the mix required for specific operations. For this reason, future MPF ships must be able to selectively sort and offload the equipment and cargo needed by the task force. Such ships must be automated warehouses at sea, able to move standard containerized loads and equipment under realistic sea conditions.

The seabase must support both air and over-the-beach operations required during various combat operations, accommodating both moderate and heavy loads.

The seabase must provide protection, both for itself and forces ashore. Inasmuch as future CONOPS for forcible entry operations envision agile, logistically unencumbered troops fighting deep inland, the seabase must have the ability to project both air and naval fires for close support.

There must be a way to resupply the seabase to allow sustained operations, either independently or as part of a larger task force. The seabase may represent a transition element to land-supported operations as U.S. forces capture and repair SPODs and APODs for later use.

In addition, the seabase must be capable of operations in challenging seas – up to sea state 4. To provide context, the table below shows the percentage of sea state 3 conditions (relatively benign conditions) or less for various littoral areas.⁷

Western Atlantic	60	Mediterranean Sea	75
Eastern Atlantic	40	Persian Gulf	89
North Sea / English Channel	52	North Arabian Sea	73
Eastern Pacific	45	West Indian Ocean	52
West. and So. Caribbean	53	Cape of Good Hope	21
NE South America	54	Gulf of Guinea	71
Western South Atlantic	43	NW Africa	48
Eastern South Pacific	40	East Coast of Japan	48
NW South America	55	East Coast Philippines	62
Western Central America	73	Korean Coast	71

⁷ Further discussion of sea state conditions is in Appendix F, *Sea States*.



Traditional amphibious operations focus on massing materiel and forces ashore. The seabase is regarded largely as a logistics delivery capability.

In future conflicts, large, fixed footprints ashore are liabilities—they are vulnerable, restrict movement and slow the operational tempo. The modern seabase is a mobile, defensible, largely prepositioned asset that combines operational, command and control, and logistics activities. It is, at the same time, fort, airfield, depot, barracks, command center and maneuver element—all able to exploit the maneuver space of the sea.

The seabase should provide a full range of base operations, starting with force assembly and projection, protection of both the Ground Combat Element (GCE) and seabase itself, support of operations for prolonged periods and joint command and control, as needed. To be effective, the seabase must be capable of operations in sea conditions that are likely to prevail in the area of operations.

Seabase Design Tradeoffs

- Fundamental seabase requirements represent tradeoffs among operational concepts, logistical requirements, lift capacity and speed, and defense requirements
- Additional requirements stem from expected sea conditions, cargo packaging, and the need to flexibly integrate the force with its materiel at sea

The conceptual design of a seabase is the result of a series of interrelated tradeoffs:

- Operational requirements (force size, weaponry, the reach inland of its military power, and environmental conditions)
- Logistical requirements to support the force, in the initial assault as well as long term
- Ship and aircraft lift and speed capabilities
- Threats the seabase is likely to confront that determine defensive measures (especially standoff distances from shore).

For example, a hypothetical threat estimate of an adversary with Mach 3.5 sea-skimming missiles that can target ships 100 miles out to sea (a three minute flight time) would put a seabase that lacks adequate defensive systems so far out at sea that helicopter and landing craft transit time and lift limitations would make it difficult to support forces at distances inland.

The need to carry out force reception, staging, onward movement and integration (RSOI) as well as logistics support operations at sea means that ships comprising the seabase require the ability to handle heavy loads (TEU inter-modal shipping containers or more) in sea conditions typically found offshore (sea state 4). Using today's geopolitical picture, this means the Northern Pacific, the Indian Ocean and the Arabian Sea.

Seabased Land Force Deployment Operations

- Projected CONOPS envision seabase ships operate at an over the horizon line of departure at least 25 n. mi. offshore
 - Helicopters and tilt-rotor aircraft deploy the airborne force inland
 - 35 knot LCACs and 20+ knot AAVs, provide transit times of approximately one hour to the beach
- When a beach/lodgment area is required and secured, ships can close to 3 n. mi. or less to support the force
 - Dictated by current fuel and water pumping capability and slow transit speeds of LCUs and lighters (5 to 8 knots) necessary to move heavy equipment
 - Envisioned LCU(R) is a 15 knot vessel able to carry three M1A1/2 tanks
- Heavy lift (TEU) air vehicles capable of operating from the seabase would have great utility
 - Would extend operational possibilities enormously
- Ability to handle cargo up to sea state 4 is crucial

Planning CONOPS call for seabase ships to move to a distance of twenty-five n. mi. offshore at the outset of conflict.

The initial movement of troops and weapons inland could occur by vertical lift. The number of available aircraft, their range, lift and speed, the size and weight of the forces, and distance from the seabase to landing zones will determine the rate at which forces deploy. Using today's helicopters and tilt-rotor aircraft, only relatively light forces could deploy in this manner over the distances the future operations will require.

At present, heavier forces must come over the beach on Landing Craft Air Cushions (LCACs) and in Advanced Amphibious Assault Vehicles (AAVs). From 25 n. mi., the one-way transit time for such landing vessels is one hour, a factor that severely limits the rate of deployment.

After the beach is secure, ships move closer to shore (three n. mi.) to accommodate the need to pump fuel and fresh water across the beach and the slow speed of lighter craft. At five to eight knots,

lighters – Landing Craft Utility (LCUs) ships – can carry heavy loads, such as main battle tanks that augment the lift capabilities of aircraft and helicopters. Higher speed lighters, that will replace current LCUs (LCU(R)), are under development. They are being designed to carry three Abrams tanks.

Heavy lift air vehicles (capable of lifting an inter-modal TEU container) that can operate directly from the seabase would provide a major improvement in the ability to deploy and sustain more robust forces ashore, especially in combat.

To preserve seabase maneuver options in the challenging seas characteristic of some possible operations areas, seabase ships should be able to handle cargo within and between ships up to sea state 4.

The Dirty Dozen Twelve Issues the Department Must Address

- **Management**

1. A Joint Sea Base Program Office
 - Re-task and reorganize existing offices
 - Ensure meaningful participation by the Army and Air Force in forming a joint capability

- **Planning**

2. Sustaining Troops Ashore
3. Protecting the Force Ashore
4. Countering Threats
 - Littoral operations an important area of operations
 - Mines, sea-skimming missiles, subs, small boats
5. Concepts of Operations
 - At sea RSOI, deployment, force protection, sustainment

The Dirty Dozen (cont)

- **New Capabilities**

6. Cargo transfer at sea
 - Inter-modal TEUs at SS4
7. Long-range, heavy lift aircraft
 - Based at sea with capability to support forces ashore and transport troops
8. Ships
 - The platforms of sea basing
9. Communication architecture
 - A shared data architecture with sufficient bandwidth, redundancy and robustness
10. Logistic support system
 - Ability to handle all Service materiel interchangeably
11. Inter-theater lift
 - HSVs, lighterage, sea-going cargo cranes, skin-to-skin transfer capabilities that can operate at SS4

- **Resources**

12. Development speed and funding
 - Creative ways to develop and fund construction of a modern sea basing capability

Meeting the requirements and capabilities for a future sea basing capability will require the Department to address the major issues listed above. They range from management, to planning, to developing new capabilities, to resources.

Most of the issues facing DoD involve developing new capabilities. Some require research and development, new concept formulation, analyses of alternatives, and system development before they can come to fruition in seabase applications. Heavy lift aircraft, heavy lift cranes, and semi-submersible platforms are among those concepts and are discussed in the slides to follow.

Of this list, three stand out as especially important capabilities that need to be developed:

- Improved cargo handling capabilities that can operate in rough seas, characteristic of many likely areas of operations
- A long-range heavy lift aircraft that can be based at sea
- Next-generation ships that support future sea basing requirements

Each of these developments is difficult, but not impossible to achieve. They require substantial research and development effort and investment to produce robust capabilities. They are all necessary to “make sea basing happen.”

The Seabase System of Systems

It's not just a bunch of ships

- Consists of interacting platforms and capabilities
- Must conform to an overall architecture
 - Allows for progression from the present to the future
 - Allows for CONUS-to-seabase deployment and sustainment using military and commercial transport
- Self defense
 - Capability for optimally pairing fires and force protection
- Can sustain operations for prolonged periods
 - Until follow-on forces arrive
 - Serve as a support base thereafter
- C2 systems
- Logistic systems
- Naval surface fire support

A seabase is a complex system of capabilities which would serve to capture not only the power and flexibility of future CSGs and ESGs, but also the superb capabilities envisioned for MPF(F) squadrons. The combination of these capabilities would allow at-sea arrival and assembly, selective logistics offload and air operations for up to a full Marine Expeditionary Brigade or equivalent Army brigade.

The challenge is to create an achievable and synchronized path from today's Carrier Battle Groups (CVBGs), ARGs, and Maritime Prepositioning Ship (MPS) squadrons to the capabilities of the seabase envisioned for the next decade. Each of the legacy upgrades – such as LHA(R) and MPF(F) – must be addressed in conjunction, together with airlift support needs. To do otherwise would optimize individual elements in stovepipes which would inevitably lead to considerations of affordability that would preclude the achievement of what the seabase of the future could offer the nation.

The seabase, as currently envisioned, will inevitably eliminate legacy concepts such as the in-theater Intermediate Support Base, as well as current distinctions between “deployment” and “employment.”

The seabase of the future must be capable of receiving logistics support from commercial container ships, while MPF(F) ships must have surface and aircraft interfaces to allow operations in conjunction with the CSGs and ESGs. The presence of these latter groups in the seabase would provide the seabase with the ability to protect itself, project power ashore, and support ground forces.

The ability of MPF(F) squadrons to carry the necessary equipment for a MEB-sized force and their ability to accept re-supply from commercial and military shuttle ships, would insure sustainment of operations ashore, while follow-on heavy forces move to contact. The seabase not only offers logistics support, but can also provide afloat command and control for the joint force commander, at-sea equipment maintenance, and medical care for ground forces.

Management

1. A Joint Sea Base Program Office

- Developing the seabase will be a complex effort
 - Requires an overall system of system architecture that supports CONOPS for a wide range of operations in a wide spectrum of environments
 - Involves the planning and development of ships, aircraft, cargo handling systems, communications and logistics
 - Requires participation of each of the services to ensure compatibility
- A Joint Program Office can handle the size, scope, complexity and duration of the sea basing development effort

Developing a system of systems, as complex as a seabase, necessitates careful coordination among the myriad projects required for implementing the system. Seabase realization must be guided by an overall architecture which coordinates diverse developments, including concepts of operation, ships, aircraft, cargo handling systems, logistics and communications. All the Services must participate to ensure compatibility.

Managing such a wide ranging, multi-Service program will require a leadership structure that spans diverse disciplines and that endures for the length of the seabase development activity. After discussing alternatives at length, the Task Force concludes that a Joint Program Office is the best choice to manage seabase development.

Planning

2. Sustaining Troops Ashore

- Current CONOP calls for troops to depart from 25 n. mi. offshore
- This departure distance results from the radar horizon and the 35 kt speed of LCACs and 20+ knot speed of AAVs and endurance of assault troops.
 - 25 n. mi. is over the horizon – an important element of surprise
 - At 25 n. mi., defense against sea-skimming missiles must detect, target, and kill threats in a minute or less
 - Lines of departure 75 to 100 miles offshore decrease large ship vulnerability, but make lighters impractical
 - Additional threats, such as mines, complicate over-the-beach logistics.
 - Ships must eventually move close to the beach to deliver heavy weapons, such as tanks
- A sea-based, heavy lift aircraft, capable of transporting a TEU load 300 miles is crucial for sea basing
 - Avoids the vulnerability / transit time
 - Speeds delivery of supplies from ship to shore

Current concept of operations for ship-to-objective-maneuver envisions the line of departure for transit ashore from the seabase at a minimum of 25 n. mi. This range is driven by the nominal radar horizon, the 35 knot transit speed of LCACs and 20+ knot speed of AAVs (which will ensure that troops being lifted only have to endure an hour of what can be a disorienting and uncomfortable trip). Such distances may be risky given the expected proliferation of sea skimming cruise missiles in the future. At 25 n. mi. with a Mach 2 cruise missile fired from shore, the seabase's protective systems, resident primarily in surface combatants, have less than a minute to observe, decide on counters, and make a kill before the missile would hit seabase platforms such as an MPF(F) ship.

With a line of departure of 75 to 100 n. mi., only airborne insertion and support of the initial ground forces ashore is realistic, leading to reduced inland reach and could eliminate surface combatant naval surface fire support. This distance also makes surface transits more difficult for LCACs and AAVs, with an LCAC round trip requiring six to eight hours. Current LCUs, with a top speed of about 8 knots, are essentially unusable, requiring 20-24 hour round trip times. The

surface movement would be so fragile that it is not clear that any operation other than a small raid or a NEO could be executed.

A surface movement, even if executed from 25 n. mi. offshore after suppression of hostile forces protecting the beachhead, could face two additional obstacles – mines which currently can only be cleared over several days and sea states at or below 2. These obstacles essentially shut down the lighterage capability required to move heavy equipment ashore. Even an improved joint logistics over-the-shore (JLOTS) capability of sea state 3 represents only a marginal improvement. These deficiencies argue for development of a heavy lift aircraft (capable of lifting 20 tons or more) which can operate from the seabase. Such an aircraft could over fly the minefield and operate in up to sea state 5. However, it would still be insufficient for getting Abrams tanks and AAVs ashore.

The distance to shore in any operation is always in the hands of the commander – the object of seabase design is to allow maximum flexibility.

Additionally, there is a need to develop the capability of carrying out warehousing operations aboard ship, particularly the selective moving of containers in high sea states, in order to tailor supply deliveries to the real-time needs of the Ground Combat Element.



Today's lack of sea-based air lift capable of delivering 20 ton loads inland means that much of the Ground Combat Element's materiel must move over the beach (such as the Light Armored Vehicle shown here) . Delays in reaching and clearing the beach of adversary defenses in the future suggest that forces projected from a seabase may have to fight using lighter equipment and whatever long-range, air-drop flights land based C-130s and C-17s can deliver.

The American military in 2020 will continue to need the flexibility to project sufficient firepower and land power ashore to attack and deconstruct sophisticated command and control and defenses in order to enable follow-on forces to come ashore through a captured port or over beaches made safe from enemy attack.

Planning

3. Protecting Forces Ashore

- Traditionally, naval forces have protected forces ashore from the sea through a combination of fire support brought ashore, NSFS, missiles, and air support
 - NSFS lacks the range and precision to protect forces 200 miles inland
 - Current cruise missiles (Tomahawks) are too large and expensive for close support of troops
- The seabase must be able to protect troops ashore against missile attack as well as provide ISR, strike and close air support
 - Forces ashore and at sea must have a common picture of the battle space
 - Cooperative engagement technologies, where sensors ashore (such as radars) link to systems at sea, are key

A traditional role of the Navy has been to provide air and naval surface fire support (NSFS) to forces ashore. In the past it has accomplished this mission with fire from 5-inch guns, land-attack missiles and sorties from carriers and ships in the amphibious force.

Supporting future joint forces ashore from the seabase will require expanding that traditional role. Current doctrine calls for the seabase to remain 25 miles or more offshore, while forces ashore strike up to 200 miles inland from the coast. These distances are well beyond the reach of traditional naval gunfire. Ships of the seabase need surface weapons systems capable of responding to calls for fire from distances greater than 25 miles. While the Tomahawk cruise missile certainly has adequate range and lethality, its size limits the number ships can carry, while its expense remains prohibitive. A smaller precision weapon is needed either in the form of a long-range naval gun, a smaller land attack missile, or an unmanned aerial vehicle (UAV).

The ships of the seabase will have a vital role in providing protection to ground forces from cruise missiles. To this end,

cooperative engagement technologies are key to success. Radars ashore linked to radars and weapons systems at sea as well as reconnaissance aircraft, unmanned aerial vehicles and strike aircraft can provide protection to both forces operating ashore and ships in the seabase.

The carrier battle group will continue to provide long-range reconnaissance, targeting, and strike capabilities in support of the ground force. In addition, large, persistent, aircraft missile platforms can provide rapid response to calls for fire.

Planning

4. Countering Threats

- Many ships constituting the seabase will have large displacements (>100K tons). A number of threats could compromise the ability to perform their missions:
 - Obstacles and Mines: Principally a shallow water threat (<100 fathoms). Current and developing Navy mine clearing capability is slow and difficult to conceal. Best approach now is detection and avoidance. More effort is urgently needed on mine clearing technologies
 - Sea Skimming Missiles: Short flight times make rapid detection, targeting, and kill a must. Persistent shipboard and airborne ISR is a must, as are rapid response antimissile defenses
 - Submarines: Long a Navy strength, anti-submarine defenses, as presently constituted, appear adequate against identified threats
 - Small Boats: The projected Littoral Combat Ship will be well prepared to deal with the small boat threat

The ship or ships that will constitute a future seabase will be large and are likely to have displacements exceeding 100,000 tons. Depending on the level of survivability incorporated in their design, such vessels are unlikely to be sunk by a single mine, missile or torpedo. However, hits with such weapons would be sufficiently damaging to force mission aborts. Thus, every effort needs to be made to counter such potential threats. While the large displacements of seabase ships limit the chances of their loss due to single torpedo hits, the small craft (lighterage) used to transfer men and materiel to the beach are vulnerable to outright loss, not just damage, caused by mines and, when close inshore, to shoulder-fired missiles.

Counters for the Mine Threat. Few nations have effective deep water mining capabilities. Water deeper than 200 meters (100 fathoms) can be assumed to be a sanctuary for the seabase. Unfortunately, in many parts of the world such water depths occur far from shore: most of the Persian Gulf is shallower than 100 fathoms. For a seabase to be positioned inside the 100-fathom line, a very large area must be cleared, and it must be done to a high degree

of certainty. Current mine clearing capability in water depths between 100 fathoms and 10 fathoms, although very sure, is slow. Clearing an area of sufficient size to provide adequate maneuver space for a seabase will take at least many days, perhaps weeks.

While the likelihood of having to clear room for an entire seabase may be small, it is highly likely that lanes will have to be cleared for lighters to operate between the seabase and the high water mark. Clearing obstacles and mines in the surf zone is a difficult problem; the Navy's capabilities in this area are limited. In the sea basing context, mine clearance will be urgent; lanes will have to be cleared in no more than one day. That will require new methods. Development of shallow water mine clearance methods must be supported; they can exploit the absence of any need for furtiveness in sea basing applications. Designs of both heavy-lift aircraft and lighters should incorporate mine countermeasure features.

Counters for Sea Skimming Cruise Missiles. Sea skimming missiles have two outstanding features as defensive weapons:

- They can be hidden in commercial buildings, mounted on flatbed trucks, or deployed aboard small ships; a 100-mile missile weighs one, or at most two, tons
- The range at which they can be detected by their target is limited by the height of the target's radar; the horizon of a masthead radar is 15 miles—45 seconds warning for a Mach 2 incoming missile

There is no acceptable solution to sea skimming missile detection except to employ search radar orbiting at high altitude (the horizon range at 25,000 feet is just under 200 miles) and to place ships beyond the range of the missiles.⁸ Moving ships well offshore also reduces the clutter background against which the search radars must operate. On the other hand, it compounds the difficulty of supporting the troops ashore.

⁸ Several projects are underway to develop medium-attack, long-endurance (MALE) UAVs that can serve as platforms for early warning surveillance radars.

Counters for the Submarine Threat. If an enemy has a submarine capability, it constitutes a serious threat to a seabase; a well-trained crew operating a modern quiet submarine in their home shallow waters cannot be found easily. But maintaining a competent submarine force is beyond the reach of all but a few nations, and is therefore an exceptional problem. The surest countermeasure is to track submarine whereabouts and pre-emptively destroy them at their piers.

Countering the High-Speed, Small Boat Threat. The high-speed small boat threat is deemed to be of minor importance because surveillance radar is needed for many purposes and weapon systems exist that can destroy these targets. One of the principal capabilities of the projected new Littoral Combat Ship (LCS) will be to counter such threats.

Planning

5. CONOPS

- Shore defenses threaten the movement of ships to the 25 n. mi. line of departure necessitated by the radar horizon and current lift capability
 - Portable, easily concealed anti-ship missiles must be cleared early in the conflict
 - A task which may involve FOPEN sensors or special ground ops to complete
 - Rapid, means for clearing mines not available at present
- The success of planning CONOPS is sensitive to a number of factors:
 - If enemy defenses force seabase ships farther offshore, current deployment systems will not suffice
 - From 100 n. mi., an LCAC round trip to shore requires 6 hours; an LCU 24 hours
 - At 100 n. mi. offshore, helicopter and tilt-rotor range is limited to ferrying troops and materiel 50 miles inland.
 - If heavy lift, sea-based aircraft (MV-22s are medium lift vehicles) are not available, the range and payload of helicopters (CH-53E) are inadequate to reach deep inland objectives
 - If mine and shore-based missile threats cannot be avoided or cleared quickly, heavy materiel (Abrams tanks, AAVs, bulk POL) cannot move ashore quickly, thus limiting initial commitment to light forces

The planning CONOPS is a sensitive balance between the requirement to defend the seabase and the ability to project forces inland.

The destruction of an adversary's seaborne platforms can be carried out in a conventional manner, but finding and destroying shore-based defenses will be difficult and might have to be accomplished on the ground. The advanced (light) force to do this will have to be delivered by air; it will have to be relieved quickly by a force the weight of which cannot be handled by air but only by sea, which means a need for high-speed lighters and rapid mine clearing. The force's relief cannot be conditional on good weather; the Department must develop the capability to perform all aspects of lighterage work in rough seas – loading, transit and off-loading.

If shore-based defenses force the seabase farther out to sea, the range and speed of both air and sea vehicles become major problems. For example, an LCAC making the trip from a ship 100 miles offshore takes six hours per round trip, not counting load and offload times, as opposed to an hour-and-a-half for a twenty-five mile distance.

Each round trip delivers the equivalent of one Abrams tank. An LCU takes even more time – one round trip would require twenty-four hours at 100 n. mi.. Similarly, the greater distance MPF(F) ships are from shore, the less distance inland vertical take-off and landing (VTOL) air lift can penetrate.

Heavy, long range airlift is critical. Without sea-based medium lifters (such as the MV-22) the ability to move troops inland drops sharply. Helicopters (CH-53E) lack the range to transport meaningful loads over planned CONOPS distances. On the other hand, should a long-range, sea-based air lifter, able to carry TEUs, become available, the flexibility and striking power of the seabase significantly improves.

On the sea side, the ability to clear beaches of mine and missile threats impacts the ability to deliver heavy combat equipment and supplies (main battle tanks, amphibious assault vehicles, fuel and water) ashore. Because of their weight, such systems cannot be easily delivered by air, but are crucial for the fighting capabilities of forces ashore. If the seabase cannot close to three n. mi. in a timely fashion, the delivery rate of heavy items would drop significantly.

