Amphibious Operations in the 21st Century

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UNITED STATES MARINE CORPS
Commanding General, Marine Corps Combat Development Command
Deputy Commandant for Combat Development and Integration

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Foreword

Amphibious Operations in the 21st Century has an ambitious purpose: inspire an intellectual renaissance in amphibious thinking. It is intended as a framework for examining the purposes, methods, and means of bridging the division between sea and land in the current security era. It provides both a way to think about the application of current amphibious capabilities and considerations for developing future capabilities. It is designed for use by our operating forces, our educators and trainers, and our force developers.

Given its broad purpose and scope, this document deviates from our standard convention for writing Service concepts, in that it recaps pertinent conceptual and doctrinal passages, past and present, and discusses organizational issues, doctrinal dilemmas, professional development gaps, and programmatic proposals regarding specific ships, craft, and equipment. It identifies numerous problems but does not pretend to offer comprehensive solutions. The impetus for this approach is to give the reader a baseline of information about amphibious applications, challenges and current capabilities in order to generate informed innovation.

G. J. FLYNN
Lieutenant General
U.S. Marine Corps

The United States is a maritime nation. It has always, and always will rely upon the seas for commerce with its trading partners, for support of its friends and allies far from our own shores, for on-scene response to crises where we have no access rights or permissive facilities, and for simply representing our national interests around the world. …Today, our diplomatic interests are well served by an ability to unilaterally position a force, and then rheostatically control its employment to suit the scenario.

The point is, as history clearly shows us, that unless crises diminish significantly in the future, the forces of choice to handle them will likely continue to be aircraft carriers and amphibious forces with embarked Marines. One might also speculate, as we enter an era characterized by increasing terrorist activities, violence in drug exportation, and the use of coercive tactics such as hostage taking, that amphibious forces, with their evolving special operations capabilities, will emerge increasingly as the more logical force of choice. There is no indication whatsoever that the zeal of xenophobic radicals, messianic clerics, nihilistic students and other insurgents bent on reversing the trend of emerging, albeit weak or impoverished, democratic governments will decrease. These men of the streets and villages are better dealt with by riflemen than by supersonic aircraft – and they will be dealt with in areas where we will not likely have and will not want to establish, bases ashore.

—General Alfred M. Gray
29th Commandant of the Marine Corps
1989

Background

The *National Defense Strategy 2008* (NDS) projects that over the next twenty years physical pressures—population, resource, energy, climatic and environmental—could combine with rapid social, cultural, technological and geopolitical change to create instability and uncertainty. It calls for development of those military capabilities and capacities necessary to hedge against these conditions, along with the institutional agility and flexibility to plan early and respond effectively alongside interdepartmental, non-governmental and international partners. Among the many challenges it describes are threats to overseas access. The *Capstone Concept for Joint Operations* elaborates further on this topic:

> *Diminishing overseas access is another challenge anticipated in the future operating environment. Foreign sensitivities to U.S. military presence have steadily been increasing. Even close allies may be hesitant to grant access for a variety of reasons. Diminished access will complicate the maintenance of forward presence, a critical aspect of past and current U.S. military strategy, necessitating new approaches to responding quickly to developments around the world as well as more robust exploitation of existing U.S. advantages to operate at sea and in the air, space, and cyberspace. Assuring access to ports, airfields, foreign airspace, coastal waters and host nation support in potential commitment areas will be a challenge and will require active peacetime engagement with states in volatile areas. In war, this challenge may require forcible-entry capabilities designed to seize and maintain lodgments in the face of armed resistance.*[1]

Additionally, burgeoning littoral populations are threatened by famine, disease, limited natural resources, and natural disasters. The maritime strategy notes that:

> *The vast majority of the world's population lives within a few hundred miles of the oceans. Social instability in increasingly crowded cities, many of which exist in already unstable parts of the world, has the potential to create significant disruptions. The effects of climate change may also amplify human suffering through catastrophic storms, loss of arable lands, and coastal flooding, could lead to loss of life, involuntary migration, social instability, and regional crises.*

[1] Mullen, Admiral, Michael G., U.S. Navy, *Capstone Concept for Joint Operations*, (Washington, D.C.: Department of Defense, 15 January 2008), pp. 5-6.

> *Mass communications will highlight the drama of human suffering, and disadvantaged populations will be ever more painfully aware and less tolerant of their conditions. Extremist ideologies will become increasingly attractive to those in despair and bereft of opportunity. Criminal elements will also exploit this social instability.*[2]

These assessments are echoed in the *Marine Corps Vision and Strategy,* which estimates that today's world population will, by 2025, increase by more than 30 percent and be more heavily concentrated within the littorals. More than 60 percent of the Earth's population will live in urban areas in 2025. This portends a world dominated by complex urban littorals, where competition exists for vital resources at the same time a youthful population becomes increasingly disenfranchised.

Concurrently, there will continue to be a blurring of what was previously thought to be distinct forms of war or conflict—conventional war, irregular challenges, terrorism, and criminality—into what can be described as *hybrid* challenges. Hybrid challenges can be posed by states, proxy forces, or armed groups attempting to impose excessive political, human, and materiel costs in order to undermine their adversary's resolve and commitment. Thus, we expect opponents—operating in a highly dispersed manner—to blend different approaches, integrating all forms of weapons and technology to oppose our efforts.

All of these challenges combined illustrate the importance of being able to operate in littoral regions, which encompass the confluence of water, air, and land. The *littoral* is composed of two segments. The *seaward* portion is that area from the open ocean to the shore that must be controlled to support operations ashore. The *landward* portion is the area inland from the shore that can be supported and defended directly from the sea. This confluence is infinite in its variations. As a result, littoral operations are inherently challenging.

As described in the maritime strategy, our national security is tied to maintaining stability in these littoral areas. Amphibious capabilities will

[2] Conway, General James T., U.S. Marine Corps, Roughead, Admiral Gary, U.S. Navy, and Allen, Admiral Thad W., U.S. Coast Guard, *A Cooperative Strategy for 21st Century Seapower,* (Washington, D.C.: U.S. Government, October 2007), p. 5.

be required to bridge the seams between water, land, and air, not merely for forcible entry purposes, but as the means of further exploiting the sea as maneuver space to conduct persistent littoral operations. Countering dispersed adversaries employing hybrid tactics will require multiple, simultaneous, and distributed actions by amphibious forces throughout the littoral region. With forces continuously maneuvering between and among locations afloat and ashore, the littoral must be viewed as a single domain.

As depicted in Figure 1, in the past twenty years U.S. amphibious forces have responded to crises least one hundred and four times. These operations represent a crisis response rate more than double that of the Cold War, validating General Gray's 1989 assessment of the future. Furthermore, during the same period forward-postured amphibious forces continually conducted sea-based security cooperation with international partners. In recent years—reflecting the philosophy espoused in the maritime strategy that preventing war is as important as winning wars—sea-based forces have expanded the number and nature of their cooperative activities to include new partners in a wider variety of regions.