While current systems do not support sea basing as envisioned (AAV, CH-46, CH-53E, LCU), new systems are being planned or in development that are first steps in the right direction (MV-22, CH53X, MEFFV, ITV, LHA(R) dual tram and MPF(F)). It is critical that the requirements for these new developments fit within the seabase system of systems.

Critical Seabase Capabilities Needed

- Improved cargo handling
 - High-tech sea cranes
 - Skin-to-skin transfer
 - Lighters capable of matching the motion of supply ships
 - Not JLOTS
- Heavy lift air vehicles
 - Quad tilt-rotor
 - Large single rotor
 - Fixed-wing
 - Lighter than air cargo movers (e.g., HULA)
- New ships
 - LHA(R) and MPF(F) seabase platforms for heavy lift air vehicles
 - Semi-submersible platforms
 - Automated warehouse ships

Seabases require new capabilities to support forces ashore. Some of these require research and development, new concept formulation, analyses of alternatives and system development before they can come to fruition in seabase applications. Heavy lift aircraft, heavy lift cranes and semi-submersible platforms are discussed in the following slides.

One problem is the lack of programs to provide means to transport troops to the seabase efficiently. Current thinking is that combat forces could fly from CONUS to an advanced base and then be shipped to the seabase over a distance of as much as 2,000 n. mi.. One concept that “solves” this transport problem is the Theater/High Speed Vessel fleet (TSV/HSV) which can lift hundreds of troops and their kit 2,000 n. mi. at 40 to 50 knots. The Department of the Navy has no TSV/HSV program at present, and, if Littoral Combat Ships (LCS) are pressed into this mission, their other missions in the littoral such as anti-submarine warfare and mine countermeasures will be uncovered. The Army has a modest six vessel TSV program in its embryonic stage, but its intention is to use TSVs to lift the objective force’s equipment and troops directly to an austere, but secure port in

the theater, not to a seabase. Thus, the interface of these relatively small TSV/HSV's with 100K ton displacement MPF(F) platforms is a problem. This is the same problem as the transfer cargo to and from lighters for shipment to shore. There is no technology work underway that addresses this interface in any sea state greater than near-calm conditions.

If these problems are not overcome – that is the lack of a robust TSV/HSV program and sea state interface – then the MPF(F) ships will have to remain at the advanced base in order to have the troops walk onboard. MPF(F) ships would have to remain within 200 n. mi. of the advanced base, to allow rotary winged aircraft to execute what would be a very demanding ferry problem. These situations dramatically diminish the timeliness of the MEB-sized reinforcement capability of a seabase operating in an enemy's littoral.

On the other hand, some programs now under development no longer serve a useful purpose for sea-based operations as envisioned by this task force. The Joint Logistics Over The Shore (JLOTS) program, for instance, lacks the capacity and robustness needed if the seabase concept of airlifted light forces followed by heavy forces supplied through a port or over the beach is realized.

New ship designs are also required for seabase duty. Seabase ships of the future, LHA(R) and MPF(F) for instance, will require large decks for sorting and loading supplies and conducting flight operations, must have accommodations for 2,000 to 3,000 personnel, have the ability to stow and load munitions, be able to selectively sort and load cargo as needed for operations, and do all of these functions at sea under realistic sea conditions – sea state 4. None of these capabilities are currently part of existing Maritime Prepositioning Squadron vessels.

New Capabilities

7. Moving Heavy Loads At Sea

- Future seabases will require four separable at-sea cargo transfer processes:
 - Selective cargo movement within ships
 - At sea transfer from vessels to lighters inside well decks
 - At sea transfer to and from lighters alongside seabase ships
 - At sea transfer from black hull commercial vessels to seabase ships
- For heavy loads, these processes differ
- Stabilized cranes, together with means to stabilize ships, offer limited technological options for at-sea cargo transfer

Container ships are generally unloaded in port by large gantries that routinely move loads from ship to shore. To be compatible with commercial practice, a seabase requires the ability to move TEU containers from the seabase 1) to internal lighters (e.g. to an LCAC in a well deck), 2) to external lighters (e.g. to LCUs or LCU(R)s), and 3) from black hull container ships re-supplying the seabase.

At-sea transfer of heavy loads is different in each transfer process. At present, the most universal means of facilitating loading is the stabilized crane, although additional means (such as heavy ballasting, roll stabilization, heavy fending, and stable SWATH designs) can reduce the difficulties of using cranes in various sea states.

Transfer to Lighters. Because of internal sloshing (called seiching), amplified by the coupling of long wave motions to resonant frequencies of ships in shallow water, the current transfer ability to lighters located in wet well decks remains limited to sea state 3 and below. Furthermore, entry to or exit from a well deck is also limited to sea state 3. Technology exists to mitigate these limitations. Large, deep draft or heavily ballasted vessels with internal roll stabilization

(e.g. such as is employed by large cruise ships) exhibit little roll up to sea state 4. Use of dynamic, laser-controlled internal gantries, augmented by laser-controlled guy wire tensioning winches on large roll stabilized ships would allow internal transfers of standard container size (and weight) loads up to sea state 4.

Transfer to External Lighters. Given current technology, the development of a sea crane that will allow the safe transfer of heavy containers from a large seabase ship to relatively small external lighters in sea state 3 represents a seemingly intractable problem in control theory. Unless the equivalent of a small harbor, contiguous to a seabase ship, can be developed and deployed to reduce the relative motions of small displacement hull external lighters, off-loading of heavy loads will remain limited to times of benign sea states.

Transfer Between Ships. Although wire line transfer technology and helicopter replenishment techniques permit the routine transfer of light loads between ships in up to sea state 4, or if necessary sea state 5, the current ability for crane-based transfer of heavy containers between ships remains limited to sea state 2. An R&D program is currently underway to develop a heavy lift crane with ability for safe operation up to sea state 3. This project presents a difficult problem in control theory for linear induction electric motors. Even if successful, the current prognosis for developing a sea crane that will provide safe ship-to-ship heavy load transfer capability in sea state 4 is not good.

The seriousness of sea state limitations on lighterage operations will vary with the location of the proposed operation and time of year.

At Sea Transfer of Personnel, Inter-modal Containers and Out-sized Equipment

- Transfer of personnel and materiel to, from and within the seabase is key to success
- Materiel packaged for shipment on black hull ships today arrives in standard containers (TEUs)
- Materiel carried by MPF(F) ships is loaded months, sometimes years before need
 - Optimum mix and order of cargo are impossible to predict
 - MPF(F) ships must have selective offloading capability
- Equipment to handle inter-modal containers at sea does not now exist

Transfer of personnel, supplies and equipment to, from and within the seabase in a variety of environmental conditions (including the open sea) is critical to projecting and sustaining sea-based forces. Selected future sea platforms will have the ability to accept personnel loads from rotary wing, fixed-wing and tilt-rotor aircraft and HSVs, as well as to conduct ship-to-ship transfer of containerized cargo and outsized equipment in the open ocean. The seabase must be capable of conducting such operations in at least sea state 4.

Seabases must be capable of re-supply from commercial ships. Seabase ships must have the ability to transfer heavy inter-modal packages, which can move easily through distribution chains (commercial, DoD and Naval) configured as containers – twenty-foot equivalent units (TEUs). Naval logistics must insure information from constant in-transit visibility (ITV) to support overall joint total asset visibility (JTAV). The focus for at-sea transfer of TEUs will be the future MPS squadron ships that form a portion of the seabase. Due to new inter-modal naval packaging, such re-supply units can quickly be broken down into smaller containers. Inter-modal

packaging will also allow breakdown and transshipment from MPF(F) ships to other vessels within the seabase, thus reducing repeated handling and its associated manpower demands. The receiving platforms (CSG, ESG, and even CLF ships) will be supported by a minimum 12,000-pound inter-modal container (similar to present-day Quad-Cons) transfer capability. Until all legacy ships can be adapted to such capabilities, the current break-bulk/palletized transfer capabilities will continue to be needed.

New Capabilities

7. Heavy-Lift Air Vehicles



Heavy air lift is an essential element for assault in depth as envisioned in both Army and Marine Corps CONOPS. The MV-22 tilt-rotor aircraft has a lift capacity of 5 tons at a range of approximately 250 n. mi.. The CH-53E can lift sixteen tons, but only for short distances.

The Marine Corps inventory of materiel needed to support a light brigade contains many items that weigh up to 20 tons (such as standard sea shipping containers). Many such items are designed to fit in a C-130. Unless the Department develops airlifters capable of moving heavier loads than the MV-22, such items can be brought ashore only over the beach, which in future operations will require lengthy mine and missile clearing. The only major items weighing more than 20 tons are M1A1 and AAVs.

Heavy Lift Air Vehicles

- Current and programmed air vehicles limit seabase ability to provide rapid, flexible force projection
 - In some planning scenarios, an entire brigade ACE (MV-22s and CH-53s) is necessary to provide the transport and supply demands of the GCE leaving no capability for subsequent tactical missions
- Heavy lift air vehicles are valuable maneuver and sustainment assets for
 - Transport of personnel and materiel to the seabase from remote advanced bases
 - Movement and supply of forces ashore
 - Persistent platforms for ISR, tankage, look-down defense radar and weapons delivery

Sea basing can never reach full potential to provide rapid, flexible force projection with current/programmed air vehicles. Analysis indicates that almost all the ACE's MV-22 and CH-53 aircraft in a nominal brigade-sized task force would be required to support the logistical demands of the Ground Combat Element at a radius of approximately 100 nautical miles. This is not a satisfactory capability for many cases, because it leaves no aircraft available for tactical missions and would destroy the flexibility and operational maneuver advantage of the force – whether Marine or Army.

Future airlift vehicles – quad tilt-rotor, larger single rotor, fixed wing, hybrid ultra large aircraft (HULA), or lighter than air cargo movers – are not alternatives to sea basing, but rather should represent the movement, mobility and maneuver assets, which would integrate into and augment the seabase.⁹

⁹ The Army Science Board has examined aerial support requirements for Army forces with similar conclusions.

Sea basing will depend upon mobility assets to assemble and close the force in the joint operations area (JOA). Given the capabilities of future air vehicles, the potential exists for lift to move the force from CONUS directly to the seabase or to the seabase via an advanced base. The bottom line: future heavy airlift must be capable of operating in austere environments and from the seabase.

Projecting forces across the breadth of an adversary's territory to distances heretofore not realized would provide the Joint Force Commander great operational flexibility and allow him to operate inside the adversary's decision cycle and thus control the tempo of battle. Emerging high speed vessels, improved lighterage, MPF(F), sea-going cargo cranes, and future heavy lift air vehicles all represent important parts of the sea basing puzzle, but air transport capabilities and limitations are critical to defining the bounds of operational maneuver from the sea.

Heavy Lift Aircraft

- A sea basable, long-range, heavy lift aircraft capable of supporting the force ashore, organic ISR, acting as a loitering weapons platform and tanker, and transporting troops to the seabase from the advanced base has a major effect on seabase flexibility
 - Several options have been developed for such an aircraft, such as quad-tilt rotor, large blade helicopters, fixed wing aircraft and lighter than air lifting bodies
 - The aircraft should be capable of lifting TEU loads for distances of 300 miles
 - It should be resident on the seabase
 - It should be capable of ferrying troops to the seabase and from the seabase to the land battle area

A new, sea basable, heavy-lift aircraft, capable of lifting TEU loads with a theater-wide range would make a substantial improvement in the flexibility and efficiency of seabases. Such an aircraft would enable all but the heaviest loads to be delivered directly to the battle area without having to transit beach or port areas – especially to areas of operations deep inland.¹⁰

Additionally, such a heavy lift asset could act as organic ISR platforms, long-loiter gun-ships, provide organic tankage support to the seabase, and facilitate the movement of troops and supplies from the advanced base to the seabase.

The MV-22, currently anticipated as the workhorse for near-term expeditionary operations lacks the lift required to efficiently support the Ground Combat Element.

¹⁰ The Army Science Board's technology studies suggest that a heavy lift aircraft with 20-25 tons capacity and 500 kilometer radius has the right properties to: provide rapid, unpredictable entry; provide follow-on sustainment; transfer cargo, including TEUs; and transfer up to 32-35 tons ship-to-shore at 103 degrees Fahrenheit at sea level.

Several options are available for the design of such a heavy-lifter, including advanced tilt-rotor, rotary wing, fixed wing and lighter than air (HULA) concepts.

New Capabilities

8. Ships: The Platforms for Sea Basing

- Two ship development challenges
 - New designs for existing ship-types that can adapt to future seabase needs
 - LHA(R)
 - MPF(F)
 - Examination of potential revolutionary vessel designs specifically aimed at seabase applications
 - Mobile Offshore Base (MOB)
 - Semisubmersible structures

Ships that make up the seabase must be designed with specific seabase requirements in mind. These requirements include support for air operations and at-sea cargo transfer mentioned earlier, as well as accommodations for forces while they are aboard and the ability to selectively handle cargo as needed to support operations.

Two ship development challenges confront the seabase developer:

- New designs for existing ship types, such as the LHA(R) and MPF(F), to replace the existing fleet with modern vessels adapted for future seabase needs
- Examination of potential revolutionary vessel designs specifically aimed at seabase applications, such as the Mobile Offshore Base (MOB) and the semisubmersible structures based on oil drilling platform technology. Such vessels could be the semi-fixed core of the seabase fleet, or of a size and design to support a major airfield, substantial storage capacity and hotel functions for large forces.

Ship development decisions must be made in the context of the overall system of systems architecture to be compatible with the needs of other major systems that deploy with the seabase.

The LHA(R) Design

- Current design falls short of future sea basing needs in the following areas
 - Space to support air operations
 - Capacity to house troops
 - Ability to transfer cargo in heavy seas
 - Ability to sustain prolonged operations
- New designs must be flexible enough to adapt to the overall sea base architecture

The LHA(R) concept is the redesign of today's Landing Ship, Helicopter Assault (LHA). The current design falls short of future sea basing needs in the space available to support air operations, its capacity to house troops, its ability to transfer cargo to LCACs and other lighters in conditions worse than sea state 3, and its ability to sustain prolonged operations ashore. Further, existing LHA designs do not meet USMC requirements for combined MV-22 and Joint Strike Fighter operations.

Analyses of alternatives for LHA(R) designs are now underway. The Task Force urges that the LHA(R) design remain flexible enough to adapt to the overall seabase architecture, incorporating all elements of the seabase system of systems and concepts of operations.

MPF(F) Support for Air and Cargo Operations

- STOM CONOPS envision all 87 rotary wing aircraft in the ACE operating off six MPF(F) ships
 - Includes 40 MV-22 tilt-rotor and 20 CH-53E helicopter aircraft
 - Future options may include fixed wing aircraft
 - Other CONOPS alternatives are under consideration
- A flight deck / hangar deck to accommodate 10 MV-22 and 4 CH-53E requires 33 spots. Today's LHA has 42 spots: an LHD has 45 spots
- Stowage of significant numbers of 20-foot TEU containers at a 70% load factor would foul 25% of an LHD-sized flight deck, rendering the area unusable
- The total cargo stowage and aircraft requirements for the MPF(F) necessitates **large deck areas suitable for flight operations**

The intensity of air operations needed to launch attacking forces and then supply them underlines the requirement for a large air combat element. That requirement then drives the need to design the MPF(F) ships with flight decks to support at a minimum MV-22 operations, as well as heavy helicopters. Such ships will also require hangar decks sufficient to support the ACE in sustained combat and re-supply operations. MPF(F) ships must have surplus space to allow flexibility rather than the bare minimum to support requirements, as is the case today.

Additionally, future sea-based, heavy lift aircraft (including fixed wing designs) could require even more space. Cargo handling requirements (particularly the ability to locate and selectively offload container-sized loads) are also major considerations in the MPF(F) design.

Mobile Offshore Bases

- The Joint Mobile Offshore Base (JMOB) builds on oil industry experience with large, floating drilling platforms
 - Consists of 1,000 foot section linked to form a runway capable of handling large aircraft
 - Cost per section is approximately \$2B
- JMOB advantages include
 - Stability
 - Large Storage Volume
 - Flexibility to deploy single sections to support helicopter operations
- The JMOB, however, has important drawbacks
 - Slow transit speeds and slower maneuvering speed once deployed compared to other seabase components
 - High cost
 - Lack of flexibility in use
 - Easier to target due to slow speed, once deployed

Mobile offshore base is a term often used to describe a large, semisubmersible platform, much akin to offshore drilling platforms utilized by the petroleum industry. The MOB is most generally referenced as having multiple sections linked together to form a sea-based runway capable of C-130 and perhaps even C-17 operations. A single section would be 1000 feet long with a beam of 500 feet and a cost of roughly \$2B. The ability to link multiple sections together has yet to be proven in significant sea states.

In concept, a single section MOB would provide a creditable afloat base. It is stable and would provide ample storage for stores and equipment. A single section would also be capable of rotary wing operations.

There are two significant drawbacks: transit speed and cost. A transit speed of twelve kts is not in keeping with the speed (twenty-four kts) required or desired for other units comprising the structure of the future seabase. The cost of a single section would exceed the expected cost of an MPF(F) ship, while providing significantly less transit speed and flexibility for other circumstances – such as

proceeding to an open port for off load or replenishment. Dollar for dollar, a modern MPF(F) design would provide the operational commander greater freedom of movement and choices for operational employment.



This popular vision of a future seabase (a super MOB) is inconsistent with the current seabase concept, which must be more mobile than the large “floating island” pictured here. The sea basing concept this task force envisions consists of multiple ships that would form together under the joint operational commander depending on the mission, the extent of enemy defense and offense capabilities, and the concept of operations. The seabase would expand and contract in accordance with actual conditions. The ships forming the seabase would coalesce and disperse as needed to perform RSOI, supply, command and control, and transportation. In its initial combat operations, the seabase could remain as much as 300 n. mi. off a sophisticated opponent’s shore. As combat operations degrade enemy defenses – air as well as maritime – the seabase would move closer to shore and strike deeper inland with air and ground forces.

Large, Semi-Submersible Platforms

- Large-platform, built on oil industry experience with semi-submersible drilling platforms, is a possibility
 - A 500 by 1000 foot or larger multi-deck structure possible
 - Cost is estimated to be approximately \$2-3 B
- Large platform advantages include
 - Stable in high seas
 - Large storage and cargo handling volume
 - Acceptable transit and deployment speeds
 - De-ballasts for transit speed, re-ballasts for deployment stability
 - Artificial lees for loading lighters
 - Ramps and cranes for unloading inter-theater transport ships
- Such large vessels make the seabase platform-centric, reducing flexibility and maneuverability
- Other semi-submersible vessel possibilities

The large, semi-submersible platform, an alternative to the JMOB, is a result of the oil drilling industry's deep sea search for oil. This 500 by 1,000 foot platform is a triple hull structure, with the center hull serving as cargo space. The protected spaces between the outer hulls and the center cargo hull could serve as protected lighter loading and unloading areas. In transit, the platform de-ballasts for higher speeds; on station, the platform is lowered into the water for stability.

The advantages of such a large, semi-submersible platform include its stability in high seas, its large cargo volume and handling potential, its high deployment speed and the artificial lees available for cargo transfer to lighters. Additionally, the semi-submersible platform ramps and cranes are capable of unloading large, inter-theater transport ships.

One Example of a Large, Semi-Submersible Support Platform



Source: Kellogg Brown and Root

This notional design of a large platform seabase support vessel, based on commercial oil drilling experience, would have ample stowage and deck space. It would be stable, due to its SWATH outriggers, and could transit at reasonable speeds, once de-ballasted into the transport mode. Its interfaces with commercial and MPF(F) ships would include both cranes and ramps. Lighters could utilize the artificial lees created between the hulls for loading and off-loading. A variety of deck configurations are possible, allowing both fixed and rotary wing operations.

Other semi-submersible configurations, also based on commercial antecedents, could be useful: for instance, a vessel which picks up and transports barges to seabase locations.

The semi-submersible support platform is not a replacement for the multi-ship seabase concept addressed in this report; it is a possible future adjunct. Additional work remains to be done on exploring the seabase utility of such large-platform options.

New Capabilities

9. Communications

- Current ship-to-shore communications are inadequate to support fully integrated seabase command, operations, logistics and defense
 - Operational and logistical communications are not integrated
 - Robust voice and wideband data communication links of 200 miles (OTH) are basic requirements in planning CONOPS
 - Communications failures prompt commanders to maintain “safety stocks” of supplies to guard against the possibility of logistics failure, clogging distribution channels
 - Reliable wideband communications over future areas of operations will require airborne or satellite repeaters
- Communications needs increase when the seabase serves as the command center for Joint Task Force
 - Broadband video conferencing and satcom voice and data links to CONUS are basic requirements

Current ship-to-shore communication capabilities are inadequate to support the requirements of a sea-based force. If the seabase is to function as the “rear area at sea,” it must have secure, long-range, robust voice and data links to mobile forces ashore, as they maneuver and call for fires. Supporting forces afloat will need real-time operational, logistical and planning information if they are to anticipate the needs of combat forces ashore.

The current sea basing concept of operations envisions ships 25 miles or more off the coast, while forces ashore move up to 150 miles inland. Providing the necessary wide-band communication links over distances of 200 miles or more will require new equipment and communication support concepts. Airborne communications nodes provide one possible solution to this communication problem. Failure to meet this requirement will force commanders to bring supplies and support equipment ashore as “insurance stock” against communications failure, negating the seabase’s utility.

Such communications requirements will increase dramatically when the seabase serves as the Joint Force Command Center. In addition to voice and data circuits, video teleconferencing and reach-back to CONUS represent basic requirements.

New Capabilities

10. Logistic Support System

- Existing logistics systems are inadequate for seabase missions
 - Seabases will serve as transshipment points for materiel arriving on black-hull cargo vessels and MPF(F) ships—sorting, repackaging, and integrating areas where troops, equipment, and forwarding services are mated to deploy and supply forces ashore
 - Such activities must occur under sea conditions likely to prevail
 - New lighterage and cargo handling systems basic requirements
 - Heavy lift aircraft, capable of using the seabase, to allow forces ashore to rely on modest supply inventories
 - Current information systems do not support the logistics-intense seabase activity
 - Existing systems allow visibility into in-transit and inventoried supplies
 - Do not yet work with other Services' logistics systems
 - “Demand pull,” the ability of task force commanders to tailor logistics needed from anywhere in the pipeline, is nonexistent

The current state of ship-to-shore supply is likewise inadequate to support the requirements of a sea-based force. To properly support a joint force ashore from the sea, the joint force must have a transshipment capability to receive equipment and supplies in theater aboard the ships of the seabase. This will require designs for new lighterage and systems to enable the transfer of materiel in high sea states.

Once equipment and supplies are aboard, the seabase must be able to conduct break-bulk and selective offload operations to move equipment and supplies ashore in quantities that tactical units can handle. The distances over which the supplies and equipment will travel demand not only high-speed lighterage, but development of heavy-lift, sea basable aircraft.

Logistical support will demand a constant flow of information. Supply support from the seabase will rely on an uninterrupted flow of data on all classes of supply from tactical units to and from the seabase back through the supply pipeline to CONUS. With virtually

no supply dumps ashore, sea-based tactical forces will critically depend on the supply system's reliability.

Current systems provide visibility into in-transit and inventoried supplies, but are unable to mix and match logistical needs easily from supply systems of the other services. Furthermore, there is no capability for task force commander to pull supplies through the system to support his operations. The failure of the logistics system to meet operational needs flexibly will inevitably result in a logistical chain clogged with unneeded inventory. A responsive system would significantly reduce the volume of supplies handled by the seabase and reduce the complexity of sorting and repackaging materiel for transshipment to forces engaged in combat.

New Capabilities

11. Intra-Theater Lift

- Multiple ships operating in the same area will form part of the seabase
 - Fundamental need for rapid, flexible cargo and personnel movement among the ships and from sea to land under most sea conditions
- Several critical problems need addressing
 - Higher speed, shallow draft vessels with sea keeping properties to allow loading and unloading under challenging sea conditions
 - Ship-to-ship load transfer at sea – deep draft vessels, SWATH configurations, or moon pools
 - Cargo packaging that makes best use of existing capabilities until new, heavier load methods are in place

The seabase will contain ships operating in the same general area in support of each other. Though specifics are scarce, the concept of operations includes the movement of troops and equipment among ships and from ship to shore. The tempo of operations will be fast (or very fast), so the movement of personnel and equipment must be fast, easy and flexible. While severe weather may be a constraint, it should be possible to maintain operations in sea state 4. The equipment may be packaged in pallets (perhaps up to 5 tons each) or standard 20 foot containers (TEUs) of up to 20 tons.

These conditions present significant technical problems.

Speed. Since the distances are relatively short, it may be possible to satisfy the speed requirements with 30-50 knot vehicles. Such vehicles can be designed today, but higher speed (and hence more fuel) means less payload, or more frequent refueling with attendant decrease in the pace of operations. Higher speeds would be desirable in the future if technology makes them available. In some cases ships need to approach the beach to offload, so shallow draft will be a valuable attribute. Note however that to assist in load transfer from seabase ships in heavy seas, a deeper draft may be desirable.

Transfer of loads. Moving heavy loads in a seaway at present is only possible in sea states up to 2. Some work has been done to extend capabilities to sea state 3, but more capability is required. Packaging of loads, methods of transfer, and ship designs need to make this possible.

Packaging into smaller weight units may be possible for some loads. However, this would call for a standardization of sorts to make off-loading and on-loading platform capabilities compatible with the load packages. This is being worked only in a limited fashion at present.

Methods of transfer need to be investigated, including traditional under-way replenishment and vertical replenishment methods, but in higher sea states, as well as more direct, simpler methods, such as ramps and other connectors, and even possibly skin-to-skin contact methodologies. Ship designs may have to focus on these offloading techniques and new technologies to assist in load transfer.

Ship-to-ship. Some hull forms are better suited to ship motions in a seaway. Since it is the relative motion of the platforms that causes much of the problem, the design of one or both platforms may simplify the problem, where actual load transfer techniques can handle the load in question. For moving platforms, active controls offer some options for improvement. Deeper draft, SWATH configuration, or moon pools may be viable options for load transfer between stationary ships. Finally, while the transfer of loads to a submerged vessel minimizes the motions of at least one of the participants, the approach seems too cumbersome to have practical application.

Ship-to-shore. Shallow draft is a key attribute. Air-cushion vehicles provide amphibian characteristics (as well as speed), but remain limited in their carrying capacity. SWATH ships have excellent sea-keeping characteristics, but have deep draft. Therefore, ways to retract the deep pods need investigation, which will inevitably complicate ship design.



The LCAC (shown here entering a dry well of a mother ship) is a workhorse in transferring heavy loads from ship to shore. It is fast and carries loads up to approximately 80 tons (sufficient for main battle tanks). Yet, difficulties loading these boats at sea in sea states over 2 or 3 and a top speed of 35 knots make lighterage a weak link at the beginning of a sea-based conflict.

Resources

12. Development Speed and Funding

- A clear vision for sea basing must precede development of systems needed to ensure mission and system compatibility
- The need for high priority development programs is clear
 - A TSV/HSV program to develop capacity consistent with operational needs of seabases
 - Develop an interface that allows fast ships and MPF(F) ships to exchange personnel and cargo at sea
 - Dramatic improvements in countermine, missile defense, and high sea cargo handling capabilities
 - A black-bottom to MPF(F) at sea cargo interface capable of SS4
 - Systems to move large loads selectively within an MPF(F) in high seas
 - A sea basable, heavy-lift (20 ton), aircraft with a 300 n. mi. range (100 n. mi. at sea, 200 inland) together with supporting ships
 - A multi-mission aircraft of this type would have a major operational and logistic impact and provide a platform for organic ISR, air-to-air refueling, gun ships and, most important, persistent look-down, early warning of sea-skimming missiles

A clear vision must precede the full-scale development of the seabase. The Task Force can identify several programs that that need startup or more robust funding to realize the concept. More developments will follow as the vision becomes clearer. Specific programs needing greater attention include:

- A TSV/HSV program to produce a meaningful number of vessels by the middle of the next decade. Current USMC thinking is that approximately 7,100 Marines need to be deployed initially to the seabase. Given a TSV/HSV that can accommodate 350 troops for transit to the seabase with an 85 percent availability rate, approximately 25 vessels could provide the entire lift simultaneously. Half that number would more than triple the lift time from approximately 50 hours at 2,000 n. mi. to 160 hours due to time committed to the round trip.
- Technology to ameliorate the TSV/HSV interface problem with larger MPF(F) ships.

- Technology and tactics to dramatically improve mine countermeasure capability and the ability to operate in sea state 3-4 in the mid-term.
- Development of heavy-lift aircraft capable of operating from the seabase to a range of 300 n. mi. to increase CONOPS flexibility.
- Technology to accept containers from commercial ships to MPF(F) ships in up to sea state 4 needs development or seabase sustainment of forces ashore would dramatically fall off.

If the concept of selective offload is to work, there is an urgent need to work on the technology to move large loads (up to 20 tons) around on the MPF(F) ships in high sea states (up to SS 4).

The funding challenges presented by the above programs are significant. Note that this funding is over and above that needed to design and build the basic MPF(F) platform. For those ships, given that LHDs in today's dollars cost approximately \$1.2 billion, a black hull, LHD-like MPF(F) vessel could cost over \$1 billion. With a proposed buy of 18 MPF(F) ships, that equates to more than \$18 billion above the Navy's present projection for ship acquisition. Furthermore, since it is not clear that designers know the "art of the doable" on MPF(F) platforms, an interim, prototype vessel for spiral development of new MPF(F) concepts should be considered along the lines of the MSC-proposed conversion of a 6,000 TEU Maersk liner.

Development of a heavy lift aircraft with range sufficient to support the deep insertion of troops from the farthest out point of departure would significantly improve seabase utility. The delicate distance/lift/defense tradeoff for operations and logistics would no longer be as sensitive to standoff distance, as in current plans. Additionally, such a heavy-lift would provide seabase elements (including the CSG) with new organic capabilities for ISR, in-flight refueling, and combat gunship support. Most importantly, such a heavy lifter would support persistent look-down, early warning of sea-skimming missile attacks.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- Sea basing represents a critical national, joint military competence to project forces rapidly from the United States
- Future sea basing needs are beyond current operating capabilities of the maritime services
- Complexity and difficulty of sea basing requires coordinated, evolutionary development of joint sea basing systems of systems
- The United States should exercise its sea basing capabilities realistically to work out problems and develop expeditionary warfare skills

The Task Force concludes that sea basing is a critical military capability for the United States. It will allow for rapid force projection into areas of likely future conflict; it will support operations on a scale likely to be needed in many combat and non combat operations; and it lessens reliance on land bases, whose use is subject to physical and political uncertainties. Sea basing represents an option useful for combined service forcible entry operations. Its flexibility allows its adaptation to a wide range of operations, from limited scope to brigade-sized actions. Seabase sustainment can reduce or eliminate the period of risk following an initial expeditionary assault.

Sea basing will require capabilities beyond those now available. Existing ARG, CVBG and MPF systems are not sufficient or flexible

enough to allow assembly of sizable forces at sea, nor can they sustain a force ashore for prolonged periods. They lack sufficient lift to supply inland forces and must operate too close to the shore to allow protection against mine and missile threats. Additionally, existing ships lack selective offload and supply marshaling abilities. The at-sea interface with commercial container ships does not exist in some sea states.

The complexity and difficulty of developing the system of systems to enable robust sea basing necessitates a coordinated development effort to ensure a coherent set of goals, requirements, and priorities. The development must involve all the Services to guarantee joint capabilities.

Sea basing should be exercised realistically on a consistent basis to develop competence and work out problems by the process of spiral development. Red teaming must be a major component of such exercises. An increase in forcible entry capabilities will require strong leadership in each of the services as well as direction from above.

Recommendations

Ensure Sea Basing enables Joint Operations

- Exploit those Joint Force capabilities that enable ***competitive advantage*** when operated from the sea
- ***Insist*** on enthusiastic participation from ***all Services***
- Getting sea basing right is crucial to future U.S. military strength and freedom of action with unilateral actions. Properly underwritten it will provide a strong deterrent
- Sea basing is the middle ground between SOF, Marine small and mid-scale operations, and larger Army operations. Joint forces must have this capability
- The SECDEF should establish a joint management process to initiate and integrate development of the future joint sea basing system of systems

Sea basing can be regarded as one element of a new expeditionary warfare triad consisting of the seabases, land-based forces, and air operations. Sea basing is a national military capability, not just the province of the Navy and Marine Corps. Future expeditionary missions may entail Army as well as Marine operations from the sea and require Air Force ISR, airlift and combat operations. Thus, it is critical that all Services participate in planning and managing seabase development to assure the interoperability of all relevant Service capabilities.

Seabases ensure U.S. freedom of action, particularly unilateral action. Properly underwritten, joint seabases will be strong deterrents.

Future Joint Task Force Commanders and their staffs may choose to locate their headquarters on a seabase. Further, the seabase operations envisioned by this Task Force (MEB or equivalent) lie in a middle ground between Marine expeditionary operations and Army mid-sized combat – such as where the 101st and 82nd Airborne

Divisions are engaged. The seabase can be regarded as a transition element as combat operations escalate in future conflicts.

The Secretary of Defense should ensure that the seabase is truly a joint capability by investing management of seabase development in a Joint Program Office, staffed by personnel from all Services.

Recommendations

Address the Dirty Dozen

- Establish R&D focus on sea basing technological needs, availability, and tradeoffs
- Prioritize, select options, and fund spiral seabase development. At current funding levels, the future seabase is a long way off (20 years +)
- Should be treated as an operational capability, not just logistics
- Integrate near, mid, and long-term needs and capabilities
- Realistic logistic support of large forces from a seabase requires
 - At-sea cargo handling capabilities
 - A new heavy lift, sea-based, aircraft
 - Matching ship designs

Each of the twelve issues listed earlier in this report are critical to the future success of the seabase. If the United States is to have the ability to conduct independent forcible entry operations from the sea in 2020, as envisioned in the sea basing concept, DoD must initiate an aggressive development effort, led by a unified management. Furthermore, the funding required for developing seabases is well beyond what is available simply by reprogramming current budget dollars.

Sea basing is more than a logistical concern—it represents an operational concept suited to the future geopolitical environment. Serious planning and operational consideration must address the uses of seabases in the future and how the Services will benefit from their flexible capabilities.

The sea basing development effort must be a progression of system designs that migrate from today's ARGs, CVBGs, and MPSs to the full concept by the year 2020. R&D priorities must include a new heavy lift, sea-based aircraft with matching ship designs as well as advanced cargo handling capabilities.

Recommendations

- Develop **at-sea cargo handling capabilities** that withstand sea state 4
 - Selective, automated cargo movement within seabase warehouse ships
 - At-sea transfer from vessels to lighters inside well decks
 - At-sea cargo transfer to and from lighters alongside seabase ships
 - At-sea transfer from black hull commercial vessels to seabase ships
- Stabilized cranes, ship stabilization and skin-to-skin transfer development provides part of the solution
 - More to be done to ensure seabase robustness

As stated earlier, ability to handle cargo under realistic sea conditions is one transformational capability of future seabases. This includes both selective cargo movement and at-sea transfer of heavy loads among seabase ships and between the seabase and commercial vessels.

No solution to the at-sea cargo handling challenge now exists. Resources must be devoted to solve each cargo handling problem: selective handling, stabilized cranes, skin-to-skin transfer and transfers between ships and lighters.

Recommendations

- ***Initiate planning and development of a sea basable, heavy lift aircraft with at least 20 ton capacity and theater-wide range***
- Plan design of MPF(F) ships and other aviation-supporting ships in the seabase to accommodate heavy-lifter options
- A variety of concepts are candidates for such a platform

Development and experimentation of future heavy lift air vehicles should continue and be integrated into the overall development of sea basing capabilities.

The sea basing planning CONOPS is a delicate balance between the ability to project forces ashore (distance, weight, tempo versus lighter and airlift capabilities) and the vulnerability of the seabase to shore-based defenses and mines. The 25 n. mi. departure line represents a compromise on both accounts, and the 3 n. mi. standoff distance for over-the-shore supply relies on the ability to clear mines. An aircraft, able to be based at sea, capable of lifting 20 tons with a range in excess of 300 n. mi. would make a major difference in the sensitivity of this balance.

Such a heavy lifter would simplify deployment, since it could carry inland virtually all combat loads with the exception of the M1A1 and AAV (20 tons is the design cargo load for the C-130). TEU loads need to be delivered directly to the battlefield without breaking containerized loads into smaller form factors, such as quad-cons. There is a need to simplify seabase handling of supplies.

Finally, a heavy lift, sea basable aircraft would enable more rapid deployment of troops and materiel from an advanced staging base to the seabase. Additionally, such an aircraft would have many other uses – ISR platform, gun-ship, aerial refueling, and persistent look down early warning. There are several possible designs for such a heavy lifter, including fixed wing aircraft, quad tilt-rotor, seaplanes, and hybrid lighter than air lifting airships.

For a heavy lifter to be usable, future ships must have the ability to base and support heavy lifter air operations. The Task Force recommends the Department initiate a heavy lifter aircraft development program, beginning with an analysis of design alternatives. Time is short for starting this program, since ships now being specified, such as the MPF(F) must have capabilities compatible with the heavy lifter aircraft.

Recommendations

Periodically exercise sea basing capabilities

- We haven't done a large forced entry operation against a hostile force since Inchon. Yet, it is likely to be the way the U.S. military must fight in the future
- Find and correct the weaknesses in the CONOPS through experimentation
 - Analogous to the Louisiana maneuvers prior to WW II – the way to get the serious bugs out of fighting capabilities before the war
- Eliminate hand-waving solutions to real problems
 - One experiment is worth a thousand opinions
- Require brigade-level seabase tests every three to five years against realistic red team opposition

The United States has not carried out a major forcible entry from the sea since Inchon, although such an entry from the sea is a strong likelihood in future conflicts. The Navy and Marine Corps consider expeditionary operations a strong competence. However it is not a capability shared with the other services. Furthermore, changes in adversary defensive systems have made amphibious assaults more dangerous than in the past.

CONOPS have evolved to favor inserting troops deep inland from the sea in order to seize crucial military objectives quickly. Current U.S. capabilities, if centered on the Navy and Marine Corps, do not represent a joint capability. The United States has not conducted large scale tests of its forcible entry capabilities from the sea, although extensive thought has gone into how such operations might occur. There are untested concepts in the current plan.

The Task Force recommends that forcible entry from the sea, supported by a seabase, should be periodically exercised on a scale sufficient to work out problems with CONOPS, systems and requirements in accordance with spiral development. This should be

a responsibility of Joint Forces Command. Such exercises should present opportunities to develop leadership and understanding in all the services in sea-based operations in much the same fashion as the Louisiana maneuvers advanced the Army and Army Air Corps' understanding of mobile operations prior to WWII.

Recommendations

Elevate the practice of littoral warfare in all the Services

- Stress that littoral warfare is the toughest, real-world challenge to continued U.S. military hegemony
 - Requires our best leaders
 - Must have incentives to undertake such assignments
- Make meaningful sea basing experience a ***strong plus*** for promotion to senior command rank
 - Increase prospects for promotion to three and four star ranks for littoral warfare officers
- Littoral warfare demands realistic protection of forces afloat and ashore
 - Mines, sea-skimmers, subs, fast response to calls for fire
 - All Services must contribute

During the Cold War, upwardly mobile rear admirals aspired to command of carrier battle groups; command of amphibious groups was usually assigned to those admirals who came out of the amphibious world, to other admirals who did not quite make the cut for carrier battle groups, or to those whose timing for rotation to sea duty did not match the availability of a carrier battle group command. Since the end of the Cold War, the Navy's focus has shifted to the littorals in contrast to the Cold War's blue water missions. As the Navy realizes its vision for Seapower 21, conducting the large-scale operations envisioned for a seabase will emphasize even more the need to have leaders experienced in these littoral operations.

The Task Force believes that part of the development and maturation for an unrestricted line officer should include service directly tied to sea basing. For a surface warfare officer, command of an Aegis cruiser which participates in Sea Shield and Sea Strike operations is not sufficient to assert that the officer possesses a seabase background. Similarly for a tactical aviator, command of a carrier wing or an aircraft carrier is not sufficient to ensure the

individual's familiarity with the operations and logistics of a seabase. Further, we believe that service in ships and squadrons which are integral parts of the seabase such as amphibious and maritime pre-positioning ships should be seen as a potential necessity to ensure that the seabase experience is legitimate.

One way to accomplish this would be to change the current "amphibious group" structure into a "seabase group" structure which would consist of ESG and MPF platforms. This command should be viewed as a premier assignment. There is evidence that experience in littoral operations is increasingly recognized (there is currently one active duty Navy four-star who has commanded an amphibious group rather than a carrier battle group), but the Task Force concludes that more emphasis is needed to reward experience and success for this critical future capability.

APPENDIX A: TERMS OF REFERENCE



THE UNDER SECRETARY OF DEFENSE

3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

04 SEP 2002

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference – Defense Science Board Task Force on Seabasing

You are requested to establish a Defense Science Board (DSB) Task Force to assess how seabasing of expeditionary forces can best serve the nation's defense needs through at least the first half of the 21st century.

The U.S. is confronted by several widely distributed potential regional threats. Further, the 2001 Quadrennial Defense Review (QDR) increased our focus on the Pacific Ocean -- while maintaining our presence in other parts of the globe. This has reinforced the shift in the Navy's focus from open water to littoral regions. The Task Force should concentrate on the need for the presence and warfighting missions that expeditionary forces perform, examining their utility and their potential for transformation. The Task Force should draw upon the experience and deliberations of the recently completed Task Force on Aircraft Carriers of the Future.

Undoubtedly situations will arise where US interests require having "boots on the ground." Accomplishing that in today's warfighting context bristles with difficulties -- the response speed that is required, availability of overseas bases, the lethality of defenses, cost constraints -- that will only worsen over the time span covered by this study. The Navy and the Marine Corps have generated a concept for future expeditionary warfare, "Enhanced Network Seabasing," which is to be the starting point for this Task Force's work. The Task Force is to consider the operational requirements, the assets that are required, the role(s) of new technologies, the effects of "jointness." The Task Force shall examine the future relationships of the Amphibious Ready Group with embarked Marine Expeditionary Unit, Carrier Battle Group, Maritime Prepositioning Ship Squadron, Marine Expeditionary Brigade, Surface Action Group, and the Combat Logistics Force in establishing the Enhanced Networked Seabase and the implications for platform costs and capabilities. In exploring these issues, the Task Force should examine the broadest range of alternatives and be guided by the following questions:

- What is the naval environment expected to be for the next 20-50 years?
- What is the role of naval forces in enabling access for joint forces through the world's littorals?

- What assets and what technologies are needed to establish a robust and capable Enhanced Networked Seabase, such as: assembly of forces at sea, protection of the Seabase, selective offload in the open sea, transfer of equipment and personnel in the open sea, over-the-horizon communications and operations, delivery of equipment and personnel onto the land, continuing logistics support, and air support?
- How does the timing of the acquisition of the technologies, platforms and systems which replace the legacy systems build-up the full capability from what it is now to what we eventually want it to be?
- As new hardware is acquired, should the function each performs stay the same as it is now on legacy platforms or are there opportunities to reallocate functionality to improve effectiveness, or efficiency, or economy?
- Beyond the acquisition and technical issues discussed above, are there other Doctrine, Organizational, Training, Materiel, Leadership, Personnel or Facilities (DOTMLPF) aspects that affect the development of a robust seabasing capability?

The Task Force should report its findings no later than June 2003.

The study will be co-sponsored by me as the USD (AT&L), the Secretary of the Navy, and the Director, Strategic and Tactical Systems. Dr. William Howard and ADM Donald Pilling, USN (Ret.), will serve as the Task Force Co-Chairs. Dr. Paris Genalis, Deputy Director, OUSD(AT&L) Office of Naval Warfare, will serve as the Executive Secretary; and Commander Brian Hughes, USN, will serve as the Defense Science Board Secretariat representative.

The Task Force shall have access to the classified information needed to develop its assessment and recommendations.

The Task Force will be operated in accordance with the provisions of P.L.92-463, the "Federal Advisory Committee Act," and DOD Directive 5105.4, the "DOD Federal Advisory Committee Management Program." It is not anticipated that this Task Force will need to go into any "particular matters" within the meaning of Section 208 of Title 18, U.S. Code, nor will it cause any members to be placed in the position of acting as a procurement official.