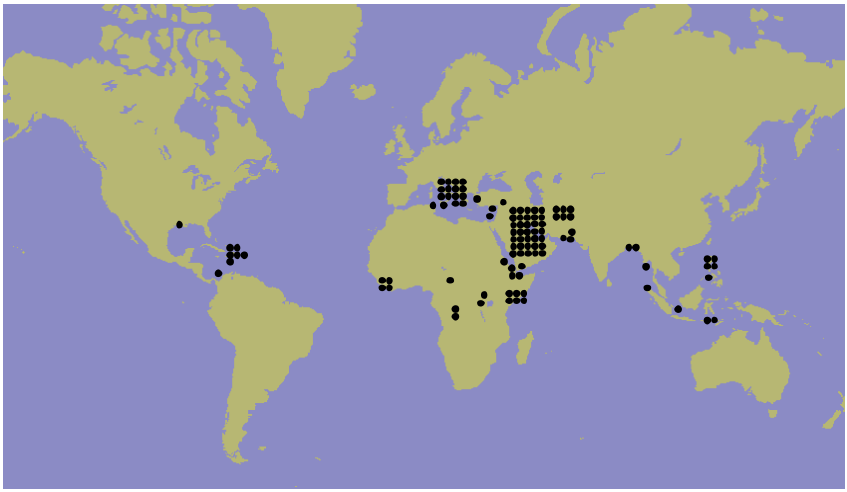

Figure 1: Post-Cold War responses to crises by U.S. amphibious forces.

In an era of declining access and strategic uncertainty, it is anticipated that this trend will continue. The geographic combatant commanders' have an increased demand for forward-postured amphibious forces capable of conducting security cooperation, regional deterrence, and crisis response. For example, their cumulative request for amphibious forces persistently postured forward in 2010 equates to four amphibious ready groups/Marine expeditionary units (ARG/MEU) plus two smaller, task-organized amphibious formations.

These demand signals reflect the applicability of amphibious forces for missions across the *range of military operations*. That range of operations extends from *military engagement, security cooperation, and deterrence* activities to *crisis response and limited contingency operations*, and if necessary, *major operations and campaigns*.[3] As a naval, expeditionary force in readiness, the Marine Corps is ***optimized for crisis response and limited contingencies***, but also contributes significant capabilities toward accomplishing missions across the range of military operations.

The applicability of amphibious forces for missions across the range of military operations is not widely understood, inasmuch as personnel engaged in joint capability development efforts often assume that "forcible entry capabilities" provide an area where the United States can accept risk. Such assumptions overlook the fact that these same capabilities also support the combatant commanders' efforts to prevent conflict and mitigate crises. They also highlight the imperative to increase common understanding of amphibious operations and their utility in the 21st century.

Broadly stated, amphibious operations employ a *landing force* embarked in ships or craft ***to accomplish any one of a number of assigned missions.*** These missions may be conducted in permissive, uncertain, or hostile environments across the range of military operations. A *landing force* is composed of Marine Corps or Army forces task-organized to conduct amphibious operations, while an *amphibious task force* is composed of Navy forces task-organized for the same purpose. An *amphibious force* is a landing force and an amphibious task force,

[3] For a full description of the range of military operations, see Joint Publication 1, *Doctrine for the Armed Forces of the United States*, pages I-15 to I-17.

together with other forces that are trained, organized, and equipped for amphibious operations.

Recent history, the strategic environment, and the maritime strategy all imply that individual naval platforms, forward deployed and globally distributed, must be capable of more diverse, smaller-scale amphibious missions while retaining the ability to re-aggregate for larger-scale events. These missions may include everything from steady-state security cooperation, to responding to man-made crises and natural disasters, to preemptive or punitive attacks against terrorists or other non-state adversaries and their sanctuaries, to major combat operations versus nation-states. Based on the foregoing, we can expect to conduct the following types of amphibious operations, presented in the order of likelihood:

- ***Amphibious Engagement and Crisis Response.*** A type of amphibious operation which contributes to conflict prevention or crisis mitigation. These may include operations such as security cooperation, foreign humanitarian assistance, civil support, noncombatant evacuations, peace operations, recovery operations, or disaster relief.[4]

- ***Amphibious Raid.*** A type of amphibious operation involving a swift incursion into or a temporary occupation of an objective, followed by a planned withdrawal.

- ***Amphibious Assault.*** A type of amphibious operation that involves the establishment of a landing force on a hostile or potentially hostile shore.

- ***Amphibious Withdrawal.*** A type of amphibious operation involving the extraction of forces by sea in ships or craft from a hostile or potentially hostile shore.

[4] Current joint doctrine labels this category "Other Amphibious Operations." As part of the revision to Joint Publication 3-02, *Joint Doctrine for Amphibious Operations*, the Marine Corps has proposed replacing that term with "Amphibious Engagement and Crisis Response."

- ***Amphibious Demonstration.*** A type of amphibious operation conducted for the purpose of deceiving the enemy by a show of force with the expectation of deluding the enemy into a course of action unfavorable to him.

The various types of amphibious operations have applicability for a variety of missions across the range of military operations. For example, a withdrawal could involve the evacuation of non-state actors within the context of peace operations, as happened with the removal of the Palestine Liberation Organization from Lebanon in 1982. Alternatively, a withdrawal could involve the evacuation of friendly forces within the context of a major war, as happened at Hungnam, Korea, in 1950. A demonstration could involve a show of force in support of United Nations' sanctions, as happened during Operation RESTORE DEMOCRACY in 1998. A demonstration could also be integral to the scheme of maneuver for a large-scale offensive action, as during Operation DESERT STORM in 1991.

Given the strategic landscape and the proven utility of amphibious forces, the Navy and Marine Corps have identified the need to increase amphibious capability, capacity, and expertise in order to prevent conflict and prevail in combat.

Description of the Military Problem

The role of amphibious forces in diverse operations—from security cooperation to crisis response to major combat—is not well understood. Too often, "amphibious operations" are thought of purely in terms of "forcible entry." This lack of understanding has contributed to a misperception that forcible entry is the only yardstick by which the requirements for amphibious capability and capacity are measured. As a result, U.S. amphibious expertise and key enabling capabilities have been in decline since the end of the Cold War.

This assessment may appear counter-intuitive, given the upsurge in the frequency of amphibious operations illustrated in Figure 1. A more detailed examination of those events, however, reveals that seventy-six of them were ARG/MEU operations, meaning that they were conducted by a limited portion of the Navy-Marine Corps team which had the

benefit of extensive work-up cycles, well-refined embarkation plans, and highly developed standard operating procedures. The balance of Marine Corps forces has been focused on other global commitments, particularly training for and participating in prolonged operations ashore in Iraq and Afghanistan. The ability to conduct amphibious operations with task-organized forces small or large—beyond the limited number of ARG/MEUs currently being rotationally deployed—has atrophied.