E. C. Aldridge, Jr.

APPENDIX B: TASK FORCE MEMBERSHIP

CO-CHAIRMEN

Dr. William Howard	Private Consultant
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TASK FORCE MEMBERS

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APPENDIX C: PRESENTATION TO THE TASK FORCE

NOVEMBER 18-19, 2002

Mr. Trip Barber, OPNAV N70	Seapower 21
Col Art Corbett, USMC (MCCDC) and CAPT(Sel) Brian Barrington, USN (NWDC)	Enhanced Network Seabasing Concept
CAPT Steve Rowland, USN OPNAV N753	Expeditionary Warfare for the 21 st Century
Mr. Spike Souders (CAN)	MPF(F) AoA
Mr. Donald Wurzel (ARETE)	Seabasing Wargame De-brief
Mr. Bill Greer (IDA)	Joint Mobile Offshore Base (JMOB)
Mr. Stan Siegel	Fast Logistics
LTC Norbert Smith, USA	Army Perspective

DECEMBER 11-12, 2002

General Mike Carns, USAF (Ret)	An Air Force Perspective on Seabasing
Pat Purtell	High Speed Vessel capabilities/limitations
Andrew R. Kondracki	Strike Up / Down
Alan Ellinthorpe	Hard Spots
RADM Crowder, USN	OPNAV Blue Cell brief on AFSB
VADM Brewer, USN	Maersk/MSC brief on S-Class conversion
John Combs	Technology for At-Sea Transfer of Heavy Load
VADM Jim Amerault, Bill Schulz, Bob Scher and Jim Albus	Container transfer in the open sea
LTC Mark Ulrich	JLOTS -- Current capabilities and research efforts

JANUARY 27-28, 2003

CDR Bud Bishop, USN	Navy I-War study
Rick Hibbert, EFDC	The MEB -2015 / STOM CONOPS
Pat O'Bryan, EFDC	MPF (F)
Chan Crangle, HQMC	Forcible Entry Study
Maj Rudolf Webbers	Lessons Learned
LtCol Thomas Fritz	J-8 Threat assessment
Mark Gibson, Mr. Spivey, and Mr. Outlaw, Bell Helicopter	Bell-Boeing Quad TiltRotor (QTR) vertical lift aircraft
Norm Betaque	Naval Studies Board
George Leineweber	Mine Countermeasures

FEBRUARY 26-27, 2003

Col Richard Witt, USAF, JL Welsh and Barry Pavel	Discussion
Lee Bishop	Maritime Prepositioned Force (MPS), the Fast Sealift Ships (FSS) and the Ready Reserve Force (RRF)
Col John Pross, USMC	Naval Seabasing Draft CONOPS
Mr. Tom Tesch	Navy Expeditionary Forces

MARCH 25-26, 2003

Nick Overfield, Commander Mike Bullock, Chief Officer Martin Stone and Commander Roger Ireland	British Perspective
COL Genaro Dellarocco, USA	Army TSV Program
Mr. Chuck Myers and Mr. Steve Huett	Hybrid Ultra Large Aircraft (HULA)
Gen Michael Hagee, USMC	A Perspective on Seabasing

APRIL 15-16, 2003

ADM Vern Clark, USN	A Perspective on Seabasing
ADM Joe Lopez, USN (Ret)	Seabasing: Industry Innovation and Technology
CAPT Chuck Fortenberry, USN (Ret)	Offshore cargo handling techniques
Bob Merkel and Loraine Brincefield	Anti ship cruise missile

Josh Davis
ADM Art Cebrowski, USN (Ret)

Army Advanced Mobility Study
A Perspective on Seabasing

MAY 27, 2003

VADM Al Herberger, USN (Ret)

Sea Horse System

APPENDIX D: THOUGHTS ON SEA BASING IN THE TWENTY-FIRST CENTURY

WILLIAMSON MURRAY
PROFESSOR EMERITUS
THE OHIO STATE UNIVERSITY

INTRODUCTION

The cornerstone of America's continued military preeminence is our ability to project combat power rapidly and virtually unimpeded to widespread areas of the world. Much of our power projection capability depends on sustained access to regions of concern. Any number of circumstances might compromise our forward presence (both bases and forward operating forces) and therefore diminish our ability to apply military power, reducing our military and political influence in key regions of the world.¹

For a number of reasons the concept of seabasing has received increasing attention in the defense community and its analysts. However, most efforts aimed at developing new concepts for sea basing start with the premise that sea basing represents an obvious and accepted principle of American defense policy, particularly because access to land bases has become an increasingly serious problem.² The basic line of argument simply boils down to a comment made by a senior naval official in 1996. "With an aircraft

¹ National Defense Panel, *Transforming Defense, National Security in the 21st Century* (Washington, DC, 1997), p. 12.

² A recent article by Vice Admiral Moore and Lt. General Edward Hanlon comments: "Sea basing is the core of 'Sea Power 21.' It is about placing at sea – to a greater extent than ever before – capabilities critical to joint and coalition operational success. By doing so, it minimizes the need to build up forces and supplies ashore, reduces their vulnerability, and enhances operational mobility.... It exploits the operational shift in warfare from mass to precision and information, employing the 70 percent of the earth's surface that is covered with water as a vast maneuver area in support of the joint force." And in all that, hardly a word about the political and strategic benefits of sea basing. Vice Admiral Charles W. Moore, Jr. and Lieutenant General Edward Hanlon, Jr., "Sea Basing, Operational Independence for a New Century," *Proceedings*, January 2003.

carrier, you get 4.5 acres of Americana with no diplomatic restrictions on when and what you can fly.”³ Such a point of view is certainly understandable from a Navy and Marine Corps perspective, given the missions and culture of those two services, but it is hardly sufficient in today’s political atmosphere.

Moreover, that premise certainly does not reflect the Air Force’s perspective. As the current Chief of Staff of the Air Force noted in late 1998, “Access is an issue until you begin to involve the vital interests of the nation that you want and need as a host. Then access is rarely an issue.” Similarly, General Joseph Ralston, USAF, then Vice Chairman of the JCS, commented in 1999, “If we stay engaged with our allies, we will have access when we need it.”⁴ Along similar lines, many Army leaders remain solidly within the landlocked perspective of their more than a half-century commitment in Central Europe. Others in the Army appear to be merely trailing behind the Air Force in the hope the latter will somehow get them to the battlefields of the twenty-first century.⁵

Nor is a belief that sea basing is central to American defense policy necessarily typical of the perspective of many Washington, DC, pundits.⁶ Simply put, the counter argument to sea basing is that

³ Quoted in Christopher J. Bowie, “The Anti-Access Threat and Theater Air Bases,” Center for Strategic and Budgetary Assessments, 2002, p. 3.

⁴ *Ibid.*, p. 2. These are astonishing comments given the consistent unwillingness of America’s allies to provide access for military operations, when they have taken a different view of the situation from the position of the United States.

⁵ One of the ironies of the Army’s present cultural predilections is the fact that it is largely dominated by a Euro-centric culture despite the fact that the two major wars in which it has fought since 1945 were in Asia and not Europe (but those wars were largely fought by Army generals whose experience had been largely in Europe). Nevertheless, since the aftermath of World War II, the Army leadership has burrowed comfortably within its barracks in Europe, while dismissing its experiences in the Pacific as being irrelevant to the Army’s mission. At present, there are over four times more army generals stationed in Europe than there are stationed in the Pacific.

⁶ It is well to remember that the one of the basic intellectual lines that characterized the arguments of the military reform caucus in the mid-1980s in its attempts to change the American approach to war was a fervent belief that the American military had, since the days of World War II, devoted far too much attention to its support and logistical structure and too little attention to the sharp end of combat, which was what really mattered. What such arguments missed was the harsh geographic reality that, unlike the German military located in the heart of Europe which did not need to get to the wars that it started, throughout the twentieth century the American military has confronted the difficult and intractable problems involved in projecting military power across two great oceans

the United States and its military forces will always have access to or can seize land bases, from which the U.S. military can project sufficient combat power to defeat opponents and achieve national goals. Dan Gouré of CSIS has put the anti-sea basing position directly in the *Naval War College Review*:

The land-versus-sea argument has been going on for a long time, with no resolution in sight. It is sufficient here to point out the fact that naval forward presence may be needed, if land bases are not available, does not make it the preferred solution. Indeed, when the stakes are sufficiently grave or the vital interests of allies are threatened, it is unlikely that U.S. political and military leaders will rely solely on naval forward presence. To put it bluntly, if land bases are necessary, they will be found or even seized. This is an often-overlooked lesson of the Gulf War or the Kosovo campaign.⁷

At present, current sea-basing capabilities are not under immediate threat of major cuts in the budgetary processes, but neither the maritime services, nor their supporters, have done a particularly good job of articulating the larger political and strategic framework, necessary to protect the current capabilities – not to mention the future possibilities of sea basing.⁸ The presence argument has some validity, but misses major aspects of the emerging strategic environment – aspects which are already suggesting some of the difficulties that an over reliance by the United States on land basing could cause in the twenty-first century.

Thus, there is a considerable danger in neglecting the strategic rationale, which must undergird the concept of sea basing. In a world of pure number crunching, sea basing is vulnerable on two counts. First, even in its present form, it is expensive in terms of the manpower and resources it consumes in procurement and

and then in waging war on the far side of those oceans. For the articulation of the reformers argument about the so-called inferiority of U.S. military forces in ground combat see: Martin van Creveld, *Fighting Power, German and U.S. Army Performance, 1939-1945* (Westport, CT, 1982).

⁷ Daniel Gouré, “The Tyranny of Forward Presence,” *Naval War College Review*, Summer 2001, p. 17.

⁸ It is worth noting that in the first year of George W. Bush’s administration, there was considerable attention given to the possibility of reducing the number of carrier battle groups, while the construction of the next carrier is still under serious consideration for cancellation.

maintenance. It is certainly more expensive than land basing. With the probability that defense budgets will decline in the near future, the costs of sea basing will inevitably confront challenges from within the Department, as well as from critics of military spending on the outside. It may well become increasingly difficult not only to achieve higher levels of support for the research and development necessary to test and procure the technologies and equipment required by new and innovative concepts, but even to defend current levels of spending for sea-basing capabilities.

The second challenge will come from those who argue for massive reliance on the technological revolution in communications and computing power that is so rapidly altering the face of the First World. Supposedly technology will alter the fundamental nature of war and do so at a far lower cost to the nation than present defense budgets.⁹ Some theorists are already arguing that position from within the maritime services themselves. Such arguments will become increasingly attractive, when the Department of Defense finally confronts the hard choices that it is going to have to make—choices it should have begun making over a decade ago. With increasing budgetary constraints -- an inevitability given the ebb and flow of American politics -- those choices are going to be painful.¹⁰ But there is no guarantee that when confronted by hard choices, either the civilian or military leaders within the Department will make the right choices.

Yet access at the strategic and political levels represents a daunting set of problems and challenges. As a recent RAND report, ironically done for the Air Force has noted:

As it has been in the past, so in the future the idea of “assured access” – the guaranteed ability for the United States to do what it wants when it wants, where it wants, from and via foreign territory

⁹ Along these lines see particularly Admiral Bill Owens with Ed Offley, *Lifting the Fog of War* (New York, 2000).

¹⁰ One of the surprising aspects of the post-Cold War world has been the relatively small decline in U.S. defense budgets compared to what happened in the immediate aftermath of World War I, World War II, and even the Korean War. Yet much of the current service planning for the coming decade appears predicated on a belief that defense budgets will continue to rise.

- will remain a chimera. Except in the most extraordinary circumstances, nations simply do not cede so much control over fundamental things.... [M]any of the contingencies that crop up in the next decade or two are likely to occur in areas where the United States faces sizeable access uncertainties.¹¹

Without access to land bases, sea basing becomes an absolute strategic necessity for the United States in the coming decades of the twenty-first century.

THE POLITICAL AND STRATEGIC FRAMEWORK OF SEA BASING

The war against the Taliban and Al-Qaeda in Afghanistan should have provided a wake up call for those who believe that sea basing represents a luxury that land bases and ground forces projected from such bases can replace. The political reality of the post-Cold War era is that U.S. allies are less dependent on the United States for their security than during the days of the Soviet Union. In fact, in the current war on terrorism the United States has become more dependent on allies and friends for intelligence and participation in addressing a global, distributed threat than it ever was in the Cold War.

Nevertheless, even during the Cold War the United States found that its interests and the perceptions by its Allies of their interests did not necessarily coincide. In 1973 all of its European NATO allies, except Portugal, denied the United States basing and overflight rights in aerial efforts to resupply Israel in the midst of that nation's desperate fight for survival during the Yom Kippur War.¹² Moreover, the American military was not even allowed to ship U.S. military equipment in Europe to the Israelis. Only the recent purchase of C-5s and bases in the Azores made the aerial bridge – with its crucial equipment loads to Israel – possible.

¹¹ David A. Shiapak, John Stillion, Olger Olikier, and Tanya Charlik-Paley, *A Global Access Strategy for the U.S. Air Force* (Santa Monica, 2002), pp. 10-11.

¹² The Dutch were more cooperative than the other NATO allies for a variety of reasons and would have allowed the use of their bases, but overflight restrictions made that impossibility.

Similarly in 1986, the United States launched air strikes at Libya to punish Momar Qadafi for his support of terrorists throughout Western Europe and Middle East. USAF F-111s, flying from bases in the United Kingdom, could only participate by flying entirely around French and Spanish air space to reach the Mediterranean. That round-about route required a major increase in tanker support and added immensely to the considerable strains on the crews flying a complex and difficult mission.¹³ As a recent RAND report has commented:

By the time the F-111s made it to Libya, numerous aircraft had had difficulties with their sensitive targeting systems that either prevented them from dropping the bombs they had carried such a distance or resulted in the delivery of the weapons well off target. Tired crews also made errors that resulted in improperly aimed ordnance. Thus, while on a strategic level the attack can arguably be assessed as a success, tactically the strikes achieved significantly less than the planners had hoped. At least some of the blame for the disappointing performance must be assigned to the excruciating mission profile, which stressed aircrew and aircraft well past the bounds of their normal operation.¹⁴

Despite America's success in the Gulf War, the 1990s saw numerous refusals by Middle Eastern states to allow U.S. forces the use of land bases on their sovereign territory. In September 1996 both Turkey and Saudi Arabia denied the United States the use of their bases to respond to Iraqi attacks on the Kurds. As a result, the United States could only respond to Saddam's actions with cruise missile attacks against targets in southern Iraq.¹⁵ A year later Saudi Arabia again denied the United States the use of its bases to respond to Iraq's expulsion of six UN weapons inspectors.¹⁶

¹³ One of the fallouts from the operation was that the unauthorized use of tankers out of Zaragoza to refuel the F-111s caused the Spanish government (it was not informed of their mission) to push the United States into moving its F-16 wing from Spain to Sicily. Shiapak, Stillion, Oliker, and Charlik-Paley, *A Global Access Strategy for the U.S. Air Force*, p. 21.

¹⁴ *Ibid.*, pp 8-9.

¹⁵ *Ibid.*, p. 6.

¹⁶ *Ibid.*, pp. 6-7.

Two months after that crisis, the Iraqis completely stonewalled UN Weapons of Mass Destruction (WMD) inspections. Again Riyadh denied use of its bases to strike Iraq. And again, one year later in November 1998 the Saudis and the United Arab Emirates refused use of their bases for U.S. aircraft to respond to Iraq's bad behavior.¹⁷ As a result, half of the U.S. combat aircraft stationed on land bases in the area (approximately sixty) were not usable for the planned combat strikes. But it was not only in the Middle East that the United States ran into access problems. During the air campaign against the Serbs and their ethnic cleansing program in Kosovo in the late 1990s, the French government, as it had done during the raid on Libya in 1986, refused to allow B-52s, flying from bases in the United Kingdom, to pass through French air space.¹⁸

The air campaign against the Taliban regime in Afghanistan again underlined the problem of access. Despite the expenditure of vast resources in building up the infrastructure of land bases in the Middle East, the United States discovered that many of its Arab Allies refused the use of that infrastructure for combat aircraft participating in the campaign against Afghanistan -- even though those being struck were not Arabs, with the exception of the Al Qaeda fighters, who ironically were the sworn enemies of the conservative regimes on the Arabian peninsula. Given this denial, the question then arises: If Middle Eastern regimes are unwilling to allow the United States use of their land bases to strike targets in a non-Arab nation, how likely would they be to allow usage, when a military effort was aimed at an Arab nation and when it was of real strategic significance to the strategic and political stability of the Middle East? Saudi Arabia provided the answer with a resounding, "No!", over the course of the recent war against Saddam's regime.

There is another significant problem which goes well beyond the problem of direct access for military action. The denial of bases to launch air strikes at targets in a region where the United States military has established an extensive infrastructure to support the projection of military power is not necessarily the worst case. It is

¹⁷ Ibid., p. 7.

¹⁸ Bowie, "The Anti-Access Threat and Theater Air Bases," p. 35.

equally possible that in the near future U.S. forces will be denied logistical or tanker use of European or Middle Eastern bases in cases where U.S. and Allied national interests diverge, as was the case during the Yom Kippur War. Such denials are an increasing possibility, as memories of the Cold War fade. Some European allies of the United States already regard their connections with America as a matter of convenience – connections, with which they can entirely dispense, if their national interests so dictate.¹⁹ To paraphrase DeGaulle, nations do not have obligations, they only have interests.²⁰

Equally important as the right to use foreign bases for military operations may be the access to and use of their infrastructure and support for the projection of U.S. forces. The denial of that infrastructure, whether directly, or by refusing to allow material and combat power to flow across borders, would make such bases entirely useless in a crisis. Thus, that base infrastructure could subtract from the net combat power available to the United States by the denial of the considerable investments made in the maintenance and logistical facilities to support the projection of U.S. forces.

As dangerous as the risks of a continuing over emphasis on land basing to the projection of U.S. military power may be, the strategic and political costs of basing too much of America's military power on foreign bases may be even greater. There are compelling political and strategic reasons why the United States should be wary of too great an emphasis on land bases on the territories of its allies. Those reasons have to do with the negative political impact such bases have had in the past, and will likely have in the future, on local attitudes towards the policies of the United States.

¹⁹ Memories of America's contributions to victory in the Second World War and the rebuilding of Western Europe and East Asia are rapidly disappearing with the death of the generations that grew up in the 1920s and 1930s. It will soon be the turn of the generation that grew up in the 1940s to die off, and then even memories of the early days of the Cold War will disappear into the mists of history.

²⁰ For an examination of the realities of the international arena see the brilliant examination by the ancient Greek historian and general, Thucydides, in the "Melian Dialogue." Thucydides, *A History of the Peloponnesian War*, translated by Rex Warner (London, 1954), pp. 400-408. For a general examination of the processes involved in the making of strategy through the ages see Williamson Murray, MacGregor Knox, and Alvin Bernstein, *The Making of Strategy, Rulers, States and War* (Cambridge, 1992).

During the Cold War, U.S. bases on foreign soil not only deterred the Soviet Union by underlining America's commitment, but represented a real political assurance of America's commitment to its allies. Nevertheless, those bases did cause considerable friction, but such friction was, for the most part, bearable to Allied political leaders.²¹ In Europe, despite considerable differences in cultural and political attitudes, Americans and Europeans shared a common heritage.²² In the case of Japan and South Korea, where the common heritage was not present, political leaders willingly tolerated the inroads of "Yankee barbarians," in return for the protection they provided against the Communist threats from the Soviet Union, North Korea, and China. In other words, as long as the threat was sufficiently obvious, frictions caused by the presence of U.S. forces on foreign territory were tolerable.

However, since the Cold War, the situation has changed dramatically. The existence of a substantial American presence on land bases in the Middle East in the aftermath of the Gulf War represents an entirely new situation. It has been the author of frictions that have already contributed considerably to the political unraveling of a region that is under enormous pressure -- not only from globalization, but from the collapse of the sureties that marked Islam's rise to world dominance in the seventh century.²³ In effect, history has demanded that Islamic societies adjust to a world that took the West at least five centuries to create.²⁴ There are large

²¹ The massive political protests in the early 1980s throughout Europe against the deployment of the Pershing II missile and ground launched cruise missiles were weathered at considerable political cost by the political leaders of America's European allies.

²² This author remembers the BBC quip of the late 1980s that was said with some sharpness: "The United States is the first country to go straight from barbarism to degeneracy, skipping civilization."

²³ For a short study of the results see Bernard Lewis, *What Went Wrong* (New York, 2002), but see also particularly his general survey of the history of the Middle East: *The Middle East, A Brief History of the Last 2,000 Years* (New York, 1995).

²⁴ For a discussion of these issues see Annex I of the Defense Science Board's "2002 Summer Study" on terrorism for an examination of the roots of that political and psychotic disease (authors: Major General Robert Scales, U.S. Army retired, Lieutenant General Brad Hosmer, USAF retired, and Williamson Murray). For the nature of the problems that confront the First World and the West in particular with the increasingly powerful influence of radical Islam on the course of events in the Middle East see among other commentaries Lew Harris, "Al-Qaeda's Fantasy Ideology," *Policy Review*, August 2002; David Warren, "Wrestling with Islam," DavidWarrenOnline, 3 December

enough pressures washing over that region without the presence of American troops, including substantial numbers of women in uniform. Thus, the presence of U.S. forces has had a direct impact on societies that are already in cultural and religious disarray. During the buildup to the Gulf War, the United States assured its Middle Eastern allies that, as soon as it had defeated Saddam's forces, it would withdraw from the region. To a great extent, it has honored that pledge, leaving only residual ground forces in Kuwait as an insurance policy against renewed Iraqi aggression.

But the presence of substantial numbers of U.S. and British aircraft throughout the region has provided a propaganda base for Al-Qaeda to argue that the West had occupied – and still occupies – Islam's holiest lands and shrines. That may not accord with how Americans view their presence in the Middle East, but that is not the point.²⁵ It is the perceptions of the locals that matter. Moreover, the presence of American airmen in Saudi Arabia has provided local Al Qaeda operatives convenient targets, as the attack on the Kobar Towers underlined in the mid-1990s. But the larger issue has been the propaganda mileage that bin Laden and his ilk have gained throughout the Middle East and other Islamic lands from the mere presence of American military forces and power in Saudi Arabia.

One should not be so naive as to believe American maritime forces will not be the target of terrorist attacks. The suicide attack on the *USS Cole* is a case in point. Nevertheless, U.S. forces based on land in areas like the Middle East are targets all the time, while those

2002; James Woolsey, "World War IV," address delivered at the National War College, 16 November 2002; and a brilliant essay by Michael Vlahos, "Terror's Mask: Insurgency within Islam," Johns Hopkins University, Applied Physics Laboratory, 2002.

²⁵ Nothing better underlines the American misunderstanding of the depth of the Islamic fundamentalist tides and the implications of those tides for the continuing utilization of land bases throughout the Middle East than the comment in a recent RAND publication on how to deal with Islamic unhappiness over the presence of U.S. forces in Saudi Arabia near Islam's holiest places: "Here again, maintaining clear lines of communication and upholding a reputation for honesty and plain dealing probably represent the best weapon the United States has against this impediment." One wonders at such attitudes, given the current state of religion and politics in the Middle East, but American political scientists have almost as short a memory as do the American people. Shiapak, Stillion, Olikier, and Charlick-Paley, *A Global Access Strategy for the U.S. Air Force*, p. 41.

at sea are rarely vulnerable to terrorists, at least in terms of the weapons available at present. The continuing attacks on Americans in Kuwait – one of the few areas in the Middle East where one would think they would be safe – suggests the tensions that U.S. presence on land cause throughout the Middle East. And it is only a matter of time before terrorists strike again at high visibility targets similar to Kobar Towers or the Marine Barracks in Lebanon.