For example, company level amphibious training opportunities, which were once the norm, are now the rare exception. Another example is the suspension of the Basic School Landing Exercise (BASCOLEX) for newly commissioned Marine lieutenants from 2001 to 2008. Due to finite training time being consumed by the logical focus on counterinsurgency, the current generation of small unit leaders has not been afforded the opportunity to gain amphibious experience and expertise. Perhaps more importantly, their limited service aboard ship has diminished the chance to forge working relationships with their counterparts in the Navy, especially at the company grade/junior officer and senior staff non-commissioned officer/chief petty officer levels. This lack of interaction has undermined mutual understanding of the Naval Service as a whole, a key facet of professional development.

Additionally, organizational changes have impacted the ability to plan and execute amphibious operations. The Navy has increased the size of, and the Marine Corps has created, their respective Service components within U.S. Special Operations Command. These components are not, however, focused on amphibious reconnaissance. Additionally, many of the Marines assigned to the Marine Corps Special Operations Command were drawn from reconnaissance units. This practice diminished the amphibious reconnaissance expertise resident within those units, a problem now being addressed through their reconstitution. Amphibious command and staff expertise at echelons above the ARG/MEU has also diminished. In the 1990's the Marine Corps disestablished standing Marine Expeditionary Brigade (MEB) headquarters in order to re-allocate personnel to the numerous joint and component headquarters created as a result of the Goldwater-Nichols Department of Defense Reorganization Act of 1986. In 2006 the Navy disestablished the standing Amphibious Group (PHIBGRU) headquarters to re-direct manpower elsewhere, furthering the trend begun in 1975 when the fleets'

Amphibious, Mine, and Service forces were merged with the Cruiser-Destroyer Forces to form the Naval Surface Forces type commands.[5] The unintended consequence of these "economies" was the loss of amphibious expertise, working relationships, and program advocacy which had formerly been generated through the habitual pairing of Marine air-ground task force (MAGTF) and Navy headquarters at higher echelons of command.

The lack of effective program advocacy has contributed to the degradation of some key materiel capabilities essential to successful amphibious operations, especially in uncertain or hostile environments. Advances in anti-access technology have exacerbated many of these challenges. The proliferation of anti-ship cruise missiles (ASCM), for example, has created a requirement for the capability to initiate amphibious operations from over the horizon (OTH). Other key capabilities which require attention include mine countermeasures, naval surface fire support, and a complementary family of ships, surface connectors,[6] landing craft and landing vehicles.

Furthermore, for more than a decade the Marine Corps has fielded vehicles and equipment optimized for extended combat operations ashore, largely unchecked by embarkation considerations, which has exacerbated existing amphibious lift shortfalls. This issue has become so extreme that in recent years the five established embarkation planning factors—troop berthing, vehicle space (in square feet), cargo space (in cubic feet), aircraft deck spots, and landing craft, air-cushioned (LCAC) spots—have been trumped by a previously unforeseen sixth factor: weight. The acquisition of an increased number of vehicles of all types, to include mine resistant vehicles, as well as larger assault support aircraft, has increased the weight problem exponentially.

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[5] U.S. Navy forces are organized under type commanders who are responsible for type-specific training and materiel readiness of units preparatory for assignment to task forces for integrated training and operational employment. Prior to the merger there were separate Amphibious, Mine, Service, and Cruiser-Destroyer type commands in both the Atlantic and Pacific. There are currently three major type commands in both the Atlantic and Pacific: Naval Surface Force, Naval Submarine Force, and Naval Air Force.

[6] Although not an approved doctrinal term, "connectors" is commonly used to describe those air and surface platforms used to shuttle personnel and resources between bases, afloat platforms, and locations ashore.

The Central Idea

The Marine Corps, in partnership with the Navy, will revitalize amphibious capabilities, capacities, and expertise in order to meet the instability and uncertainty challenges of the 21st century.

The ideas espoused in, and subsequently evolved from, *Operational Maneuver From the Sea* (OMFTS) will provide the conceptual foundation for exploring the non-materiel and materiel initiatives which will ***expand the operational reach and flexibility of amphibious forces to conduct the range of military operations.***

The Marine Corps is a naval, expeditionary force in readiness. The associated mindset and culture is embodied in our core competencies, which articulate *what we do*. The Commandant has championed a comprehensive restoration of amphibious capability, capacity, and institutional expertise. This restoration will allow amphibious forces to proactively address future security challenges, respond to crisis, and prevail in conflict. While this effort will involve internal initiatives regarding the way in which Marines are organized, trained, and equipped, the preponderance of this work must be undertaken in full partnership with the Navy and, in some instances, with the wider joint community. It must address both non-materiel and materiel force development issues, which will involve closely inter-related revisions to doctrine, organization, training, and education.

The OMFTS concept published by the Marine Corps in 1996 espoused the advantages of projecting landing forces directly from the sea to operational objectives inland. It used the 1992 relief effort in Somalia, which required a landing and build-up in Mogadishu in preparation for subsequent humanitarian efforts inland, as a basis for comparison with the potential for direct delivery of "maneuver welfare." OMFTS also cited the 1950 amphibious assault at Inchon—in effect an operational-level turning movement which resulted in the liberation of Seoul and isolation of enemy forces to the south—as a classic example of applying maneuver warfare from the sea.

The Somalia comparison illustrated both the applicability of OMFTS across the range of military operations and the idea that "Seabasing will

free Marines from the need to set up facilities ashore…" By performing command and control, fires, and logistics functions afloat, fewer personnel and resources would need to be transported ashore and amphibious flexibility, tempo and unpredictability would be enhanced, permitting the landing force to maneuver directly from the sea to inland objectives—an action now commonly referred to as ship-to-objective maneuver (STOM).

The concept emphasized that, "OMFTS is not limited to the high end of the spectrum of conflict. Indeed, in a world where war will be made in many different ways, the very notion of 'conventional' warfare is likely to fall out of use. For that reason, the techniques of OMFTS must be of use in a wide variety of situations, ranging from humanitarian relief to a high-stakes struggle against a rising superpower."

Most significantly, OMFTS offered a *substantially different way of thinking about amphibious operations* made possible by U.S. naval superiority. During the Central Pacific campaign in World War II the existence of a highly capable enemy fleet provided the key driver for the conduct of amphibious operations. The object was to deliver a self-sufficient landing force ashore as rapidly as possible so that the U.S. fleet would be free to maneuver against an enemy fleet's expected counterattack. In a post-Cold War era without an opposing fleet threat, the "deliver and depart" approach was no longer required. The U.S. fleet was free to maneuver or loiter at sea, and project and sustain forces from the sea, as desired. Threats to the fleet now came largely in the form of littoral anti-access defenses. OMFTS has significantly influenced numerous follow-on naval documents, to include *Marine Corps Operating Concepts for a Changing Security Environment*, and *A Cooperative Strategy for 21st Century Seapower* (the maritime strategy).

The strategic concept articulated in the maritime strategy—using the sea as maneuver space to overcome impediments to access—reflects the OMFTS pedigree. Although the maritime strategy does not use the term, its content clearly makes the case for seabasing. Seabasing is a naval capability that provides joint force commanders with the ability to conduct selected functions and tasks at sea without reliance on infrastructure ashore. It is a concept for employing a variety of platforms, versus a specific type of platform.

Additionally, the maritime strategy expands upon the ideas espoused in OMFTS by using the sea as maneuver space for proactive activities which will contribute to conflict prevention. The use of naval forces, such as special purpose (SP) MAGTFs focused on security cooperation, to conduct highly distributed, sea-based operations, exemplify this idea.

The Naval Service is exploring a number of initiatives which will further improve our capabilities, as well as enhance the ability of our joint, multinational, and interagency partners to use the sea as maneuver space. Building upon the foundation provided by amphibious ships, aircraft carriers, and military sealift ships, ongoing initiatives include the development of littoral combat ships (LCS), high-speed inter- and intra-theater connectors, enhanced connectors, maritime prepositioning capabilities that allow for assembly and projection of forces at and from the sea using both vertical and surface means, and integrated naval logistics. These initiatives—as well as others yet to be envisioned—will be employed in combination to enhance access by reducing the joint force's reliance on ports and airfields in the operational area.

This exploration and innovation must be informed by likely employment scenarios for amphibious forces. In the 1920s and '30s the Navy and Marine Corps had a well defined scenario, to include a clearly defined adversary and operating environment, to guide their intellectual effort. Today's Sailors and Marines are presented with a much more complex security environment, with multiple adversaries and scenarios both real and potential. In general, however, amphibious operations will likely be planned and executed based on one of three operating environments—permissive, uncertain, or hostile. Each of the three operating environments and the strategic context are described below in order to provide a framework for further study.

Permissive Environment

A permissive environment is one in which host country military and law enforcement agencies have control as well as the intent and capability to assist operations that a unit intends to conduct.

Forward postured ARG/MEUs routinely conduct a variety of amphibious assistance operations in permissive environments. The capabilities

which allow an amphibious task force to deliver and support a landing force on a hostile shore are the same capabilities that allow them to overcome limited or damaged local infrastructure, while also providing a diplomatically discrete alternative to basing U.S. forces overseas. Command and control suites, flight decks, well decks, vertical and surface connectors, medical facilities, and carrying capacity allow amphibious forces to conduct sea-based security cooperation, build partnerships, respond to disasters and, when necessary, facilitate the introduction of additional naval, joint, or multinational capabilities, as well as interagency, international, or non-governmental organizations.

For these reasons, the combatant commanders' demand for forward postured ARG/MEUs greatly exceeds likely future capacity. These shortfalls may be offset by disaggregating ARG/MEUs to conduct distributed operations, or though the episodic deployment of global fleet stations (GFS),[7] with embarked SP MAGTFs or other Marine Corps forces task-organized to conduct missions such as security cooperation and humanitarian assistance.

The employment of a disaggregated ARG/MEU or a GFS will require thorough pre-deployment planning and organization. In each case, a robust mission analysis will be necessary to identify the appropriate capabilities, task organization, and embarkation plan. For disaggregated ARG/MEU operations, the MEU capability set may not change substantially beyond some increased redundancy with respect to command and control and intelligence functions. Embarkation plans, however, may require significant adjustment in order to distribute MEU capabilities throughout the ARG in a manner which will support disaggregated employment. Embarking the capabilities of a MEU normally requires three ships, an amphibious assault ship (LHA/LHD), an amphibious transport, dock (LPD), and a landing ship, dock (LSD). In those future cases where the LHA may not contain a well deck, the ARG composition must be altered to ensure adequate well deck, vehicle square, and connector capacity. Embarkation plans must give due consideration to merging the inherent capabilities of each ship with select MEU capabilities in order to accomplish likely disaggregated missions.

[7] The *Global Fleet Station Concept of Operations* defines GFS as "a highly visible, positively engaged, persistent sea base of operations from which to interact with partner nation military and civilian populations and the global maritime community."

GFS deployments will call for determination of an appropriate "mother ship" (or ships), surface and air connectors, and embarked capabilities based on the nature of the planned missions, partner-nation needs, and regional diplomatic concerns. While several different platforms—such as joint high-speed vessels (JHSV), Coast Guard cutters, maritime prepositioning ships, and hospital ships—have been involved in the initial GFS deployments, the characteristics of amphibious ships have made them an especially suitable platform for this role. These characteristics include the ability to operate near shore and provide sufficient space for personnel, equipment, and supplies, as well as the ability to carry, launch, and recover surface and/or vertical connectors. Given the permissive environment, the primary criteria for connectors assigned to GFS will likely be carrying capacity, versus speed or defensive protection. Similarly, embarked capabilities will likely include mobile training teams, engineers, medical personnel, and other logistics units—as well as interagency representatives and international relief organizations and supplies—versus combat units.

When conducting operations in a permissive environment, personnel and equipment going ashore may notionally be considered a "landing force" but are not normally referred to as such due to the cooperative nature of their missions. They are, however, likely to be organized into one or more *forward liaisons* and some number of teams organized by *function* or *location of employment*, as appropriate to the purpose of the operation.

Uncertain Environment

An uncertain environment is one in which host government forces, whether opposed to or receptive to operations that a unit intends to conduct, do not have totally effective control of the territory and population in the intended operational area.

Forward deployed ARG/MEUs have frequently conducted a number of amphibious crisis response operations, such as noncombatant evacuation or embassy reinforcement, in uncertain environments. Occasionally, they have been called upon to aggregate with additional forces to conduct larger missions, such as the 1995 amphibious withdrawal of

United Nations' forces from Somalia. Similar applications of amphibious capability can be anticipated in the future.

Additionally, in the 21st century an increased number of ungoverned or under-governed areas throughout the world are being exploited as safe havens by terrorists, weapons traffickers, pirates, and other criminal elements. Amphibious forces are increasingly likely to be tasked with counterterrorism, counter-proliferation, and counter-piracy missions. These will likely involve amphibious raids conducted for the purposes of: destroying terrorists and their sanctuaries; capturing pirates or other criminals and seizing contraband; rescuing hostages; or securing, safeguarding and removing materiel, to include weapons of mass destruction. Additionally, amphibious forces may also be committed to more extensive, longer-duration missions in uncertain environments, such as peace operations or large-scale crisis response.

The various missions likely to be conducted in an uncertain environment may be performed by a MEB embarked aboard amphibious ships, by an ARG/MEU, by disaggregated portions of an ARG/MEU, by an SP MAGTF embarked in one or more amphibious ships, or by other task-organized Navy-Marine Corps forces operating from a variety of vessels. These vessels might include surface combatants or LCS adapted to launch and recover assault support aircraft and/or landing craft.