Finally, there is little prospect that the deeply held anger within so much of the Islamic world will be assuaged by anything less than the complete surrender of the West and its values that aim at testing the frontiers of human knowledge.²⁶ That anger is a harsh reality that will remain part of the strategic landscape for the remainder of this and perhaps the next century. But there is no need to maximize those tensions and frictions by the addition of large land-based air and ground forces, whose mere presence is a reminder to the Islamic world of its decline and the rise of the West.²⁷ In every sense many in the Islamic world are hearing a tune similar to that played by the British Army at Yorktown in 1781: “The World Turned Upside Down.” The United States does not need to exacerbate the tensions and frictions of globalization by presenting those living in the Middle East with the visual every-day presence of Western military forces.

THE GEOGRAPHIC PROBLEM

The United States again confronts the realities of its geographical position and the impact of that geography not only on its grand

²⁶ The sharpest and most coherent depiction of the threat from the religious fanatics in the Islamic world is Harris, “Al-Qaeda’s Fantasy Ideology.” His bottom line is that there is one decisive advantage to the ‘evildoer’ metaphor [President George Bush’s description of Al-Qaeda], and it is this: Combat with evildoers is not Clausewitzian War. You do not make treaties with evildoers or try to adjust your conduct to make them like you. You do not try to see the world from the evildoers’ point of view. You do not try to appease them, or reason with them. You try, on the contrary, to outwit them, to vanquish them, to kill them. You behave with them in the same manner that you would deal with a fatal epidemic – you try to wipe it out.”

²⁷ For the failure of the Arab world to adapt to the conditions of the modern competitive, and global world despite the enormous riches that oil has brought the region, see the UN report of summer 2002 done by a group of Arab economists and political scientists. In every important category their world lags behind the First World with virtually no sign of change over the past four decades – a reality these honest critics of their own societies graphically depict. For a summary of their report see “Self-doomed to Failure,” *The Economist*, 14 August 2002.

strategy, but on its military strategy as well. To an extent that was not true during the Cold War, when an extensive web of army and air force bases girded the world, America's power now lies in North America.²⁸ The current strategic problem is quite similar to that which confronted U. S. military planners at the onset of America's participation in World War II -- how to project the immense military and economic power of the United States across the great oceanic distances of the Atlantic and the Pacific that separate the nation from its strategic interests without many intervening bases.

In the Cold War the existence of bases on foreign soil and their military infrastructure eased the logistical problems confronting American strategists. But even then the tyranny of distance forced the United States to rely on its maritime forces to a considerable extent. The major change in the post-Cold War world is that distances now exercise their tyranny to an even greater extent. Unfortunately, there are relatively few signs of a recognition of that reality throughout a defense establishment enthralled with procurement and technological change.

In three of the four geographic areas that lie at the heart of America's strategic interests (Europe, the Middle East, and Northeast Asia) there still exist, over a decade after the ending of the Cold War, substantial infrastructure: bases, prepositioned equipment, maintenance facilities, and political connections that promise some degree of cooperation.²⁹ It seems unlikely that there will be a catastrophic explosion in Europe. At least for crises on that continent, it seems likely that the United States will have access to its bases throughout the NATO region, for the foreseeable future, as long as

²⁸ In 1965 the USAF possessed seventy bases scattered across twenty-five countries. By 1985 that total had declined to forty-six bases in seventeen countries, and by 1995 that number had fallen to fifteen air bases in only ten countries. There is no reason to believe that this process will not continue over the coming decade. Bowie, "The Anti-Access Threat and Theater Air Bases," p. 31

²⁹ The most basic context in the making of strategy, and especially in the making of military strategy, lies in the geographic realities that confront nations. On this topic see Williamson Murray and Mark Grimsley, "Introduction: On Strategy," in *The Making of Strategy*, pp. 3-23; for the influence of geography on military operations and culture see Williamson Murray, "Some Thoughts on War and Geography," in *Geopolitics, Geography and Strategy*, edited by Colin S. Gray and Geoffrey Sloan (London, 1999).

European troubles involve internecine quarrels in places like the Balkans.

What is less likely is that those bases will be available for a crisis in the Middle East, particularly if some European nations view their interests as conflicting with the projection of military power into the Middle East. The general unwillingness of Europeans to support current U.S. policy in the Middle East—driven to a considerable extent by their dependence on Middle Eastern oil—is only going to get worse as memories of the Cold War fade. The reluctance of France and Germany to support U.S. policy over Iraq are a signal that the United States can no longer rely on European support for many of its policies. Such attitudes will inevitably translate at some time in the future to an unwillingness to provide access to America's bases in Europe in the middle of a major crisis.

If access is a political problem for land-based ground and air forces deploying to the Middle East, it is an even greater problem in the Pacific in an operational sense. While U.S. land bases in northeast Asia and Guam are well positioned to handle a military crisis with North Korea, they are not positioned to handle troubles in Southeast Asia.³⁰ Australia and Singapore have certainly been forthcoming in providing access to U.S. naval forces, but the former is probably too far from potential trouble spots in Southeast Asia to represent more than a useful staging area.³¹ The use of the latter carries with it the baggage of considerable vulnerabilities, given Singapore's very small size. The *Quadrennial Defense Review Report* underlined the difficulty of projecting U.S. military power across the Pacific into Southeast Asia in its report to the Congress:

The distances are vast... [and] [t]he density of U.S. basing and en route infrastructure is lower than in other critical regions. The

³⁰ In East Asia American land bases in South Korea and Japan provide a political assurance of American commitment to the area, which may be more important in providing a sense of political stability to Japan, South Korea, and even China than for their deterrent effect on North Korea's bizarre regime.

³¹ This was the case in 1942 and much of 1943 for the American military efforts against Imperial Japan's naval, ground, and air forces in the New Guinea and Solomon campaigns, where intractable logistical and supply problems confronted U.S. forces—problems that represented as great a set of obstacles as those posed by a ferocious and fanatical opponent.

United States also has less assurance of access to facilities in the region. This places a premium on securing additional access and infrastructure agreements and developing systems capable of sustained operations at greater distances with minimal theater-based support.³²

If Indonesia were to continue its down ward spiral into civil war or political collapse, or China were to become more than a political threat in the South China Sea, given its already extraordinary territorial claims in the area, the United States could project its military power through sea basing in order to defend U.S. interests in an area with critical sea lines of communication, on which so much of the world's trade and prosperity depends.

THE OPERATIONAL PROBLEM

Even if we retain the necessary bases and port infrastructure to support forward deployed forces, they will be vulnerable to strikes that could reduce or neutralize their utility. Precision strikes, weapons of mass destruction, and cruise and ballistic missiles all present threats to our forward presence, particularly as stand-off ranges increase. So, too, do they threaten access to strategic geographic areas.³³

Only those, who have read deeply into the history of American military operations in the Second World War, understand fully the difficulties that U.S. forces confronted in the early months of America's participation in that war. Throughout 1942, American forward operating bases were under constant attack by the air, ground, and naval forces of the Axis. Such attacks took a severe toll of the defenders. In June 1942 the crucial naval base at Midway Island in the Central Pacific came under heavy air attack by aircraft launched from Japanese carriers that destroyed much of the island's infrastructure. Only extraordinary miscalculations by the attacking Japanese commander and the luck that placed U.S. dive bombers over Japanese carriers at the exact moment Japanese *Zero* defenders

³² Quoted from the *Quadrennial Defense Review Report* by Bowie, "The Anti-Access Threat and Theater Air Bases," p. 24.

³³ National Defense Panel, *Transforming Defense*, pp. 12-13.

had descended to ocean level to attack American torpedo aircraft saved the island from falling to an immense Japanese armada.

Two months later, at Savo Island in August 1942, Japanese heavy cruisers sank one Australian and three U.S. heavy cruisers in the anchorage immediately off the shores of Guadalcanal – the cost to the attacking Japanese: minor damage to one of the attacking cruisers. At that time the U.S. Marines were struggling to bring a modicum of supplies ashore to defend the airfield they had just captured. Over succeeding months, almost continuous air attacks, 16" shells from Japanese battleships, heavy shelling by Japanese cruisers and destroyers and, eventually, substantial numbers of Japanese ground forces assaulted the Marines and their forward operating base. To protect that naval base from Japanese forces attacking down the "Slot," the U.S. Navy suffered a series of costly reverses in September and October 1942. Only desperate resistance by Marine and Navy aviators, the sacrifice of much of the U.S. Navy's surface power then available in the Pacific and the tenacious resistance of Marine grunts on the ground prevented Guadalcanal's fall and the destruction of the 1st Marine Division.

In the war against the European Axis, throughout the winter of 1942/1943, American air bases and ports in North Africa received a constant diet of pounding from the Luftwaffe. In one case during the Battle of Kasserine Pass, panzers from Field Marshal Erwin Rommel's marauding *Afrikakorps* managed to overrun a major American air base. In early spring 1943 during the Tunisian campaign, George Patton, furious at the Luftwaffe attacks on his forces, proposed giving Luftwaffe pilots a medal, when they struck his headquarters while Generals Dwight Eisenhower and Field Marshal Harold Alexander were visiting to hear out his complaints about Luftwaffe attacks. Throughout the North African campaign the Germans were able to inflict substantial damage on Allied shipping unloading in Oran and Algiers.³⁴

³⁴ For an operational view of the campaigns of World War II see Williamson Murray and Allan R. Millett, *A War To Be Won, Fighting the Second World War* (Cambridge, MA, 2000).

By 1944 that situation had radically changed for the better in both the European and the Pacific theaters. U.S. forces moved across the Central Pacific with their base structure virtually invulnerable to attacks by the forces of Imperial Japan. On the other side of the world, American forces raced through France in great open columns, unafraid that the Luftwaffe might interfere with their movement. During the Battle of the Bulge Patton's Third Army's tank columns were able to drive with their lights on, as they raced to the relief of hard pressed U.S. forces in the Ardennes. Only on the 1st of January 1945, did the Luftwaffe launch a strike that destroyed nearly 300 Allied aircraft on the ground in Belgium, but only because Allied aircrews and air defenses were recovering from a vast number of New Year's eve parties. But that attack cost the Luftwaffe so many aircraft and fighter pilots that turned out to be the German air force's swan song. The Luftwaffe would never again launch a significant military operation.

American experiences in the limited wars that accompanied the Cold War mirrored the experiences of the last years of the Second World War – at least as far as the relative invulnerability of American bases, infrastructure, and support facilities went. There were, of course, occasional rocketing of American bases and guerilla attacks during the Vietnam War, which at times caused considerable damage, but only over a period that lasted nearly a decade. Nevertheless, the American military has slowly, but steadily, become accustomed to a world in which its land-bases are seemingly invulnerable. Ironically, the very policy of deterrence only served to reinforce a sense of the invulnerability of American bases to attack among all too many U.S. military leaders. Admittedly there were considerable efforts in the late 1970s and 1980s to prepare U.S. and NATO air bases withstand a massive assault by Warsaw Pact air forces.

But even these considerable efforts to prepare base infrastructures to withstand aerial assault did not seem sufficient to protect NATO and American air bases in case of war. In the mid 1980s a series of tests of U.S. capabilities suggested how difficult it would have been to be air bases operating, while under a sustained assault by Warsaw

Pact aircraft and missiles.³⁵ Those experiments saw a major U.S. base reinforced significantly beyond the normal base engineering support structure (the so called “Salty Demo” tests). The results, however, were depressing in terms of the difficulties in reconstituting a land-base structures under heavy enemy attacks.³⁶ As an article on the experiment notes:

The results [of the simulated Warsaw Pact attacks] were a sobering demonstration of the synergistic chaos that ensues when everything goes wrong at the same time. Thirty-one percent of the base’s personnel were casualties, half of them killed and nearly a third of the wounded were unable to return to duty. There was considerable damage to aircraft, vehicles, buildings, communications, and power systems... [F]ires burned all over, and unexploded ordnance lay about everywhere. Repair teams were short-handed and in some cases did not have the equipment and supplies they needed.³⁷

Ironically, despite these suggestive tests, the implications have had little impact on either the Air Force’s or Department’s thinking. Moreover, despite the apparent vulnerabilities of forward operating bases, the Air Force is increasingly emphasizing short-range tactical aircraft in its force structure. Part of the explanation for such a casual dismissal of the threat to forward operating bases was undoubtedly the experience of the Gulf War, when none of the numerous bases, off of which Coalition aircraft flew, were subject to attack by Iraqi aircraft or missiles. The other part of the explanation may be that the Air Force is caught in a budgetary squeeze between its desire to acquire the F-22 and its other requirements. In the squeeze, the need to reconstitute air bases after attack has simply fallen out of the budget.

³⁵ RAND simulations in the early 1980s suggested that Warsaw Pact strikes against U.S. air bases in Europe in the first week of hostilities would cut sortie generation rates by over 40 percent, while destroying upwards of 40 percent of deployed aircraft. Another RAND study commented that: “In Europe, main operating bases and support equipment previously thought survivable may become extremely vulnerable.” Quoted in Bowie, “The Anti-Access Threat and Theater Air Bases,” p. 8.

³⁶ *Ibid.*, pp. 7-8.

³⁷ John T. Correll, “Fighting under Attack,” *Air Force Magazine*, October 1998, pp. 50-52.

The official line seems to be that defending fighters can prevent an opponent from pushing through sufficient aircraft or cruise missiles to inflict serious damage on the forward operating bases of U.S. forces.³⁸ The difficulty with such arguments is that the emerging operational world is likely to see increasing numbers of cruise and ballistic missiles, perhaps with precision and stealth capabilities, all likely to present a significant challenge to U.S. forward operating land bases. GPS is not just a technology available to U.S. forces and America's future opponents will undoubtedly figure out to use such technological capabilities to their advantage. On the missile threat the Hart/Rudman commission commented four years ago:

The competition between missile developments and defensive systems will be a key operational challenge over the next several decades. Large-scale missile attacks will be able to overwhelm defensive systems, despite considerable improvements to them. American bases abroad will become vulnerable to these weapons.³⁹

In the near future potential enemies of the United States will possess capabilities, either developed by indigenous industries, or purchased abroad, to attack stationary targets, particularly large ones like airfields and ports. Those targets will be identified before a crisis occurs and U.S. military forces deploy. It is already obvious to any power with pretensions of becoming a regional competitor to the United States that it must target and attack the air bases in its region into which the Air Force's expeditionary forces could flow and into which Army ground forces could begin to arrive.

³⁸ As one commentator has noted: "[A]s recent force structure decisions have increased reliance on forward bases, the USAF seems to have discounted concerns over air base vulnerability, primarily because no opponent currently appears capable of mounting a serious threat. The focus of debate now revolves around performance and survivability in the air against enemy aircraft and surface-to-air missile systems, while ground performance and survivability appears to be largely ignored." Bowie, "The Anti-Access Threat and Theater Air Bases," p. 9.

³⁹ U.S. Commission on National Security/21st Century, *New World Coming: American Security in the 21st Century*, Supporting Research and Analysis, Washington, DC, 15 September 1999, p. 52. Dr. Andrew Krepinevich commented three years later: "...the growing proliferation of ballistic and cruise missiles, and of weapons of mass destruction, is likely to enable even third tier militaries to place American bases overseas in their cross hairs. Such bases... may become the 21st century's Omaha Beaches; killing zones for massed, immobile soldiers and war supplies." Quoted by Francis G. Hoffman, "In Sailing in a Fog of Peace: Future Anti-Access Threats," presentation at National Defense University, Washington, DC, 9 July 2002.

Moreover, one cannot eliminate the possibility of special force/guerrilla attacks on air bases. In 1942, British SAS commandoes in North Africa destroyed almost as many Luftwaffe aircraft on the ground as the RAF shot down in the air over the course of the year. During the Vietnam War, North Vietnamese and Vietcong commandoes managed to destroy nearly 100 aircraft and damage over 1,000 with unsophisticated weapons like satchel charges and mortars despite the fact that many U.S. bases lay far beyond the reach of the North Vietnamese in Thailand.⁴⁰ It is not likely that potential opponents of the United States will not notice and respond to the successes that First World Special Forces have achieved over the past several decades.

The potential for anti-access by direct attacks is not just a threat that confronts the Air Force. To one extent or another, it will confront all the services over the coming decades. It has major implications for the Army which is devoting substantial resources to developing new capabilities and weapons systems to speed up deployment of its units. To a considerable extent, those capabilities are predicated on airlift being available and on access to land bases to which Army units can deploy in order to begin ground operations against the enemy. Anti-access capabilities obviously also have considerable implications for the use of ports and other fixed facilities by the Navy and the Marine Corps.⁴¹

But while the latter two services are paying significant attention to the anti-access problem, the Air Force, at least in its budgetary choices, appears almost oblivious to the emerging threats that technological change is already offering America's future enemies. This appears to be the case particularly with regards to its procurement policies. At present, the Air Force is targeting much of its procurement resources for tactical fighters, while at least,

⁴⁰ Alan Vick, *Snakes in the Eagle's Nest: A History of Ground Attacks on Air Bases* (Santa Monica, CA, 1995). The author's bottom line: "The centrality of airpower to modern warfare makes airfields even more tempting targets than they have been [in the past].... If the historical experience is any indication, standoff threats [from special forces or guerrillas] will continue to pose a particularly daunting challenge." Ibid., pp. xx-xxi.

⁴¹ Here the conceptual work in both of the maritime services is clearly focused on addressing the emerging anti-access problem, as it pertains to the projection of Marine forces ashore.

according to its white paper on the future bomber force, it will not begin work on a replacement long-range bomber for the B-2 until 2013.⁴²

Almost as much as the Marine Corps, the Army has a vital interest in involving itself in sea basing. Over the past six decades, it has found the seabase extraordinarily useful for the projection of ground power into areas of interest to the United States. From the Second World War through the Vietnam War, the sea provided virtually everything the Army took into combat or fired at the enemies of the United States. That has not changed; in any substantial conflict in the future, whatever the projection power of airlift, the army will in the end have to rely on the seabase for the movement of heavy units and supplies that enable it to fight.

However, in a major shift in its approach to movement to contact with the enemy, the Army, on two separate occasions over the past decade, has used the seabase as the loci for that movement. In Haiti, an aircraft carrier provided the seabase for a brigade of the 101st Airborne Division, while during the recent ENDURING FREEDOM operation the carrier *Kitty Hawk* provided a secure base for SOF units to move on into Afghanistan.

Reinforcing the importance of sea basing are the logistical numbers that will, for the foreseeable future, make some form of sea basing essential during the conduct of U.S. military operations. Simply put, the deployment of one of the Air Force's Expeditionary Air Forces represents an enormous logistical task. The deployment of thirty aircraft to Qatar in 1997 required the movement of 4,000 short tons of personnel, munitions, force protection, and other items (overall approximately ninety C-17 loads).⁴³ And the base infrastructure at Qatar was hardly a bare-bones base.

⁴² Department of the Air Force, "White Paper on the Bomber Force," Washington, DC, 1998, p. 28. For the Air Force's surprising approach to long-range strike see Williamson Murray, "The United States Should Begin Work on a New Bomber Now," *Policy Analysis*, Number 368, The CATO Institute, March 16, 2000.

⁴³ Bowie, "The Anti-Access Threat and Theater Air Bases," p. 27.

When one considers that most of the forward operating bases, from which U.S. forces will have to operate in the future, will not possess a sophisticated infrastructure, the difficulties involved in relying on land bases become even clearer.⁴⁴ The problem of supplying fuel alone represents an intractable problem. A single squadron of F-15E (twenty-four aircraft) requires 400 *tons* of fuel per day; an Expeditionary Air Force no less the 2,500 tons.⁴⁵ When one adds in the tonnages of weapons, sustenance for supporting troops, and maintenance supplies required to support such forces, a picture of the difficulties involved in deploying U.S. military power by air become readily apparent.

It is hard to see, given the present size of U.S. airlift forces, how the United States could support Air Force and Army units on land-bases that were subject to sustained attack by cruise or ballistic missiles, as well as special forces. In those circumstances sea basing should be an increasingly attractive option for the Army B and even in some respects to the Air Force. Does this mean that the United States should entirely abandon the idea of land basing? Obviously not. But the emerging threats and vulnerabilities suggest that U.S. military forces should increasingly rely on sea basing in one form or another.

⁴⁴ The difficulties that the Air Force will encounter in putting together a workable base structure where none exists were underlined by those encountered in the Stans during ENDURING FREEDOM, where it took an inordinate amount of time to begin operations because virtually everything had to be flown in. Had the Air Force had to deploy significant numbers of Army troops initially as well, those difficulties would only have been exacerbated.

⁴⁵ Bowie, "The Anti-Access Threat and Theater Air Bases," p.27

CONCLUSION

There are no easy solutions to the strategic reality that confronts the United States at present. The projection of military power from North America has in the past, and will in the future, represent a number of intractable problems. That projection, even during the Cold War, when the United States had large numbers of bases scattered around the world, has never been an easy task. But the pullback of U.S. forces to bases in North America only exacerbates that strategic reality. And now the United States confronts the possibility its opponents will attempt to deny it access to bases on foreign soil, either through diplomacy, intimidation, or the actual use of military force. The dangers of the emerging world order to the projection of America's military power were succinctly pointed out by the authors of the Hart-Rudman Commission four years ago:

Clearly, there are new challenges in our future, especially for a U.S. military strategy that has relied on forward based and forward-deployed forces as a key component of that strategy. The permanent stationing of U.S. forces abroad will become more difficult to sustain. The political costs of such bases will likely rise, as well as the vulnerability of such forces to attack [by] ballistic missiles, terrorism, and weapons of mass destruction. Taken together, the pressures against the permanent forward basing of U.S. military forces have profound implications for U.S. strategy, power projection capabilities, and alliance relationships.⁴⁶

What to do? It would seem that new capabilities and technologies created by the revolution in communications and computers – as well as in other areas – offers considerable possibilities for the development of advanced concepts for sea basing. But it is not the new technologies that drive the need for new thinking and approaches to sea basing. Rather it is the strategic and political framework that underlines the need to project U.S. military power from the sea. And that strategic and political framework also suggests the need for sea basing to become something more than just the property of the Navy and Marine Corps. In effect, sea basing

⁴⁶ U.S. Commission on National Security, *New World Coming: American Security in the 21st Century*, pp. 56-57.

must become a truly joint concept with capabilities that allow for the projection of the full panoply of American military power against the enemies of the United States.

APPENDIX E: OPERATIONAL ISSUES OF SEA BASING IN THE TWENTY-FIRST CENTURY

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INTRODUCTION

For political reasons as well as the increasing lethality and accuracy of cruise and ballistic missiles in the hands of potential opponents, the access to and use of land bases by America's military forces has been and will become increasingly in question over coming decades.⁵⁷ In a number of political cases during the Cold War, U.S. military forces found access even to their own bases on foreign soil severely limited or even denied by host nations.⁵⁸ The political difficulties that have confronted U.S. forces in accessing bases since then have steadily increased. For the past decade and a half, U.S. forces have run into significant political difficulties in using bases in the Middle East to execute strikes against Saddam Hussein's truculent regime.⁵⁹ At various times not only Arab nations but the Turks as well have refused U.S. forces the use of their bases to launch air strikes against Iraq. Yet, the most telling indication of how difficult it is even at present to gain access to bases for the conduct military operations has come with the decision of the Turkish

⁵⁷ For a specific discussion of the difficulties in accessing bases on foreign soil see Williamson Murray, "Thoughts on Sea Basing in the Twenty-First Century," unpublished paper, Defense Science Board Task Force on Sea Basing, February 2003.

⁵⁸ The most obvious case occurred during the Yom Kippur War when all of the European nations except the Portugese refused to allow U.S. resupply aircraft to utilize bases on their soil. Similarly during the 1986 raid on Libya, the French and Spanish refused to allow F-111s, flying out of bases in the United Kingdom, to use their airspace. The resulting lengthy flight around both nations placed great strain on the crews and impacted on the operational success of the mission, although the strategic results -- improved Libyan behavior—more than justified the mission.

⁵⁹ See among others David A. Shiapak, John Stillion, Olger Olikier, and Tanya Charlik-Paley, *A Global Access Strategy for the U.S. Air Force* (Santa Monica, 2002), pp. 6-9.

parliament earlier this year to turn down \$6 billion in foreign aid and even larger amounts in loan guarantees from the United States in return for allowing the 4th Infantry Division to move across its territory in order to attack Iraq from the north. As a result, the United States has found itself without the ability to conduct major operations against northern Iraq at the outbreak of war against Saddam Hussein's regime, while the 4th Infantry Division's equipment was quite literally at sea and its troops in Texas.

But it is not just a matter of America's allies being unwilling to allow U.S. military forces to utilize the bases on their soil. The strategic reality is that even before the Cold War ended, U.S. forces had begun to come home. This process has only accelerated since 1990. In effect for the first time since the early 1940s the United States directly confronts the problem of projecting its military power across two great oceans - with all the logistical and geographical implications that that strategic reality implies.

This does not necessarily mean that in the future the United States will possess no land bases on territories beyond North America. Rather, it suggests that the number of those bases will be fewer and less able to support substantial deployments of U.S. air and ground forces in crisis situations. Moreover, the base infrastructure will be less able to support major deployments through to other areas of the world. Finally, the most likely places where the United States will continue to maintain bases, such as Europe - and perhaps Northeast Asia after North Korea implodes - are the least likely to require U.S. military support. On the other hand, those places most likely to require U.S. deployments - the Middle East, Southeast Asia, and South Asia -- to execute large-scale contingencies are the least likely to have either the bases or infrastructure to support U.S. military forces.

Exacerbating the difficulties involved in accessing land bases is the fact that such bases are becoming increasingly vulnerable to relatively precise cruise and ballistic missiles, not to mention enemy special forces, guerrillas, and terrorists. The National Defense Panel commented on these growing threats to land-bases abroad in the following terms:

Even if we retain the necessary bases and port infrastructure to support forward deployed forces, they will be vulnerable to strikes that could reduce or neutralize their utility. Precision strikes, weapons of mass destruction, and cruise and ballistic missiles all represent threats to our forward presence, particularly as stand-off ranges increase. So, too, do they threaten access to strategic geographic areas [of importance to the United States].⁶⁰

It is not that sea basing is a more efficient or less costly alternative to land basing. In some cases land bases will be more attractive and useful; in others they will compliment the use of sea based forces. However, for the most part, sea basing will likely prove more politically and operationally useful in the emerging strategic environment than land bases. Moreover, sea basing may be the only possible avenue of approach to defend national interests and to attack and defeat the enemies of the United States. The importance of the seabase to the initial operations against Al-Qaeda and the Taliban regime in Afghanistan, when access to land bases was either not available or required an extensive buildup, is a clear indication of the importance of sea basing to the projection of U.S. military forces in the coming decades of the twenty-first century.⁶¹

This paper aims to examine several aspects of sea basing: its historical utilization, the difficulties that amphibious operations have confronted, and how one might think about the utilization of future potential capabilities of sea basing to defend the interests of the United States. The past is important because it is the only way through which one can understand the operational challenges. The present offers up capabilities that will not only be available decades into the future, but which can support and extend the operational possibilities open to future forces. And finally, the United States needs to develop certain potential operational capabilities to extend

⁶⁰ National Defense Panel, *Transforming Defense, National Security in the 21st Century* (Washington, DC, 1997), p. 12.

⁶¹ In terms of the Middle East and bases in that region, one could wonder at the end of 1992, since the Saudis were unwilling to allow U.S. aircraft to bomb non-Arab Afghanistan, how likely would they be to allow U.S. access to bases when the target was a fellow Arab nation. We now have the clearest possible answer in terms of recent American military operations against Saddam Hussein's regime.

present capabilities in significant ways against opponents, who also are evolving new and challenging options to defend themselves.

To end this introductory section, one might usefully define exactly what sea basing is as a concept. This definition is not meant to be restrictive, but rather to suggest how the Joint community and the Services might best think about a future, in which the United States will rely on the sea to a significantly greater degree than it has over the past half century for the projection of its military forces against the nation's enemies:

Sea basing: The capacity and/or capability to project sustainable military power ashore from the sea. The operational and technological capabilities on which sea basing rests must be flexible and adaptable to a wide range of contingencies and capable of meeting and overcoming an increasing number of threats. Sea basing is inherently Joint: it must include the integration of new ISR capabilities as well as precision fires to enable ground forces to destroy an opponent's will. The ability of sea basing to project U.S. power ashore can be substantially extended by military force based on land, but in the emerging strategic environment, it must be capable, with minimum support from land-based forces, to defeat enemies who possess substantial anti-access capabilities.⁶²

THE PAST

As island nations, both Great Britain and the United States have relied on the sea to project their power and influence onto the continents of the world.⁶³ The great world-wide empire the British assembled in the eighteenth century rested on the Royal Navy's ability not only to control the world's oceans, but to project and

⁶² The above definition is the result of extensive conversation and debate that took place among the members of the Defense Science Board's task force on what exactly constitutes a seabase in the present as well as the future. Included in these discussions were active members of the U.S. military as well as the members of the task force.

⁶³ In the context of defending its global national interests, the United States is to all intents and purposes an island nation that confronts great oceans lying between itself and potential opponents. That has conferred a great strategic advantage on it, in that it has been relatively invulnerable to attack by its opponents. Nevertheless, at the same time it has confronted the intractable problems involved in projecting its military power across great oceanic distances, a problem which with the return of U.S. military forces to the continental United States has resurrected the problem to a level of the challenge that the United States confronted in 1941.

support land forces at crucial strategic locations. In 1756, the Royal Navy landed and supported Major General John Wolfe's expeditionary force at Quebec City; the ensuing battle on the Plains of Abraham won the British control of Lower Canada. In the spring of the following year, the arrival of a Royal Navy squadron provided the reinforcements and supplies that destroyed the French position in Upper Canada and ended forever the French threat to the American colonies.⁶⁴

At the same time these events were playing out in North America, British sepoy troops, supported by the sea control provided by the Royal Navy, broke French power in India. On that naval power and its ability to project and support ground forces ashore, the British achieved a dominant position in the world – one which has continued to reverberate down to the twenty-first century. Today, the world's language of choice is English rather than French, a direct result of those victories won by Britain's naval and ground forces in the middle of the eighteenth century.⁶⁵

In the wars against the military forces of the French Revolution and Napoleon's Empire, the projection of military force onto the European continent proved more difficult than campaigns against the French colonial empire. Before 1789 the British had been able to wage war against France's colonies because their allies had contained French military power on the continent. After 1789 that was no longer the case, as French armies destroyed one coalition after another. The British did launch a number of raids against the French revolutionaries and Napoleonic France. However, those raids largely floundered on their inability to move with dispatch, once ground forces had come ashore. Invariably, the French reinforced threatened areas sufficiently quickly to contain the landing before British troops

⁶⁴ For a brilliant depiction of the war between the British (with some considerable help from the American colonists) and the French for the control of North America see Fred Anderson, *Crucible of War, The Seven Year's War and the Fate of Empire in British North America, 1754-1766* (New York, 2000).

⁶⁵ A fact which the French have not forgotten.

could do great damage.⁶⁶ It was not until the British found a secure base in Portugal, from which their small professional army under the Duke of Wellington could support a massive guerrilla uprising in Spain, that they had a significant and direct impact on the course of the general European war.⁶⁷

AMPHIBIOUS OPERATIONS IN THE WORLD WARS

For the century of peace that followed the Napoleonic Wars, the British found that the combination of superior technology and the ability to project relatively small, but well-trained forces from the sea allowed them to control a global empire without a prohibitively expensive defense budget. Their technological superiority over native forces in their colonial empire was simply too great for the locals to have much chance on the battlefield, as the Zulus found out in the 1880s. All that changed in 1914, when the British committed their army to the war on the European continent against the great conscript armies of Imperial Germany. That small, professional army had a disproportionate impact on the fighting in 1914, particularly in the Flanders battles in the fall, where the British Expeditionary Force slaughtered a German corps—largely drawn from the Reich’s university student—and probably saved France from defeat in the war.⁶⁸ But when it was over, there were hardly any survivors from

⁶⁶ The Walerchen campaign of 1809, during which the British landed a force of approximately 40,000 men, escorted by thirty-five ships of the line, on the Scheldt Estuary in an attempt to seize Antwerp, failed because British commanders failed to act quickly enough to encourage the Dutch to revolt against French rule despite their considerable unhappiness with the rapacity of the Napoleonic system. The landing force moldered in low ground, where a substantial number of British soldiers fell victim to disease.

⁶⁷ In fairness to the British, their naval blockade of France and its allies had a significant impact on the French economy, while their financial support was crucial to the support of the great coalitions that the European powers put together against the French Revolution and Napoleon. For the clearest account of the course of the Napoleonic Wars and the British contribution to the allied cause see David Chandler, *The Campaigns of Napoleon* (London, 1966). For the impact that the Industrial Revolution had on these wars—in effect as important a revolutionary event in its military implications as the French Revolution—in providing the financial basis for Allied victory in the Napoleonic Wars see MacGregor Knox and Williamson Murray, *The Dynamics of Military Revolution, 1300-2050* (Cambridge, 2001), chpt. 1.

⁶⁸ So intense and accurate was the aimed rifle fire of the British professionals that the Germans thought that the BEF was equipped with a far larger number of machine guns than was actually the case.

the initial force of “old contemptibles” who had landed in France that August.⁶⁹

In 1915, the British launched their ill-fated attack on the Gallipoli Peninsula in an attempt to open up the sea lines of communications (slocs) to Czarist Russia. Here their failure to develop complex amphibious techniques and inter-service cooperation (joint) over the course of the nineteenth century resulted in the failure of a brilliant strategic idea, because of flawed execution at the tactical and operational levels.⁷⁰ The British made two major landings, the first in April 1915 and the second in August. Each gained some measure of tactical surprise.⁷¹ But each failed, when British and Anzac (Australian and New Zealand) troops failed to take advantage of tactical surprise, because of a focus on building up follow-on forces and creating sufficient logistical support on land to meet Turkish attacks.⁷²

Despite their weaknesses, the Turks under the inspired military leadership and generalship of their future modernizer, Mustafa Kemal, responded quickly enough to prevent the British from gaining a clear operational success. The inevitable result, given the technological sophistication of weapons and the primitive state of tactical conceptions, was deadlock. By denying British and Anzac troops the high ground, the Turks prevented the British fleet from breaking through into the Sea of Marmara and attacking

⁶⁹ One of the foremost soldiers in the British Army has entitled his account of the fighting in 1914 *The Death of an Army*. See Anthony Farrar-Hockley, *The Death of an Army* (New York, 1968).

⁷⁰ Winston S. Churchill, Britain’s great war leader in the Second World War, found his reputation tarnished by the failure at Gallipoli for the next thirty-five years, although as one of his most recent biographers has pointed out, he had virtually no control over the operational planning and execution of the operation. See Geoffrey Best, *Churchill, A Study in Greatness* (London, 2001).

⁷¹ The first landing did not gain any strategic surprise, because the Turks knew that the British were coming, but not where. In the end the Turks and their German advisers guessed wrong, but the British failed to take advantage of the situation. For the most recent study of Gallipoli see Timothy Travers, *Gallipoli* (London, 2002); see also Alan Moorehead, *Gallipoli* (London, 1956).

⁷² There was, it is worth noting, an extraordinary amount of military incompetence, but the point here is that the pattern of the amphibious operation would be repeated in a considerable number of cases throughout the twentieth-century, at least in those cases where the enemy could bring significant reinforcements to bear on the fighting.

Constantinople – which might well have resulted in Turkish collapse.⁷³

The pattern of Gallipoli is worth paying particular attention to, because it suggests the difficulties involved in past amphibious operations in achieving a success against an opponent who could reinforce his defending forces as quickly, if not more quickly, than the landing force. In describing the problem involved in amphibious operations against defended coasts, one should refer to Figures 1 and 2 below.⁷⁴

The difficulty that the British encountered in the two amphibious attacks they made at Gallipoli was that their first wave in most cases gained a successful lodgement and a considerable measure of surprise, but the ensuing phase, during which British and Anzac forces were building up sufficient forces and supplies to push inland, also allowed the Turks to respond. Turkish reinforcements for the threatened sector arrived with sufficient dispatch to create defensive that contained attacking troops and defeated British efforts to seize the high ground, on which victory at the Dardanelles depended.⁷⁵ In effect, a combination of exhaustion in achieving the initial lodgment, losses in achieving that beachhead, and failures in leadership allowed the Turks the time to build up enough combat power to stop any British exploitation that could have led to Allied operational success.

⁷³ This is, of course a contentious point, but the present state of the evidence does indicate that the Turks were on the brink of abandoning Constantinople, when it looked like the British were on the brink of success in March and April of 1915.

⁷⁴ I am indebted to Major General Robert Scales, U.S. Army retired, for the conception and design of the depiction in Figure 1.

⁷⁵ The British also ran into one of the greatest military and political geniuses of the twentieth century, Mustafa Kamal, the father of modern Turkey – the only Islamic nation to adapt successfully to the challenges posed by the West over the past two centuries.

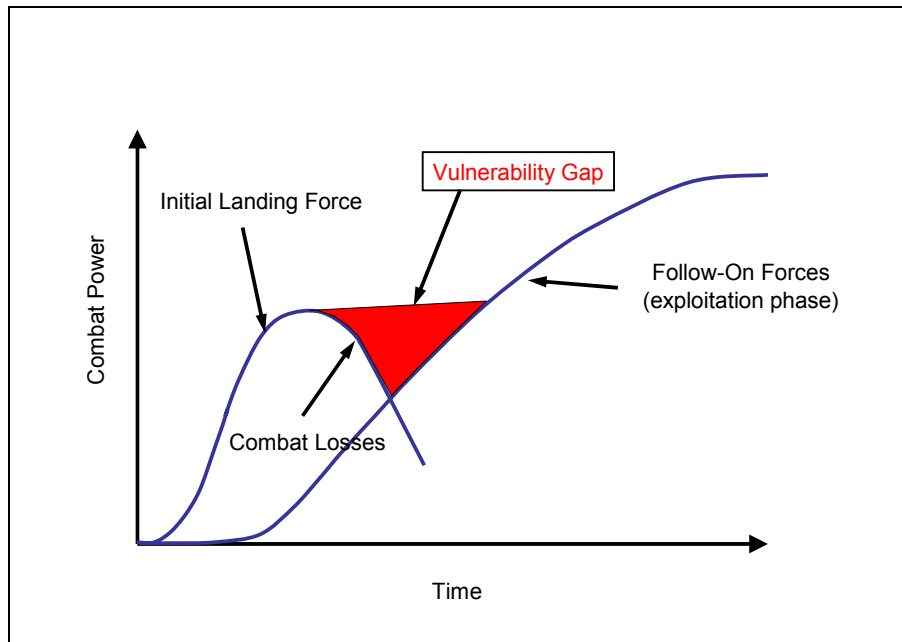


Figure 1: Expeditionary Operations Profile

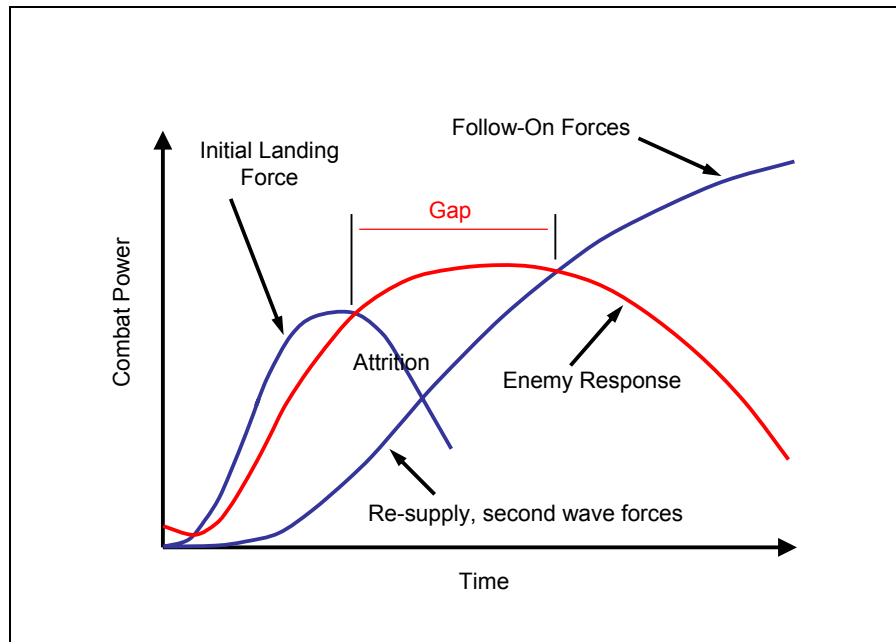


Figure 2: The Vulnerability Gap Results from a Net Force Deficit

This same pattern came close to being repeated in the Pacific in the first American operations during the Second World War. In the Guadalcanal campaign, the Marine landing force was sufficiently strong to seize the airfield and create the basis for a successful lodgement.⁷⁶ Thereafter for a considerable period of time, the Marines had to remain on the defensive around Henderson Field due to the difficulties involved in building up their fighting and logistical base. Fortunately for them, the Japanese initially underestimated the threat and only sent a reinforced regiment to confront what was in fact a divisional sized force. By the time the Japanese high command woke up, it was too late. American air and naval strength was sufficient – just – to place severe constraints on Japanese abilities to reinforce their forces on Guadalcanal. But it had been a terribly close call. Had the Japanese acted with dispatch, they could have thrown sufficient forces on the island to destroy the 1st Marine Division.

For the rest of the Pacific campaign, U.S. landing forces only had to confront outnumbered Japanese garrisons on the islands of the Central Pacific. American air and maritime superiority was such that the Japanese had virtually no chance of reinforcing their hard pressed forces.⁷⁷ It was a very different case in Europe, where Allied amphibious attacks occurred against a continental enemy in a position to reinforce his defending forces. At Salerno in September 1943, the Germans not only had strong defenses along the beaches, but substantial reinforcements inland. British and American landing forces established the beachheads relatively quickly, but soon ran into the problems posed by building up and supplying sufficient forces to move inland. The British held their bridgehead without difficulty, but the Germans came perilously close to driving the Americans into the sea. For a time the joint and combined commander, General Mark Clark, considered pulling the U.S. 36th Infantry Division off the beach, but reconsidered after a major German counterattack ran out

⁷⁶ For the most thorough analysis of the Guadalcanal campaign and the accompanying fighting that took place in the waters surrounding the island, see Richard R. Frank, *Guadalcanal, The Definitive Account of the Landmark Battle* (New York, 1990).

⁷⁷ They were able to reinforce the defenders of Luzon in the Philippines in 1944, but that was only due to the close proximity of the other islands, which somewhat mitigated American maritime and air superiority.

of steam – partially as the result of running into a *cul de sac*, where concentrated American artillery fire butchered the attackers.⁷⁸

Five months later a combined Anglo-American amphibious force hit the beaches at Anzio.⁷⁹ It caught the Germans completely by surprise – so much so that the only Wehrmacht troops in the area were four drunken officers, who drove their Volkswagen into a landing craft. The invasion commander, however, driven largely by his fears that the Germans would launch a counterattack, chose to build up his forces before moving inland. The Germans, acting with speed and ruthlessness, prevented any immediate Allied exploitation of the landing. They then launched a series of ferocious counterattacks that came close to driving the Allies into the sea. As Churchill so aptly described the results, “instead of hurling a wild cat on to the shore all we got was a stranded whale and Sulva Bay [the second landing on the Gallipoli Peninsula] all over again.”⁸⁰

In the Normandy landings in June 1944, the Allies confronted the same problem – how to cover that gap between the initial impetus of the landing and the point where the invading forces possessed sufficient strength to defeat the enemy’s main forces. Here the Allies made a number of crucial moves to cover the initial weaknesses of the buildup phase. Beginning on 1 April 1944, they launched a massive air campaign that included the entire strategic as well as the tactical air forces of both nations and aimed at destroying the Wehrmacht’s ability to reinforce Normandy.⁸¹ That air campaign was one of the most successful of the Second World War – virtually shutting down the transportation network of northern France (road as well as rail) by 5 June 1944.⁸² In addition, the Allies dropped three

⁷⁸ For a discussion of the Salerno landings see Williamson Murray and Allan R. Millett, *A War To Be Won, Fighting the Second World War* (Cambridge, 2000), pp 379-381.

⁷⁹ *Ibid.*, p. 380.

⁸⁰ Quoted in Martin Gilbert, *Winston S. Churchill*, vol. 7, *The Road to Victory, 1941-1945* (Boston, 1986), p. 69.

⁸¹ For a discussion of the arguments that led up to that decision as well as the impact of the campaign against the German transportation network in Northern France, see Williamson Murray, *Luftwaffe* (Baltimore, MD, 1985), pp. 249-257.

⁸² A report by the German railroad authorities in France reported as follows in early June 1944 as to the condition of the rail system in the period immediately before the Allied landing: “In [France

airborne divisions to cover their flanks and distract the Germans as to what was actually happening.