Operations in an uncertain environment will be conducted with the expectation of armed opposition, but are likely to be subject to restrictive rules of engagement which will drive planning and execution. Amphibious forces will likely be prohibited from preemptive kinetic attacks against potential adversaries. While a fully integrated anti-access defense is unlikely to be present, potential adversaries—including non-state actors—may still possess sophisticated and lethal anti-access weapons. During the 2006 noncombatant evacuation operations in Lebanon, for example, international naval forces were not threatened by an integrated system of submarines, minefields, coastal artillery and air defense weapons, but they were exposed to potential, random attack by ASCMs and hand-held anti-air missiles. Amphibious forces will therefore be forced to rely on a combination of OTH operations, improved ship-board defenses, connector speed and agility, and highly responsive counter-fire. Information operations, to include deception,

psychological operations, and the non-kinetic neutralization of potential adversaries' command and control systems, will likely be required.

When conducting operations in an uncertain environment, the landing force will normally be organized into a number of elements. These may include a *forward command element* to provide on-scene command and control, to include direct liaison with State Department personnel when required, as well as a *security element* whose job is to isolate the objective area from external interference or attack. Amphibious raids will include an *assault element* tasked to destroy, capture, rescue or recover the intended target. A *support element* may be established for a number of purposes; in a raid it might be tasked to provide direct fire for the assault force, while in a noncombatant evacuation it might provide landing zone control or assist State Department personnel in processing evacuees.

Hostile Environment

A hostile environment is one in which hostile forces have control as well as the intent and capability to effectively oppose or react to the operations a unit intends to conduct.

The most common mission for amphibious forces in a hostile environment will involve amphibious assaults, although withdrawals, demonstrations, and raids can also be expected as part of the joint campaign. Regardless of the size or nature of the mission, the organization, capabilities, and techniques required to conduct large-scale amphibious assaults provide the basis for adaptation to conduct all other types of amphibious operations in a hostile environment. Large-scale amphibious assault operations will require the broad range of naval, joint, and interagency capabilities necessary to establish local sea control and project power ashore. Included among them are the ships, aircraft and surface platforms required to transport, land, and sustain a MEB or Marine expeditionary force (MEF)-sized landing force, which will normally be transported and employed in four echelons: an *advance force*, an *assault echelon*, a *rapid reinforcement echelon*, and an *assault follow-on echelon*.

An *advance force* is currently defined as a task-organized element of the amphibious force which precedes the main body to the objective area.[8] Its function is to prepare the objective for the main assault by conducting operations such as reconnaissance, seizure of supporting positions, minesweeping, preliminary bombardment, underwater demolitions, and air support. In light of changes in joint force doctrine, organization, and capabilities, the advance force may need to be redefined as a joint, versus naval, task organization. Amphibious ships, surface combatants, LCS, submarines, and a variety of aircraft and water craft may be employed to deliver and/or recover those portions of the advance force operating inshore or ashore, often under clandestine conditions. Upon arrival of the main body in the objective area, the advance force is usually disestablished and forces revert to the landing force, amphibious task force, or other designated joint, Service, or functional commands.

An *assault echelon* is comprised of tailored units and aircraft assigned to conduct the initial assault on the operational area. For MEF operations, the assault echelons of two MEBs will be embarked in amphibious ships to conduct STOM. By shifting a portion of their vehicles and cargo to follow-on shipping, the assault echelon of each MEB can be accommodated on seventeen ships, at least five of which must be LHA/LHD. Given the widespread availability of first-generation ASCMs, amphibious task forces must, at least initially, remain OTH in order to negate the effectiveness of those weapons. Amphibious forces must therefore employ a complementary mix of vertical and surface platforms which will allow them to initiate the assault from OTH and then sequentially close with the shore, as enemy defenses are collapsed, in order to rapidly build up combat power. These platforms may include various combinations of vertical lift aircraft and amphibious vehicles capable of delivering Marines directly to inland objectives, as well as an assortment of ships and craft capable of rapid near-shore or beach off-load of armored, mechanized or motorized vehicles for subsequent overland maneuver.

[8] Joint doctrine is contradictory regarding the definition of "advance force." Chapter XIII of JP 3-02, *Joint Doctrine for Amphibious Operations*, specifically states that advance force operations are conducted by "a task-organized element of the amphibious force…," which is the definition used above. However, JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, defines advance force more narrowly as "A temporary organization within the amphibious task force…"

The *rapid reinforcement* echelon is composed of a third MEB equivalent and select joint or multinational forces which can be assembled and projected without reliance of ports or airfields in the objective area via Maritime Prepositioning Force (Future) (MPF(F)) ships. Platform interfaces aboard the MPF(F) ships will be compatible with the family of assault echelon vertical and surface platforms, allowing great flexibility in conducting arrival and assembly operations at sea, and selectively offloading personnel and materiel in order to reinforce the assault echelon at the desired time and place. MPF(F) ships will include: aviation capable ships which can support tilt-rotor aircraft and helicopters; auxiliary cargo and ammunition ships which will be capable of selective offload; large, medium-speed, "roll-on/roll-off" ships which will be capable of transferring vehicles to surface connectors for transit ashore; and mobile landing platforms which will provide "float-on/float-off" capability for additional amphibious vehicles and landing craft.

The *assault follow-on echelon* is composed of the assault troops, vehicles, aircraft, equipment, and supplies that, though not needed to initiate the assault, are required to support and sustain the assault. In order to accomplish its purpose, it is normally required in the objective area no later than five days after commencement of the assault. The assault follow-on echelon will be delivered through a combination of strategic sealift and JHSV. These ships may be offloaded: using MPF(F) ships and/or roll-on/roll-off discharge facilities as a conduit for transfer to ship-to-shore connectors; through the establishment of causeways, "Mulberries,"[9] and similar expeditionary facilities; or via captured ports.

Employing distributed maneuver from the sea for a range of military operations will require enhanced methods and means. Questions which immediately arise include: What capabilities are required? How should naval forces be organized? How are command relationships impacted by forces which rapidly—*and continuously*—maneuver throughout the seaward and landward portions of the littoral domain? The conceptual underpinnings for 21st century amphibious operations described above provide an intellectual foundation for exploring the inter-related topics of non-materiel and materiel initiatives.

[9] "Mulberries" were prefabricated artificial harbors designed by the British and towed to Normandy for use during Operation OVERLORD in 1944.

Non-Materiel Initiatives

Major Earl "Pete" Ellis wrote the seminal conceptual treatise on amphibious operations, *Advanced Base Operations in Micronesia*, in 1921. At that time the Navy and Marine Corps did not possess a single amphibious ship, landing craft, or amphibious vehicle. Sailors and Marines did not have a unified view of how to plan an amphibious operation, embark a landing force, conduct a rehearsal, move the force to an objective area, or execute the planned action.[10] They didn't have agreed-upon procedures to perform a myriad of tasks necessary to set conditions for landing and then project, support, and sustain a landing force. They didn't have agreement on command arrangements for such an operation. Initially, they didn't even have a consensus regarding the strategic necessity or feasibility of amphibious operations. What they did have was intellectual curiosity.

They applied that curiosity over the next two decades. Armed with growing recognition that amphibious capabilities would be needed versus an emerging adversary, they examined, debated, and expanded upon Ellis' ideas in professional military schools and journals. They tested and evaluated them in training exercises and experiments. They captured initial lessons learned in tentative manuals, and then tested and refined them into doctrine. When the war they anticipated finally did come, they were ready to translate Ellis ideas into materiel capabilities and—perhaps more importantly—possessed the knowledge required to use those capabilities effectively.

The lessons from that era are clear. Restoration of amphibious capability, capacity, and institutional expertise can only occur if there is an intellectual renaissance in amphibious thinking. Armed with an understanding of today's strategic environment—especially the nature of hybrid challenges and the utility of a sea-based approach for conflict prevention and crisis response—this intellectual renaissance must examine potential changes to:

[10] Planning, embarkation, rehearsal, movement, and action (PERMA) are the doctrinal phases of an amphibious operation.

- **Doctrine.** Among the many topics in need of exploration and doctrinal development, at the forefront are command arrangements, control measures, and command relationships. Throughout distant history, amphibious operations have often been complicated by unity of command issues between the commanders of land and sea forces. In 1933 the creation of the Fleet Marine Force (FMF), as a "type-like" command under the operational control of the fleet commander, reduced that problem for U.S. naval forces. Later, amphibious doctrinal developments provided further resolution by codifying the division of labor and authority between the commander, amphibious task force (CATF) and the commander, landing force (CLF). This included agreement that CATF and CLF were co-equal in planning matters and certain key decisions, as well as transition of command ashore.

  The 1986 Goldwater-Nichols Act has, however, generated fundamental changes to the doctrine for joint operations. As a result of those changes, all joint forces include Service components which have direct access and responsibilities to the joint force commander. Marine Corps and Navy component commanders are therefore separate from and equal to each other. The joint force commander has the authority to organize forces to best accomplish the assigned mission. He may conduct operations through the Service components, functional components, or a combination of the two. The joint force commander has the authority to establish subordinate commands, assign responsibilities, establish or delegate appropriate command relationships, and establish coordinating instructions for the Service and/or functional component commanders. Given the foregoing, the relationship between FMF and fleet commanders has become unclear. Joint doctrine has also removed formal title and command relationship connotations from the terms CATF and CLF. The sea-based approach to operations, whereby it may not be desirable for the CLF to transition command ashore, further complicates matters. Additionally, joint force commanders normally organize their forces to include air and special operations functional components which possess many of the capabilities necessary to set conditions for landing.

Informed by these changes to public law, joint doctrine and current practice, the Navy and Marine Corps are conducting a comprehensive examination of command arrangements and command relationship options. This examination should consider the roles of the joint force commander and the various functional commanders, including the potential utility of establishing a littoral functional component commander, without discarding time-tested principles such as co-equality in planning matters and decisions. Closely related to the examination of the division of labor among functional components is the establishment of appropriate control measures. A review of permissive and restrictive control measures may be required in order to ensure that friendly forces can effectively fire and maneuver while minimizing the likelihood of fratricide.

The integrated application of naval capabilities for a diverse range of missions requires a flexible approach to command arrangements. Combat experience and the test of time have proven that the cooperative spirit of "supported-supporting" helps us optimize the effectiveness of all elements of the naval force. Command relationship options include operational control, tactical control, or a support relationship as described in Joint Publication 1 and are determined by the common superior commander, or establishing authority. The type of relationship chosen by the establishing authority should be based on mission, authorities, nature and duration of the operation, force capabilities, command and control capabilities, operational environment, and recommendations from subordinate commanders.

- **Organization.** The disestablishment of several standing MAGTF and PHIB headquarters has resulted in diminished higher echelon amphibious expertise and advocacy. The relationship among the MEF commanders, the numbered fleet commanders, and the joint force maritime component commanders is unclear. These challenges are symptomatic of a larger issue, which is the loss of parallel Navy and Marine Corps commands supported by staffs with commensurate capabilities. Currently, we have standing parallel command structure only at the ARG/MEU level and even these headquarters have dissimilar staffs in terms of composition and seniority. Recently, the Navy has discontinued the use of expeditionary strike groups (ESG)

as a standard rotational deployment construct. The Navy has, however, retained standing ESG headquarters within Second, Third, and Seventh Fleets and envisions that they will perform duties that are similar to those formerly accomplished by the PHIBGRU. Currently, portions of the MEF command elements are designated to perform as MEB command elements when directed. These MEB command elements may provide viable counterparts to the ESGs if appropriately staffed. Doing so would re-establish parallel commands, promote habitual relationships, enhance mutual understanding, and provide an exercise and experiment venue so that innovation and advocacy can be institutionalized. These and other organizational initiatives must be incorporated into exercises to develop mutually beneficial working relationships, and improve overall readiness and operational effectiveness.

- **Training and Education.** As described earlier, in recent years training and education within the Marine Corps have been focused—for very good reasons—on reinvigorating "small wars" expertise. Arguably, those efforts have been quite successful and a more balanced approach, which restores some emphasis on amphibious operations, must now be implemented. In striking that balance it should be noted that the amphibious innovations of the 1920s and 1930s came at the same time Marines were conducting counterinsurgency operations in Haiti and Nicaragua, performing peacekeeping duties in China, and producing the *Small Wars Manual* at Quantico. Re-instituting BASCOLEX, re-generating small-unit amphibious training opportunities at the Expeditionary Warfare Training Groups, revising the program of instruction within professional schools to include amphibious planning scenarios and essay topics, do not have to be accomplished at the expense of irregular warfare instruction. Rather, an essential aspect of exploring 21st century amphibious operations is to refine how they may contribute to overcoming irregular challenges. These and other initiatives, to include larger joint and multinational amphibious exercises, must be pursued.

Materiel Initiatives

The OMFTS concept advocated certain capability enhancements, key among them being:

> *To move units from ships lying over the horizon to objectives lying far from the shore, we will require the capability to cross great distances, reduce the limitations imposed by terrain and weather, and, most importantly, to seamlessly transition from maneuvering at sea to maneuvering ashore and vice-versa.*

OTH operations were intended as a means of increasing operational and tactical surprise while enhancing force protection against modern anti-access threats. This idea was elaborated on in the supporting concept of *Ship-to-Objective Maneuver*, which may be considered a tactical manifestation of OMFTS, and the associated *STOM Concept of Operations*. OMFTS cautioned that:

> *There is no single answer to the many challenges that will present themselves in the future, naval forces will have to adapt as they have done throughout history to changing circumstances. For that reason, it is important that naval forces avoid a narrow definition of their capabilities.*

For several years, the Marine Corps has emphasized a triad of programs in order to improve the ability to conduct STOM through the addition of complementary OTH capabilities. These are: the expeditionary fighting vehicle (EFV), the tilt-rotor aircraft (MV-22), and the LCAC. The desire to provide a mix of vertical and surface means is well founded. Operational experience has repeatedly demonstrated that the rapid projection of combat power ashore is the key to success in all amphibious missions across the range of operations. Experience and analysis have shown that the fastest means of doing so is through a combination of vertical and surface lift.