The result of these measures was that the Allies largely prevented the Germans from bringing to bear sufficient forces to threaten the initial lodgements. Even at OMAHA beach, where well-sited and undamaged German defensive positions came close to stopping the landing, the Americans gained sufficient space for follow on forces and supplies to come in. The bridgeheads were thus deep enough to facilitate their expansion on succeeding days of the campaign⁸³. On the other hand, of the German forces, only the 21st Panzer Division, located close to the British invasion beaches, was able to launch a counterattack late on the first day – one that failed dismally. The first major reinforcements, the murderous juveniles of the Waffen SS *Hitlerjugend* Division, began arriving early in the morning hours of 7 June, and German reinforcements came up on the invasion areas, thereafter, in higgledy piggledy fashion throughout the rest of June.⁸⁴ Nevertheless, the Germans were still able to contain the Allied bridgehead for all of June and July and prevent the Allies from turning the battle into a mobile contest until early August, when the dam finally broke.

and Belgium], the systematic destruction that has been carried out since March of all the important junctions of the entire network – not just the main lines – has most seriously crippled the whole transport system.... As a result,... it is only by exerting the greatest efforts that purely military traffic and goods essential to the war effort... can be kept moving.... the rail network is completely wrecked.” Ibid., p. 256. In effect the Allied air forces created a logistical desert – one that ironically, besides giving the Germans enormous difficulties in reinforcing the Normandy Battle, had a serious impact on Allied military forces once they reached the German frontier in September 1944.

⁸³ For a discussion of the reasons lying behind the near defeat at Omaha Beach see Williamson Murray, “The Needless D-Day Slaughter,” *Military History Quarterly*, Spring 2003.

⁸⁴ For example the SS Division Das Reich, at the time of the invasion located in southern France at Limoges, took over two weeks to arrive in Normandy instead of the expected two to three days that German plans had called for.

These historical examples suggest a number of important constraints that any enlarged sea basing concept for projecting military power at the operational level must address. Sea basing has consistently allowed attacking military forces to pick the time and the place of where their amphibious forces will come ashore.⁸⁵ But no matter how successful the initial landing may have been, the pattern has remained consistent. Invariably attacking forces have confronted a period immediately after the landing, where the lassitude induced by success and the difficulties involved in building up supplies and follow-on-forces for exploitation of the initial success have invariably resulted in a lull in forward movement.⁸⁶

In cases such as the Central Pacific, where the enemy could not reinforce his forces, such dead periods had little effect. At Gallipoli in 1915, however, the Turks had time to seal off the bridgehead and deny British forces the high ground, which would have allowed them to open up the Dardanelles and seize Constantinople. In Europe during the Second World War, amphibious operations at both Salerno and Anzio came dangerously close to failure during the dead period after the first wave had come ashore. Even at Normandy, where the Omaha Beach landings barely managed to achieve a lodgement, the 1st Infantry and 29th Divisions remained in a perilous position for the first twenty-four hours after they had captured heights overlooking the beaches.⁸⁷

⁸⁵ As pointed out earlier in this article, even at Gallipoli the British gained a sufficient measure of tactical and strategic surprise over their Turkish opponent—not once but twice!

⁸⁶ The lassitude was sufficient to prevent the British forces from moving forward to seize Caen, even though they had a relatively open road to the Norman City. Their failure to move on Caen, which they were supposed to seize by the end of the first day, resulted in the Germans holding that crucial road and communications center for the next month and a half.

⁸⁷ The near disaster at Normandy was largely the result of General Omar Bradley's general disinterest in naval gunfire support despite the direct evidence from Salerno and the Pacific of its importance to the success of landing operations, particularly in attacking fortified beach defenses. The Army and Marine assault on Kwajalein in the Pacific three months before Normandy had received the support of seven battleships; Omaha Beach had only one battleship supporting the landing. The British landings received one-and-a-half-hour's preparatory bombardment from supporting ships; Omaha Beach only twenty minutes. As one observer reported, Bradley's attitude toward the lessons of the Pacific could be summed up as "what do we have to learn from a bush-league theater." For an examination of Bradley's responsibility for the most costly

THE FALKLAND ISLANDS

British amphibious operations to retake the Falklands in the early 1980s from General Galtieri's fascist regime suggests a number of interesting points about how one might think about the problem of amphibious operations in the twenty-first century.⁸⁸ Admittedly there are considerable differences between the amphibious capabilities the British possessed at the time and the capabilities American forces possess at present and are likely to possess in the future. But it is the pattern of amphibious and logistical operations that the context of the Falkland's war forced the British to follow – namely that they had to project everything from the sea in terms of combat power. Those lessons the American military should ponder.

To begin with, much of the British military establishment – not to mention those in the civilian bureaucracy and the politicians – had concluded Britain no longer needed amphibious capabilities, given their nation's strategic commitments to Europe and the central front.⁸⁹ Thus, the British movements that initiated the reply to the Argentinean seizure of the Falklands involved throwing a lot of kit, Royal Marines, soldiers, and assorted supplies on ships heading south. The inchoate initial response, then forced the British to halt at an interim seaborne base at the Ascension Islands – and resort ship loadings and troops in preparation to making an opposed landing in the Falklands. That effort also allowed them to bring into the airfield at Ascension many of the initial supplies and pieces of equipment forgotten in the rush south. The intensive diplomatic maneuvering occurring in the immediate aftermath of the Argentinean invasion provided the time for resorting and reloading.

amphibious operation launched by U.S. forces during the Second World War (nearly double the casualties suffered by the U.S. Marines at Tarawa) see Murray, "The Needless D-Day Slaughter."

⁸⁸ The best book on the Falkland Island's campaign remains Max Hastings and Simon Jenkins, *The Battle for the Falklands* (London, 1983). For an outstanding examination of the logistical difficulties the British confronted and how they solved them see Michael Clapp and Ewen Southby-Tailyour, *Amphibious Assault Falklands, The Battle of San Carlos Water* (London, 1997).

⁸⁹ In fact, if the Argentinians had waited another year to launch their invasion of the Falklands, the British would not have been able to reply. In April 1982 the British government was on the brink of selling its light carriers to the Indians and the Australians, doing away entirely with the Royal Marines, and breaking up the few amphibious ships that it still possessed.

As with amphibious operation in World War II and Korea, the British gained a considerable measure of surprise, as to the location of the landing and its timing. Thus, the initial assault in San Carlos Bay met virtually no opposition on land and only a light response from Argentinean aircraft. Despite that success, the British ran into the same lull required to build up forces, supplies, and fire power that had marked so many past amphibious operations. On the second day the Argentineans launched a series of ferocious and all too effective air attacks on British shipping in San Carlos waters.⁹⁰ It took the British almost a week to overcome the dead period before paratroopers struck against Argentinean forces at the Goose Green settlement; that attack was followed almost immediately by a march under hideous early winter conditions across East Falkland Island for the attack on the main Argentinean positions at Port Stanley. The fact that British artillery was almost out of ammunition, when the Argentineans surrendered, suggests how close the eventual margin of victory.

Meanwhile the British had shipped an addition brigade sized force south to help in the final portion of the campaign in the *QE2* (*Queen Elizabeth 2*). The Gurkas and the Guards battalions of that brigade transhipped into other shipping at the South Georgia Islands, where due to both the lack of facilities and foresight, much valuable equipment remained behind. The price paid by the ill-prepared brigade turned out to be excessively heavy, when attacking Argentinean Skyhawks and Mirages severely damaged two British amphibious ships with large numbers of troops still on board. In the end, the reinforcing brigade was probably not needed: Royal Marine Commandos and paratroopers had proven sufficient to overcome an Argentinean military force that was badly led, badly trained, and largely unprepared to handle the ferocious weather conditions of the Falklands.

⁹⁰ The British were considerably aided by the fact that the Argentineans confined their attacks almost exclusively to the Royal Navy's warships rather than to the supply and personnel ships and by the fact that many of the bombs that the Argentinean aircraft carried had been improperly fused and so failed to explode.

British operations in the Falklands suggest a number of interesting points about amphibious operations. First, an interim land base (probably somewhere on the world's oceans) will be of critical importance in sorting through the logistical and support problems that confront attacking forces. Second, surprise in terms of the location and timing of the attack will probably be achievable, except against all but the most sophisticated opponents. Third, forces attacking from the sea must use that initial period of surprise, not only to execute the build-up, but to launch significant military operations to break the enemy's cohesion. In other words, the dead period, marking the Falklands and earlier amphibious operations is no longer acceptable, given the technological sophistication future opponents will likely possess.

If the enemy is not immediately rocked back on his heels by military operations, he could attack the amphibious forces at sea and ashore with cruise and ballistic missiles that would be far more accurate and lethal than the Mirages and Skyhawks the Argentineans possessed. Fourth, transfer and movement of follow-on forces through the seabase to support continuing military operations may need an interim land base or island base. Nevertheless whether they occur from land or at sea they must occur in a faster and more seamless fashion than the reinforcing brigade that eventually arrived in the last stages of the Falkland's campaign.

THINKING ABOUT SEA-BASED OPERATIONS IN THE TWENTY-FIRST CENTURY

As with all things dealing with military operations, the context – political, strategic, operational, and tactical – is what will be crucial in determining who wins and who loses in the future. In the twenty-first century, the United States will confront a number of challenges – some great, most small – requiring the projection of its military power. At present it relies on a combination of power projected from the sea, from land bases in the vicinity of the crisis, and from the continental United States. As suggested above, the political and strategic realities suggest that the second of those options, land bases, will become increasingly doubtful as a means for the United States to project military forces in pursuit of national objectives. With a

refocusing of priorities, the United States Air Force could be in the position to project significantly greater military power from bases in North America against America's enemies for much of the remainder of the twenty-first century.⁹¹

What then will the United States require in terms of sea basing to meld with distant attack from North America. In a number of smaller contingencies, ranging from situations similar to the Bangladesh typhoon relief effort to intervention in Somalia, the United States will need forces that resemble the Marine expeditionary units that have done such yeoman service in the recent past. Admittedly, those capabilities, deeply embedded in the cultures of the Marine Corps and the Navy, will require new weapons of greater range, lethality, and precision. Clearly ISR, utilizing space-based sensors and unmanned aerial vehicles (UAVs), will enable greater understanding of the enemy and his intentions. Given the increasing devolution of advanced capabilities from first world to second and third worlds, present amphibious forces and their descendants will require the ability to reinforce Marine expeditionary units more rapidly and seamlessly to achieve a more robust and sustainable force. The return to the concept of Marine expeditionary brigades undoubtedly represents recognition of this need, for the Marines will need the capabilities to begin operations against a prepared enemy with more than a Marine expeditionary unit.

More robust and effective opponents will require substantial additions, changes, and new concepts of operations and logistics to the framework of sea based forces. To begin with, the conduct of operations against a major regional competitor will require island bases, from which the U.S. logistical system can function with greater efficiency, not only during buildup, but the operational phases. At present, the United States utilizes bases at two locations, Guam and Diego Garcia, which would seem ideal for such a role.⁹² A major basing facility on the northwest coast of Australia – a region far from

⁹¹ On the need for a substantial buildup in the U.S. strategic bomber force beyond what the USAF has been recommending over the past decade see Williamson Murray, "The United States Should Begin Work on a New Bomber Now," Policy Analysis, The CATO Institute, 16 March 2000.

⁹² I am indebted to Admiral Dennis Blair, USN retired for this point.

the most populated regions of that continent – could provide the jumping off spot to deal with troubles in southeast Asia.

Such oceanic bases will require a greater infrastructure than presently available. With a major buildup in infrastructure, these bases would provide the key logistical center through which reinforcing units, supplies, and equipment would arrive from North American bases. Those three great bases would represent the equivalent of the Ascension Islands in the Falklands Island campaign. Moreover, the United States could place a portion of its prepositioned assets at each of the three bases. The investment to allow for operational maneuver from the sea would be considerable; those investments need tailoring to provide the investments in air and sea lift to support the rapid deployment of forces from North America.

Looking at possible military operations in the future, say 2025, the seabase, reinforced from and with slocs reaching back to Diego Garcia, Australia, or Guam – depending on the contingency – would form up off an enemy's coast. At that future date, it would still consist of a number of platforms built in the first decade of the twenty-first century, and in some cases earlier.⁹³ The overall combat projection capabilities of the force would, however, enable U.S. forces to reach deeper into enemy territory from further off shore, not only with air strikes, but ground forces as well. Clouds of relatively cheap, but combat effective UAVs, supported by space-based assets, would provide commanders an improved sense of the enemy's movements and in some cases intentions.⁹⁴ But no matter how great the advances in technology, much of the enemy's intentions and plans will remain opaque, even after the beginning of operations.

⁹³ For example a number of *Nimitz* class carriers will still represent an integral portion of the Navy's warships capable of projecting air power from the sea.

⁹⁴ Nevertheless, whatever the improvements in technology over the next two decades, U.S. forces will never gain the ability to predict the enemy's intentions, nor will they ever entirely remove the uncertainty and ambiguities that have always characterized the nature of combat. For why this will remain so see particularly Barry D. Watts, *Clausewitzian Future and Future War* (Washington, DC, 1996).

The largest difference with current amphibious operations will rest on the ability of the seabase and its various components to provide an off shore footprint of what has traditionally become the on shore footprint. In other words, many of the key functions that now command and support Marine forces fighting on shore will find themselves remaining at sea. Such portions of the seabase will include, but not exclusively, substantial portions of the logistic infrastructure, much of the Marine air wing and its support structure, intelligence functions, as well as those who manage and control UAVs and sensors.

Perhaps even more important than a deeper reach from farther off shore and a smaller footprint on shore is that the seabase must serve as something more than the framework for projecting a Marine Expeditionary Unit (MEU) or Marine Expeditionary Brigade (MEB) ashore. In particular, in major regional contingencies, the seabase must serve as the interim stopping point for follow on heavier Army forces. Those forces will move through the seabase, or even form part of the seabase before operations begin. At times Army forces would immediately follow in the wake of the first insertions of Marines by air deep into enemy territory. In some cases, insertion would also come across beaches, where air strikes and special operations forces have eliminated enemy defenses. At other times, the sea-based equivalent of the 101st Airborne Division (Airmobile) would operate with the first strikes of the Marines to immobilize and paralyze the enemy's sense for what is happening. In addition, Army airborne forces, perhaps flying directly into the theater of operations from North America, could seize airfields for later deployments.

Once a path was open, Marine units, followed by heavy Army units, could open up corridors and avenues of approach into the interior. The initial efforts might also aim to gain a port into which the Army could bring heavy armor and from which it could begin rapid exploitation. Nevertheless, given the missile threat such a port would serve largely as an entry and disembarkation point; there would be no intention to build up large supply dumps of a logistical infrastructure the enemy could attack. Here, the Army of the future must have the potential to disembark forces with a speed that it can

not at present match. Not until U.S. ground and air operations had substantially eliminated the missile threat would airfields and ports begin to receive a portion of the logistic infrastructure from the sea. At that point, supplies could begin moving directly from the United States to ports.

The crucial enabler for sea basing capabilities that could support both the projection of Marine and Army ground forces from the sea onto enemy territory and their sustainment in an extended campaign would depend on a radical improvement of America's logistical capabilities. If there is to be a true revolution in military affairs involving U.S. military forces in the coming decades, it must come in the field of logistics and the ships and aircraft that support that logistic effort. The possibility exists that technology will offer the American military quad-tilt rotor aircraft or even hybrid aircraft – with their helium lift capable of landing anywhere on land as well as on the sea.⁹⁵ Such logistic enablers could go a long way to improving the ability of the seabase to move logistical support ashore to support the ground forces in combat.

With faster ships able to shuttle between the interim bases (Guam, Diego Garcia, and perhaps northwestern Australia) and the seabase, the possibility will exist for rapid movement of supplies, ammunition, and other requirements in a faster fashion than true today. But for such a logistic system to work sufficiently effectively to make the seabase and its power projection capabilities a reality, the Navy and the Department of Defense need to solve a number of intractable problems: selective cargo off loads, transfer and movement of cargo in stormy seas, the ability to integrate in-coming cargo with what already exists on the seabase, and the creation of logistical standards and commonality among the Marines, Army, and Navy.

⁹⁵ Chuck Meyers, "Briefing on Hybrid Ultra Large Aircraft (HULA) Task," 25 March 2003, Defense science Board Task Force on Sea Basing.

Since the basis of evolving American doctrine points towards rapid decisive operations with dispersed, swiftly moving units, the basic approach on which sea-based operations will have to rest will consist of operational exploitation, intensive tempo, and precise firepower: in other words maneuver warfare.⁹⁶ The firepower to support rapidly maneuvering Army and Marine ground forces would come from a variety of sources: loitering UAVs, close air support aircraft on station, remote artillery fires, and other possibilities.

CONCLUSION

The difficulties with which land basing is already confronting the American military in terms of projecting its military forces, underlines that the Department of Defense and the Joint world need to address in the immediate future how to expand the present capabilities of the seabase not only operationally, but in a logistic sense as well. The Joint concept of operation should aim at integrating Marine and Army capabilities to the extent that operations from the sea strike with such tempo and consistent application of force that the enemy never has the opportunity to recover his balance. Such Joint air, land, and sea efforts from the seabase should represent a devastating rapier-like thrust at the enemy's heart.

There is a larger issue here. Many of the experimental war games, played so far within the Department of Defense to examine concepts like rapid decisive operations, have emphasized the ability of future U.S. forces to destroy enemy units with which they come in contact. However lethal the combination of new doctrine and technologies on the battlefield may prove, the real aim of such U.S. operations should not be favorable exchange ratios, but rather paralyzing the enemy's entire command and control system, not just in a military sense, but in a political sense as well. The success of German operations in

⁹⁶ For the future of ground war see Major General Robert H. Scales, Jr., U.S. army retired, *Yellow Smoke, The Future of Land Warfare for America's Military* (Lanham, MD, 2003); and Colonel Douglas MacGregor, *Breaking the Phalanx, A New Design for Landpower in the Twenty-First Century* (Westport, CT, 1997).

France in 1940 did not depend on the numbers of French soldiers Wehrmacht tactical units were able to kill, wound, or capture, but rather the paralysis that German operations were able to induce in the minds of French senior commanders. U.S. operations from the sea by the third decade of the twenty-first century should have a similar aim in mind.

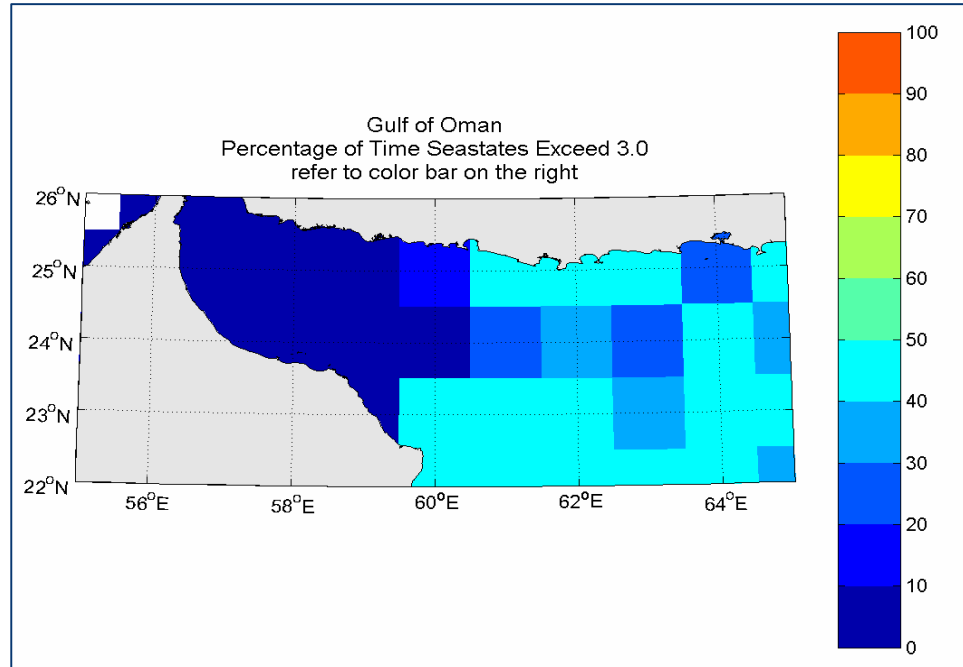
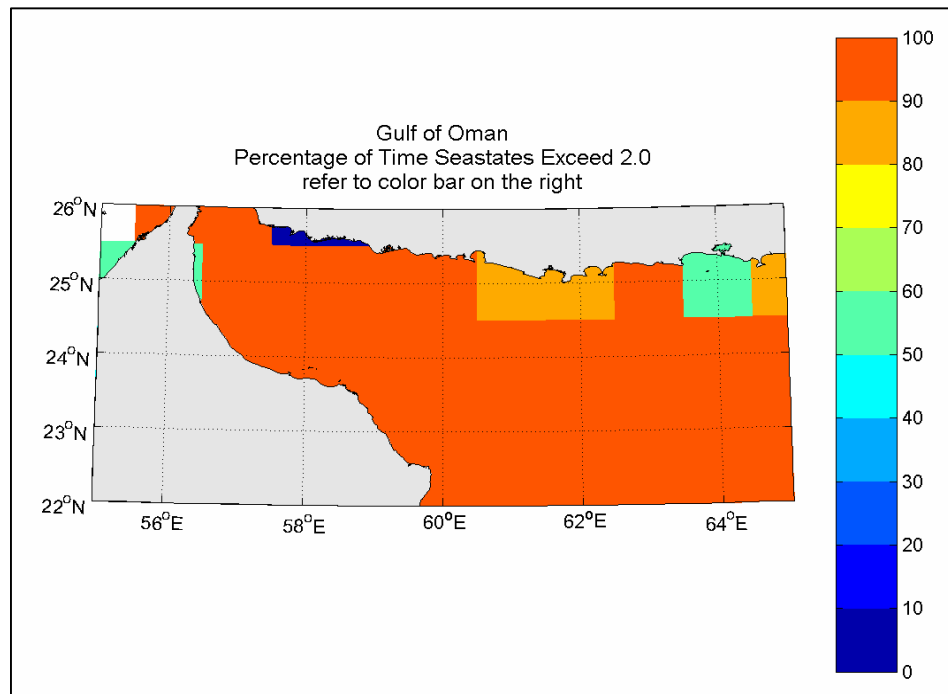
APPENDIX F: SEA STATE