Meanwhile, the global proliferation of anti-access weapons among both state and non-state actors has further complicated the access challenge, even for benign missions. This is exemplified by Hezbollah employing a C-802 ASCM against an Israeli warship during the Lebanon crisis in 2006, which added an additional dimension to U.S. noncombatant

evacuation operations. Such events validate the wisdom of operating, at least initially, from OTH in order to reduce ASCM effectiveness.

The emphasis on the EFV/MV-22/LCAC triad has, however, obscured the fact that other naval capabilities—extant, emerging, or potential—support amphibious operations in general and STOM in particular. There is a growing—*and erroneous*—perception that STOM cannot be accomplished without the EFV, and that both the concept and vehicle are applicable only to "high end" combat against a peer competitor, an event many believe unlikely. STOM can, if fact, be conducted without the EFV and is also applicable across a range of military operations. Absence of the EFV translates into STOM with more modest operational reach and tempo than envisioned versus no STOM at all.

As envisioned, EFV offers some significant tactical and technical advantages. Its tactical advantages in maneuver flexibility, range, operating tempo, and surprise are often not well recognized. Technical considerations, such as the ability to reduce the effectiveness of ASCMs by launching from OTH, are more readily understood. Less apparent is that the OTH capability of the EFV may be more important for operations in an uncertain environment than those in an openly hostile one. In an uncertain environment friendly rules of engagement may preclude preemptive attack of ASCM launch sites ashore, even though potential adversaries are less encumbered.

Furthermore, a small but increasing number of potential adversaries possess the latest generation ASCMs. The improved range, speed and maneuvering characteristics of these weapons cannot be defeated simply by staying beyond the horizon, meaning that improved ship-board defensive systems and preemptive neutralization of ASCM launch sites and delivery platforms will be critical to mission success.

A renewed emphasis on the ideas first espoused in OMFTS, and reinforced in the more recent documents derived from it, is in order. The advantages of sea-based maneuver to the joint force commander must be emphasized. Naval forces must understand that the situation, mission, operating environment, level of opposed access, and the results achieved from a continuous effort to defeat that opposition, will determine the organization and sequence of amphibious operations. Additionally, and

perhaps most importantly, the multi-dimensional complexity of the littorals as well as the key roles of joint command and control, joint intelligence, surveillance and reconnaissance, joint combined arms, and joint advance force operations in setting the conditions for successful amphibious operations must all be recognized and fully developed.

Navy and Marine Corps capability development efforts must heed the cautionary guidance in OMFTS to "avoid a narrow definition of their capabilities." The Naval Service must therefore continue to develop and employ a complementary mix of capabilities which can, through a combination of sequential and concurrent actions, initiate amphibious operations from OTH, collapse enemy anti-access defenses as necessary, and then conduct near-shore or beach offload of forces in order to rapidly build up combat power at the objective. Examples include:

- **Tilt-rotor aircraft.** The MV-22, which is currently entering service, will significantly increase the speed and range of vertical STOM. Employment of MV-22s in hostile environments may require the neutralization of air defenses, but will also provide the means of circumventing ASCMs, mines, and other threats to surface landing. Given the size and weight of MV-22s in relation to embarkation planning factors, as well as the limitations on internal and external lift capabilities, it is neither feasible nor desirable to procure an all tilt-rotor inventory of aircraft to conduct vertical STOM. Rather, a complementary mix of tilt-rotor aircraft and helicopters is necessary to comprehensively meet vertical lift requirements while also conforming to embarkation constraints.

- **Helicopters.** The current inventory of helicopters is capable of STOM, within range limitations. Like the MV-22, helicopters provide the means to circumvent surface challenges to access but may require neutralization of air defenses in hostile environments. They may also be employed to land forces tasked with defeating coastal defenses from the landward side and/or to secure cushion landing zones in support of surface-delivered forces. New aircraft, such as the CH-53K, will provide increased range and the ability to lift a wider array of landing force vehicles and equipment.

- **EFVs.** As described earlier, the EFV is designed to provide surface assault capability from OTH to inland objectives and increased maneuver flexibility, range, operating tempo, and surprise. The ability to conduct STOM from OTH will reduce the effectiveness of ASCMs not only in openly hostile situations, but also in the uncertain operating environment which will likely be prevalent in the future. Optimized for OTH assault and subsequent mechanized combat, EFVs could provide the ability to project significant combat power ashore. They may not, however, be particularly well-suited for stability operations or maneuver in complex terrain. The EFV therefore provides only one component of a comprehensive family of tactical vehicles which will allow landing forces to conduct a range of operations in permissive, uncertain, or hostile environments.

- **Amphibious assault vehicles (AAVs).** Current AAVs may also conduct STOM, either by embarking them aboard LCACs for high-speed delivery or by moving amphibious ships nearer to shore. The former option provides the desired maneuver flexibility, range, and surprise, but at reduced operating tempo and increased risk due to the time required for offload in secure cushion landing zones as well as the number, capability, and survivability limitations of current LCACs. Acquisition of sufficient numbers of improved landing craft or vessels capable of splashing AAVs three to six miles from shore would, however, improve the desired tempo. The latter option of closing the amphibious ships nearer to shore continues to accept the risk and limited flexibility which exist today. To diminish that risk, operations in an uncertain environment may require more aggressive rules of engagement, while operations in a hostile environment will require an increased effort to detect and neutralize both first generation and advanced ASCMs. Both environments will require improved ship-board ASCM defenses.

- **Fast landing craft.** Several nations currently operate high-speed, long-range landing craft suitable for operations from OTH, such as the Swedish CB-90. These craft may be suitable for a number of STOM scenarios, such as advance force operations, supporting attacks to securing beach landing sites or cushion landing zones for other forces, or negotiating rivers and estuaries to reach objectives inland. These craft could also have utility for sustained littoral

operations and some maritime interception operations. They can be embarked aboard a wide variety of ships, such as surface combatants, to provide additional lift options.

- **LCACs and Ship to Shore Connectors (SSCs).** Current LCACs are capable of transiting from amphibious ships and then conducting beach offload of armored, mechanized, or motorized vehicles for subsequent maneuver to inland objectives, provided coastal defenses are sufficiently neutralized. The current inventory of LCACs is both aging and numerically insufficient to meet amphibious and MPF(F) requirements. With the addition of an improved bow door/ramp system and the ability to rapidly un-gripe vehicles, it is feasible for the next generation LCAC—the SSC—to conduct near-shore offload of either current AAVs or a replacement infantry fighting vehicle possessing a limited amphibious capability. This would allow the majority of over-water transit to be conducted at high speed from OTH, and rapid offload of existing or off-the-shelf mechanized vehicles for subsequent maneuver to inland objectives.