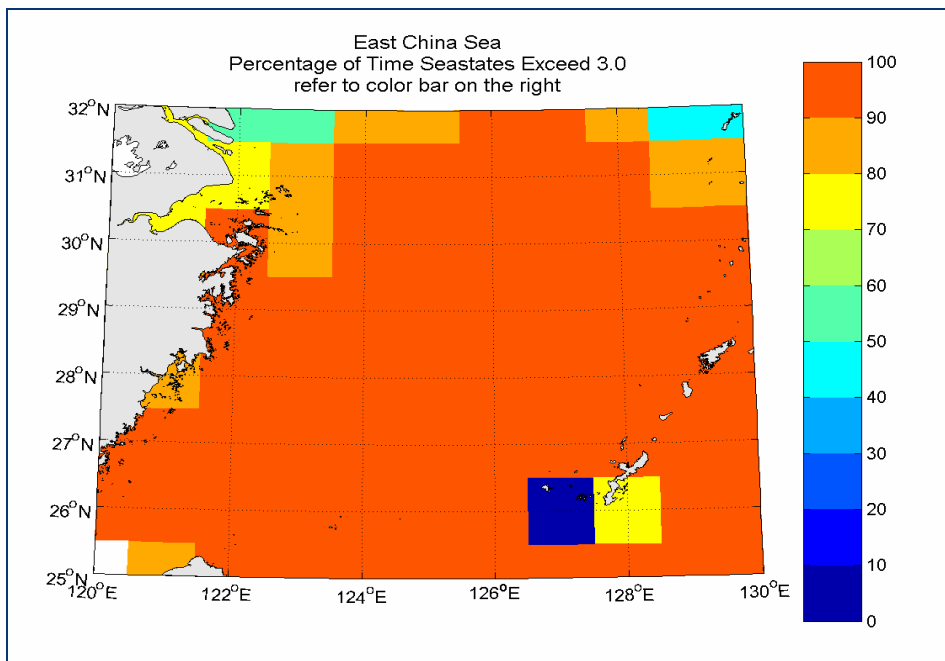
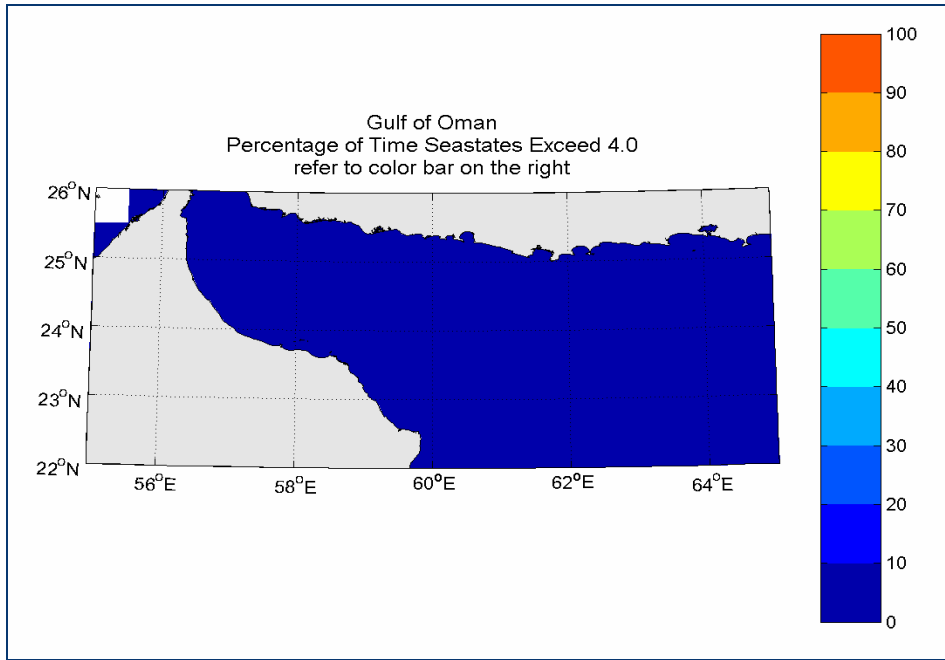
MARINE BEAUFORT SCALE

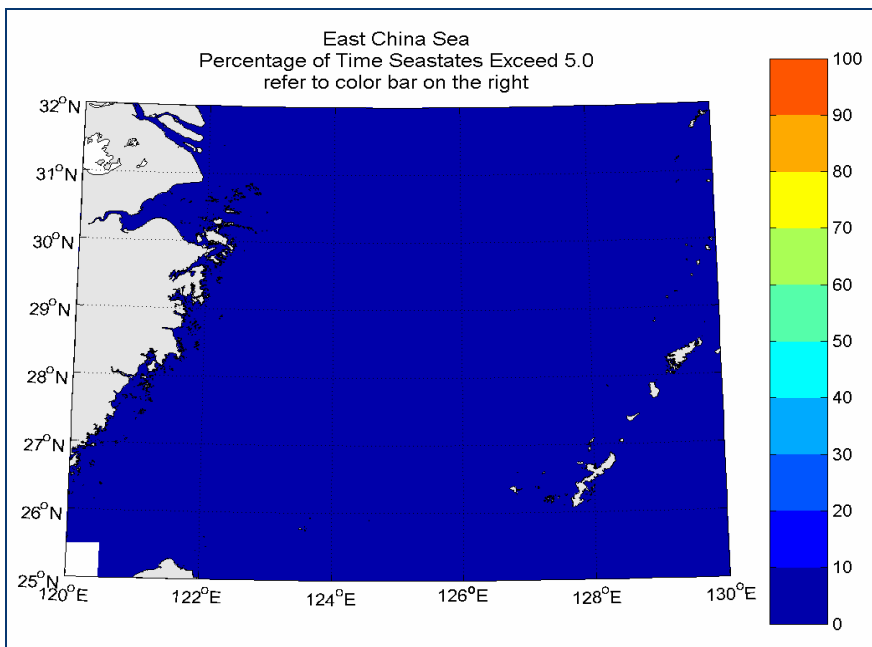
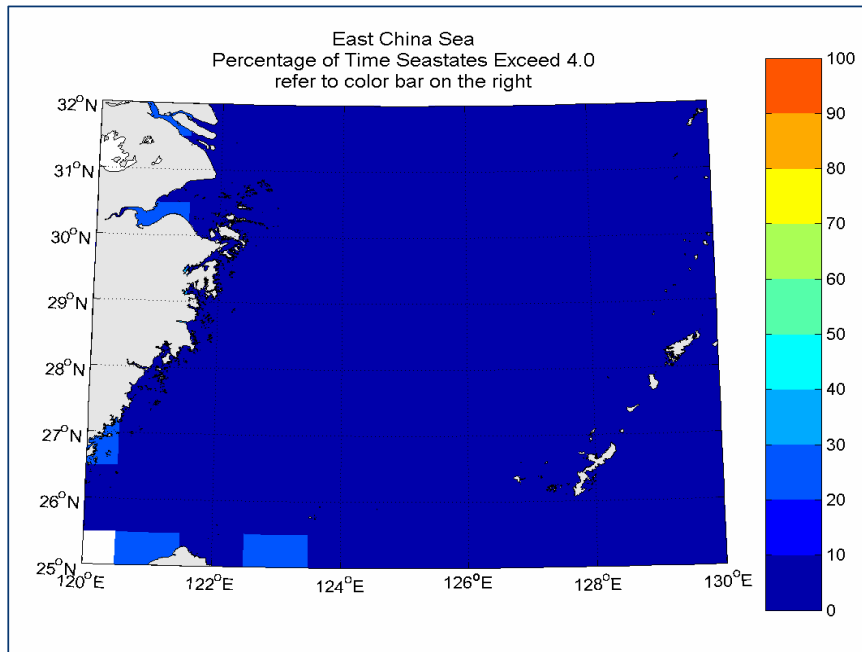
The Beaufort scale was originally developed in 1805 by Sir Francis Beaufort as a system for estimating wind strengths without the use of instruments. It is currently still in use for this same purpose as well as to tie together various components of weather (wind strength, sea state, observable effects) into a unified picture.

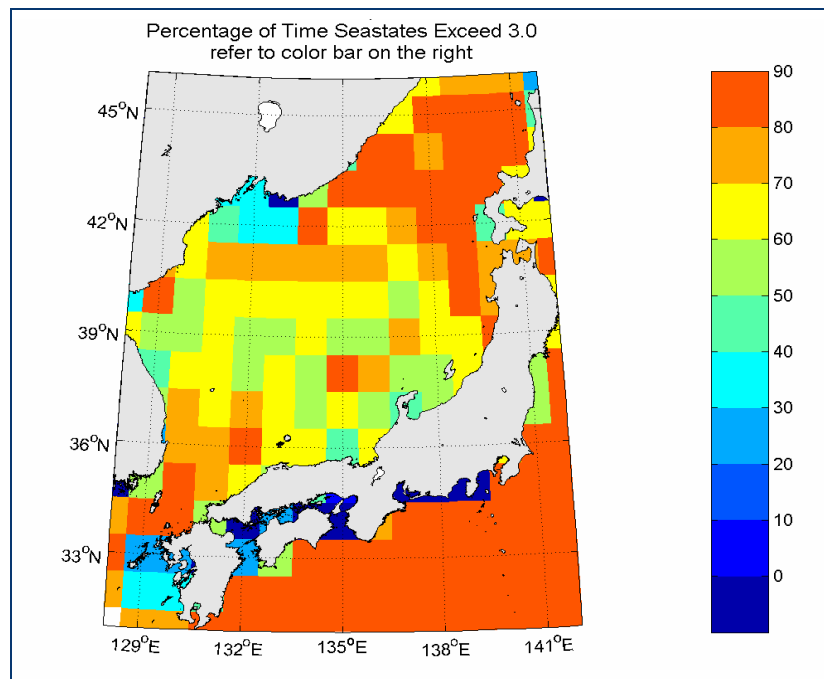
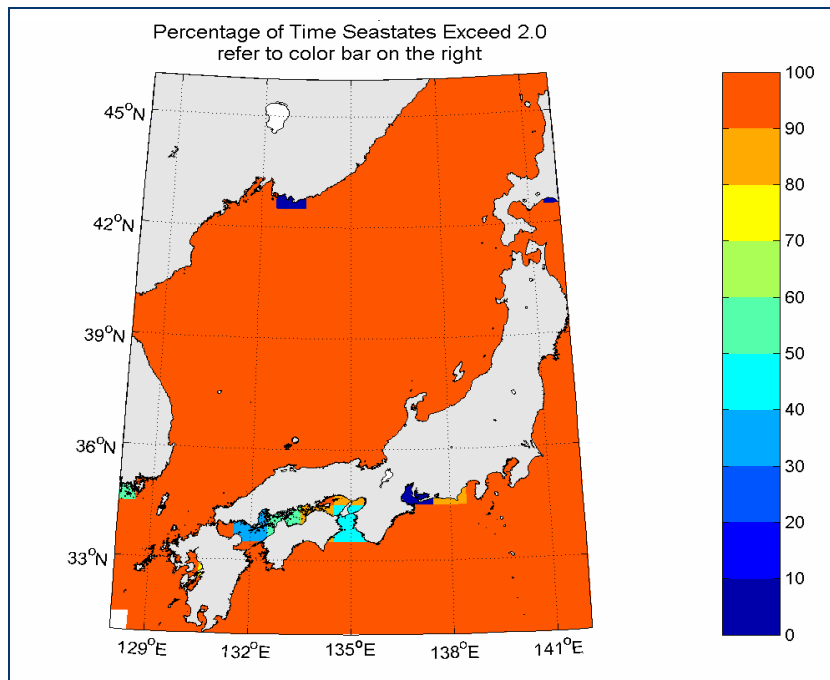
Force	Speed		Marine Conditions
	(knots)	(mph)	
0	<1	<1	Calm, sea like a mirror.
1	1-3	1-3	Light air, ripples only.
2	4-6	4-7	Light breeze, small wavelets (0.2m). Crests have a glassy appearance.
3	7-10	8-12	Gentle breeze, large wavelets (0.6m), crests begin to break.
4	11-16	13-18	Moderate breeze, small waves (1m), some white horses.
5	17-21	19-24	Fresh breeze, moderate waves (1.8m), many white horses.
6	22-27	25-31	Strong breeze, large waves (3m), probably some spray.
7	28-33	32-38	Near gale, mounting sea (4m) with foam blown in streaks downwind.
8	34-40	39-46	Gale, moderately high waves (5.5m), crests break into spindrift.
9	41-47	47-54	Strong gale, high waves (7m), dense foam, visibility affected.
10	48-55	55-63	Storm, very high waves (9m), heavy sea roll, visibility impaired. Surface generally white.
11	56-63	64-73	Violent storm, exceptionally high waves (11m), visibility poor.
12	64+	74+	Hurricane, 14m waves, air filled with foam and spray, visibility bad.

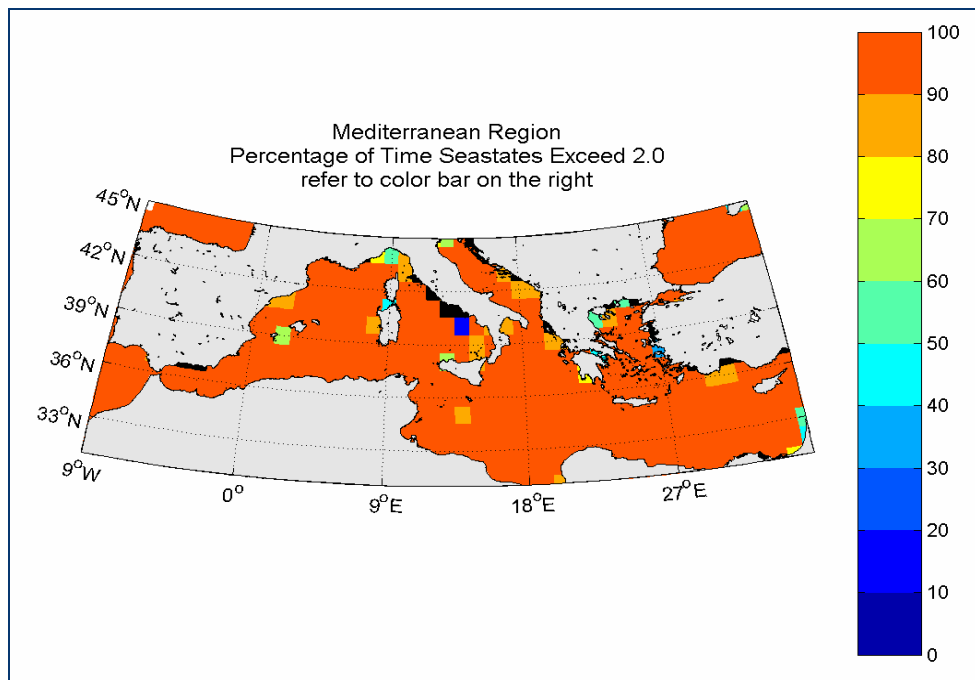
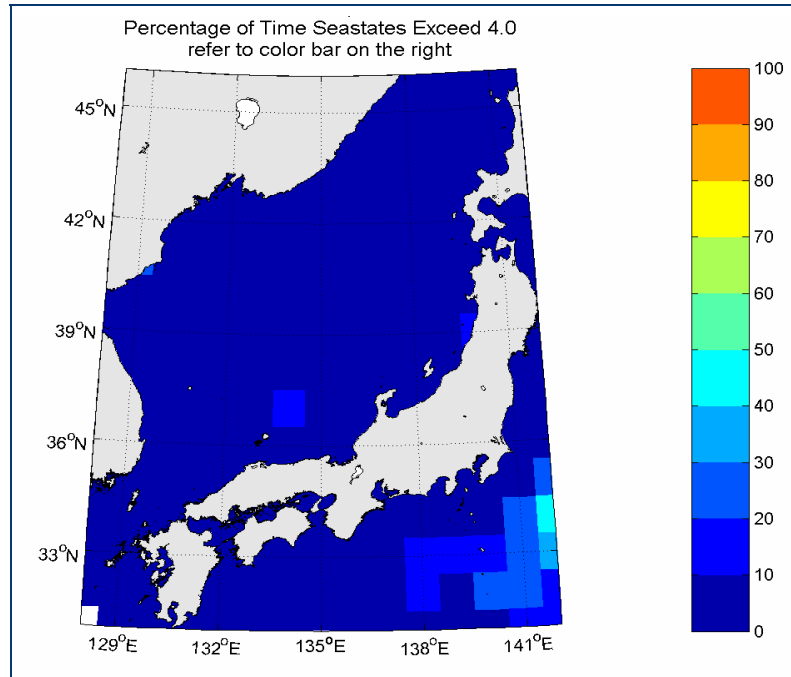
ref: <http://www.ncdc.noaa.gov/ol/climate/conversion/beaufortsea.html> (National Climatic Data Center, NOAA)

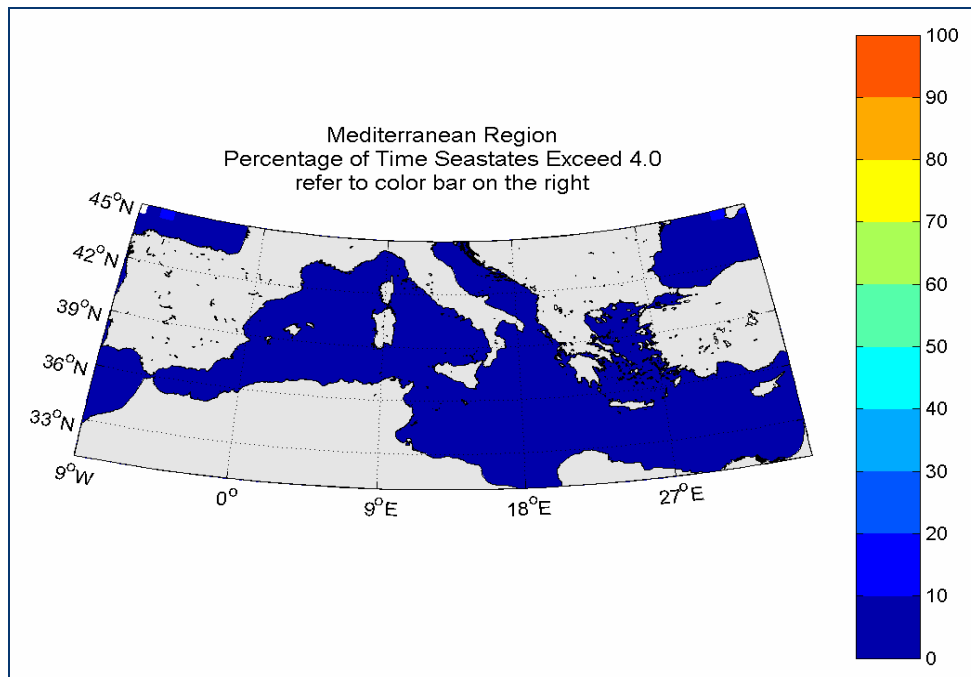
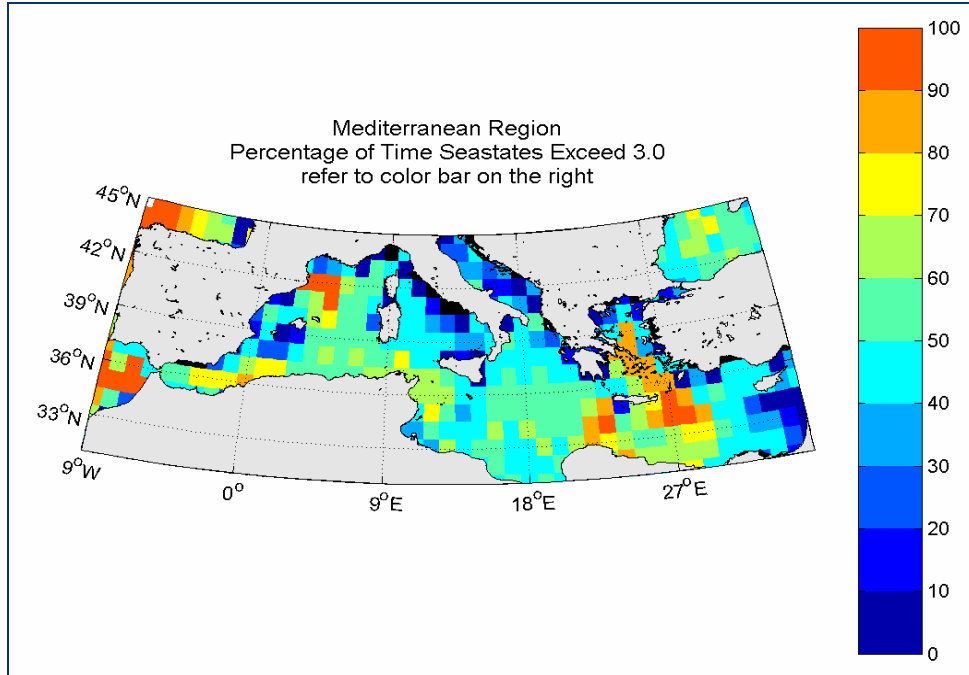












APPENDIX G: GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AAAV	Advanced Amphibious Assault Vehicle
ACE	Aviation Combat Element
APOD	Air Port of Disembarkation
ARG	Amphibious Ready Group
ATF	Amphibious Task Force
CLF	Combat Logistics Force
CONOPS	Concept of Operations
CONUS	Continental United States
CSG	Carrier Strike Group
CVBG	Carrier Battle Group
ESG	Expeditionary Strike Group
GCE	Ground Combat Element
GPS	Global Positioning System
HULA	Hybrid Ultra Large Aircraft
ISR	Intelligence, Surveillance and Reconnaissance
ITV	In-Transit Visibility
JCS	Joint Chiefs of Staff
JFCOM	Joint Forces Command
JLOTS	Joint Logistics Over-The-Shore

JMOB	Joint Mobile Offshore Base
JOA	Joint Operations Area
JTAV	Joint Total Asset Visibility
LAV	Light Amphibious Vehicle
LCAC	Landing Craft Air Cushion
LCS	Littoral Combat Ship
LCU	Landing Craft Utility
LCU(R)	Landing Craft Utility (Redesign)
LHA	Landing Helicopter Amphibious
LHA(R)	Landing Helicopter Amphibious (Redesign)
LHD	Landing Helicopter Dock
MEB	Marine Expeditionary Brigade
MEU(SOC)	Marine Expeditionary Unit Special Operations Capable
MOB	Mobile Offshore Base
MPF	Maritime Prepositioning Force
MPF(F)	Maritime Prepositioning Force (Future)
MPG	Maritime Prepositioning Group
MPS	Maritime Prepositioning Ship
NEO	Noncombatant Evacuation Operations
NSFR	Naval Surface Fire Support
QDR	Quadrennial Defense Review
RSOI	Reception, Staging, Onward Movement and Integration
SPOD	Sea Port of Disembarkation
STOM	Ship-to-Objective Maneuver
SWATH	Small Water-Plane Area Twin-Hull

TEU	Twenty-foot Equivalent Unit
TSV/HSV	Theater/High Speed Vessel
UAV	Unmanned Aerial Vehicle
VTOL	Vertical Take-off and Landing
WMD	Weapons of Mass Destruction