- **Landing Craft, Utility (LCU).** LCUs have the range to operate from amphibious ships located OTH, but do so at relatively slow speeds. Their large carrying capacities make them suitable for a variety of amphibious tasks, including delivery of AAVs or other vehicles for subsequent maneuver inland, either in a permissive environment or after coastal defenses have been sufficiently neutralized. Like LCACs, they are currently not available in sufficient numbers.

- **JHSVs.** These vessels provide rapid inter and intra-theater movement of personnel and equipment. Currently, they are capable of offloading onto austere infrastructure, such as a seawall or primitive pier. During World War II, the Navy operated several hundred landing ships, tank (LST). These were ocean-going vessels which employed a bow door/ramp system to offload tracked vehicles near shore and wheeled vehicles directly onto the beach. Potentially, JHSVs could be modified to include a capability for near shore discharge of amphibious vehicles and beach offload of other vehicles similar to the original LST concept. If the characteristics of the JHSV and LST can be successfully merged, the result would be a

vessel capable of high-speed ocean transit and rapid near shore or beach offload of armored, mechanized, or motorized vehicles for subsequent maneuver to inland objectives. Near shore or beach offload of such vessels would, of course, be dependent upon sufficient neutralization of coastal defenses.

- **Transformable Craft (T-Craft).** The Office of Naval Research is exploring the potential of a vessel capable of conducting high-speed ocean transit from an intermediate support base, conducting at sea transfer of vehicles and equipment, and then transitioning through shallow water or mud-flats to conduct a "feet dry" offload beyond the high-water mark. Several T-Craft prototypes are under development and are expected to combine the ocean-going range and speed of the JHSV, with the OTH amphibious capability of an LCAC and payload greater than an LCU. While overcoming the technological challenges associated with such a vessel will be challenging, a successful T-Craft design might significantly alter amphibious methodology.

- **LCS.** Designed as fast, agile vessels, LCS can accommodate interchangeable modules for a variety of missions, such as mine warfare and anti-submarine warfare. Development of additional module options, such as fire support, berthing, command and control suites, and surface connectors, may give the LCS increased utility in a number of amphibious missions. Employed singly or as multi-ship task forces, LCS equipped with such modules could project and recover Marines conducting security cooperation, humanitarian assistance, forward liaison, and noncombatant evacuation, or reconnaissance, raids, and other advance force tasks.

- **Technologies to defeat ASCMs.** An independent study published in 2005 concluded that the global inventory of older ASCMs poses a minimal threat to the U.S. Navy, but that defensive capabilities are not keeping up with the evolution of more sophisticated systems.[11] As described above, OTH operations negate the effectiveness of the widely proliferated first generation ASCMs, but are less effective

[11] Mahnken, Thomas G., *The Cruise Missile Challenge*, (Center for Strategic and Budgetary Assessments: Washington, D.C., March 2009), p. 18.

against advanced weapons, necessitating improved capabilities to locate, neutralize, or intercept these systems. Negating the effectiveness of advanced ASCMs is a much more complex problem that will likely require a number of capabilities resident within the various components of the joint force. The Marine Corps, given its Title 10 mandate to develop landing force doctrine and capabilities in coordination with the other Services, needs to articulate the ASCM challenge sufficiently to energize development of a comprehensive joint solution.

- **Technologies to defeat mines.** The ability to locate, avoid, or when necessary clear mines from blue water through the beach zone remains a significant challenge. The Navy intends to replace the current inventory of mine warfare ships with mine countermeasure modules aboard the LCS being introduced to the fleet. Neither the existing nor emerging vessels offer a comprehensive solution, however, as they do not address mines in very shallow water (approximately 40' to 10' in depth), and the surf zone (10' to the high water mark). Currently, the Navy uses mammals and unmanned undersea vehicles in very shallow water, but these capabilities are extremely limited. The Air Force may provide a method to clear mines in the surf and beach zones by using the Joint Direct Attack Munitions (JDAM) Assault Breaching System (JABS), provided these munitions are procured in adequate numbers and sufficient targeting data can be obtained. This is another challenge which the Marine Corps must highlight sufficiently to energize development of a comprehensive joint solution.

- **Technologies to extend the range and effectiveness of naval surface fire support.** Historical analysis, as well as an examination of modern weapons systems, reveals that amphibious operations conducted under hostile or uncertain conditions must be supported by complementary air and surface fires. The ability to provide round-the-clock, all weather, sea-based fires with the necessary range, responsiveness, and effect on target remains a key requirement. The short range and small caliber of current naval guns give them limited utility, causing an over-reliance on more expensive—and weather dependent—carrier aircraft. A more diverse mix of long-range major caliber guns, smaller caliber guns,

missiles, aircraft, and unmanned aerial vehicles would provide a more holistic and operationally effective solution. A 2007 study concluded that, by re-commissioning battleships with improved gun munitions and missile systems, the desired blend of capabilities could be achieved in a cost effective way because the need to fill the Navy's current shortfall in aircraft carriers and aircraft would be eliminated.[12] The recently initiated *Joint Expeditionary Fires Analysis of Alternatives* should give due consideration to such ideas in the quest for a comprehensive solution.

Summary

While ARG/MEUs have performed superbly, U.S. amphibious expertise and key enabling capabilities have been in decline in recent years, largely because their applicability to the current security environment has not been well recognized and the press of current operations has pre-occupied our institutional focus. Working in partnership with the Navy and the other Services, where appropriate, the Marine Corps is committed to applying our present amphibious capabilities, and developing future capabilities, in order to address the strategic challenges of the 21st century.

Toward that end, this document has recounted pertinent conceptual and doctrinal ideas, operating environments, the strategic context, and specific initiatives to give the reader a baseline of information about amphibious capabilities, applications, and challenges. The purpose for doing so is to inspire an intellectual renaissance in amphibious thinking and innovation.

[12] See Welch, Colonel Shawn A., U.S. Army, *Joint and Interdependent Requirements: A Case Study in Solving the Naval Surface Fire Support Capabilities Gap*, (Joint Forces Staff College: Norfolk, VA, 17 May 2007).

If it had not been for the constant urging of the Marine Corps, the amphibious art would hardly have been developed at all.[13]

—Admiral W. H. P. Blandy
U.S. Navy (Retired)
1951

[13] Blandy, W. H. P., "Command Relations in Amphibious Warfare," (Annapolis, MD: U.S. Naval Institute Proceedings, Vol. No. 77, No. 6, June 1951), pp. 569-580. Admiral Blandy commanded Amphibious Group One for the assaults on Kwajalein, Saipan, Palau, Iwo Jima, and Okinawa.