

Naval Amphibious Capability in the 21st Century

*Strategic Opportunity
and a
Vision for Change*



Report of the
Amphibious Capabilities Working Group

27 Apr 2012

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Executive Summary

Thesis

Now, more than ever, the rapid-responsiveness, readiness, flexibility, precision and strategic mobility of maritime forces are essential to ensuring continued access and security in the global commons and the littoral regions that border them. As the Nation prepares for an uncertain future, its maritime and amphibious capabilities are essential to deterrence, building alliances, denying sanctuary, projecting influence and, when required, projecting power against increasingly lethal and asymmetric adversaries.

Rapidly evolving security and fiscal environments, however, demand corresponding changes in our forward-deployed, crisis response force to include operational thinking, concepts, education, training, capabilities, and partnerships. Increasingly more capable and irregular threats to our national interests require an integrated, multidomain approach informed by continuous innovation in naval warfighting, littoral maneuver, and amphibious operations. Amphibious capability has an aggregate utility across the range of military operations that is reflected in combatant commander demand. Approaches such as single naval battle, an integrated naval expeditionary system, broadened combined arms, and special operations integration are an effective counter to increasingly capable anti-access and area denial (A2AD) threats that seek to limit our freedom of action.

Above all, we guard against surprise and preserve our nation's readiness through vigorous professional education, training, wargaming, experimentation and exercises that integrate the naval, special operations forces (SOF), joint, interagency and multinational force. Future fights are most likely short warning, "come as you are" challenges from an irregular threat. As the joint, expeditionary force in readiness the Marine Corps, and its Navy partner, will maneuver from the sea to apply influence and power at a time and place of its choosing. In doing so, the naval team mitigates risk and sets initial conditions for the joint and interagency force.

Opportunity

The Marine Corps' and the Navy's amphibious capabilities have long played a central role in securing the global interests of a maritime nation. The increased importance of the littorals and complexity of the maritime domain demand a fundamental shift in innovation and capability development. Forward engagement and partnership building, innovation in power projection, assured littoral access, rapid response to crisis and an ability to sustain expeditionary operations from the sea are essential national capabilities. The Marine Corps has gained critical experience over the last decade in the challenges of operating in an irregular warfare environment in difficult human terrain. None of these hard-won lessons are rendered obsolete in the emerging security environment. Indeed, the naval force has a unique opportunity to integrate its vast experience in the human domain with its innate ability to gain access to the entirety of the global littorals. If naval relevance is measured in its impact on human affairs, the U.S. naval force of the 21st century stands at the threshold of a uniquely 'maritime moment' of opportunity. In a compelling historic parallel to the naval innovations of 1922-1940, the Marine Corps and Navy have the opportunity to seize this 'maritime moment.' The Amphibious Capabilities Working Group (ACWG) report identifies ready opportunities for the Marine Corps and Navy amphibious force to strengthen its partnership with the whole of the naval force, align its complementary capabilities with special operations, and improve the efficiency and effectiveness of the Marine Air-Ground Task Force (MAGTF) to operate in the littorals.

Strategic Imperative

The flexibility of Marine Corps and amphibious capabilities align them well with the security demands articulated in *Strategic Guidance for the 21st Century*. They offer a portfolio of innovative, low-cost, small footprint means for crisis response, forward engagement, direct and indirect approaches. Their utility in a wide range of missions, ability to operate without a large footprint ashore and scalability in times of crisis make them an essential tool for national decision makers or joint commanders at all levels. By design, they enable and smoothly integrate with the other elements of the joint force, enable the interagency, and are a natural partner to special operations. Where U.S. citizens, allies or interests are threatened, maritime response capabilities provide a range of rapid intervention options, tailorable to the special demands of each crisis. When conflict escalates, their ability to flexibly scale-up to the forcible entry demands of a major contingency serves as a rheostat for the application of persuasive military power. In global crisis, they respond quickly, buying time for situation development and strategic decision making. Built for war, these same naval forces can respond to humanitarian disasters, conduct noncombatant evacuations and set the conditions for enduring peace in the global commons. Their growing capabilities in cyber and information warfare expand their already significant utility into new domains. Ensuring the continued efficacy and efficiency of this essential capability builds on an already robust demand for a force that:

- *Embraces change and opportunity in the operational environment by developing Marines and Sailors with expanded expertise in the maritime domain and irregular warfare.*
- *Remains forward-deployed to provide immediate response capabilities when citizens, interests or allies are threatened, containing conflict at its lowest level through rapidity of response.*
- *Provides a small-footprint, steady-state theater presence to address the conditions of conflict, visible deterrence to prevent escalation, and a swift response when deterrence fails.*
- *Supports post-OIF/OEF strategic challenges that require immediate responsiveness, precision effects, small footprints on land, rapid scalability and combined arms that project influence and power across the air, land, maritime, cyber, space and cognitive domains.*
- *Enables and integrates a wide range of lethal and non-lethal effects with the interagency and joint force, especially special operations, providing theater shaping, and operational preparation of the environment, to create strategic decision space for national leadership.*
- *Operates comfortably in an environment where dominance is not assumed, gaining access through the multidomain capabilities of the joint force, achieving campaign objectives through a well-choreographed effort in time, space, tempo, and asymmetric force application.*
- *Provides a rheostat of discriminating response options from small-scale contingencies to major operations, augmenting the effects of precision fires with the ability to achieve effects in the human environment ashore when the mission requires (e.g. protect civilians, defend embassies, separate factions, seize critical infrastructure, conduct rescues, execute recovery operations, enable interagency actions, eliminate terrorist sanctuaries, secure weapons of mass destruction, reinforce special operations, or defeat threats).*
- *Denies sanctuaries to terrorists or proliferators of weapons of mass destruction (WMD) through theater shaping activities, deterrence, or supporting/conducting discriminating raids on sites and networks that complement, or exceed, the capacity of special operations forces.*
- *Provides air or surface response options without the requirement for an enduring presence on land, returning to sea platforms as swiftly as they arrived ashore.*
- *Supports sustained operations from the seabase or expeditionary basing, avoiding the unwanted entanglements or vulnerabilities of a large footprint ashore.*

- *Leverages forward-deployed warfighting capabilities to respond swiftly to human disaster without placing burdens on local infrastructure ashore, enabling other elements of national response.*
- *Sets initial conditions for a joint, interagency and multinational response to crises and contingencies through enhanced readiness, strategic mobility and comprehensive command and control.*

Evolving Threats

Maturing Marine Corps and amphibious capabilities to the operating demands of 21st century warfighting requires an appreciation for the threats it will likely face. While future threats are inherently unpredictable, some emerging trends are clearly discernable. Diffusion of power to a wider range of state and non-state actors increases the likelihood of local instabilities, competition for resources, and regional power struggles. New conceptions of ‘threats’, ‘access’, ‘enemies’, and power projection will become necessary as non-state actors grow in influence and states turn to proxy methods of conflict. Expanded methods of A2AD will augment military technology, and alter the calculus of gaining access in a joint campaign. The Nation’s most frequent security interventions will continue to be small scale contingencies, requiring the forward presence and readiness of its maritime crisis response force. Its most-dangerous and most-lethal interventions will require gaining access against a modern adversary, which uses its own multidomain capabilities to impede access in unconventional ways. Potential threats make preparedness for conflict across the spectrum a necessity by:

- *Seeking access to **weapons of mass destruction**.*
- *Increasing the **complexity of conflict** beyond weapons capabilities by leveraging cyber, social, informational and human environments.*
- *Directly threatening U.S. interests through **piracy**, **criminal** organizations or **terrorism**.*
- *Posing challenges in the human domain by practicing irregular warfare and struggles for political influence, thereby avoiding the standard effects of a conventional military force.*
- *Using **non-state proxies** to strike U.S. interests while avoiding the capabilities of joint fires.*
- *Countering local U.S. interests to gain **regional dominance** or domestic political influence.*
- ***Threatening allied or partner states** through direct provocation or by fomenting instability.*
- *Developing **advanced technology** A2AD capabilities.*
- ***Proliferating modern weapons** technology to a broader range of state and non-state enemies, increasing their lethality, range and accuracy against U.S. joint forces operating in the air, at sea and on land.*
- *Avoiding U.S. conventional military strength by innovating **unconventional** anti-access capabilities that interdict joint forces through economic effects, sabotage, diplomatic restraints, collateral damage concerns, information warfare, and intimidating of regional allies and others.*

Warfighting Observations

The ACWG report presents a comprehensive list of warfighting observations. These observations serve as a useful backdrop to Service objectives for naval partnership, capability development, training priorities, experimentation, concept maturation, and issue prioritization. A few of the most pertinent are addressed below. Tomorrow’s warfighters must consider that:

- ***Domain dominance cannot be assumed** by the U.S. joint force. Fighting for localized dominance in time and space lies at the heart of countering A2AD threats, and can be achieved through deception, tempo, littoral maneuver, mass, multidomain effects and the planned presentation of asymmetric capabilities against less nimble opponents.*
- ***Crisis response is a 'come as you are' endeavor.** While deliberate war planning comes with prepared schedules and enabling activities, threats to national interests will present themselves on their own timelines. Forward deployed crisis response forces must be equipped, trained, and practiced for the entire range of contingencies they may find themselves in.*
- ***Operational preparation of the environment (OPE)** occurs in a much greater context than 20th century concepts for battlespace shaping. Sustained engagement by forward-deployed forces builds shared values, enhances partnership, denies sanctuaries to threats, prevents conflict and identifies asymmetric advantage.*
- *The naturally **complementary capabilities between special operations and amphibious forces** provide a sliding scalability in crisis prevention and immediate responsiveness to global opportunities in counterterrorism, counterproliferation, or larger contingencies.*
- *Approaching the maritime domain as a singular battlespace (containing land, sea, air and cyber components) offers opportunities through a **single naval battle** approach that integrates all elements of sea control and naval power projection into a cohesive whole.*
- *The modern amphibious force can employ a variety of mobility options to conduct littoral maneuver at distances to hundreds of miles. The **stand-off range** for amphibious operations is the result of a careful calculus that includes battlespace geometry, risk, threat, and conditions.*
- ***Hybrid and proxy enemies** will avoid presenting a conventional surface for U.S. forces to strike, and will challenge access through irregular means. When they can gain access to advanced weapons, these adversaries will use them in ambush.*
- *Threat employment of guided rockets, artillery, missiles and mortars (G-RAMM), whether at sea or ashore, relies on a **battle network of observation, tracking and targeting**. This network contains vulnerabilities potentially exploited in the fight for localized dominance.*
- ***Operating concepts** including Operational Maneuver from the Sea (OMFTS), Ship-to-Objective Maneuver (STOM), and Distributed Operations (DO) are well-aligned to the 21st century security environment, but require **continued innovation** in organization, equipment and execution.*
- *Getting there quickly is not enough. In an austere environment, **sustainment is the true measure of an 'expeditionary' force**, and is a unique characteristic of maritime forces operating from the sea, supported through a seabase afloat.*
- *Access ashore for the ground element of a multidomain force may be required to execute **missions in the human environment** (protect, influence, deny, enable, raid, capture, reinforce, contain, secure, recover.) Lasting effects in this environment are often the objective of the joint campaign, necessitating a littoral access component of the multidomain joint force.*
- ***The modern aviation combat element** provides significant capability gains that have not yet been fully incorporated into operating concepts.*

Achieving the Vision for the Future of Amphibious Operations and Naval Warfighting

The increasing complexity of littoral warfare, and the diversity of missions that maritime forces are likely to be assigned, preclude templated or prescriptive approaches to amphibious operations. The warfighting

observations contained in the report do suggest some naval warfighting ‘principles.’ Among those described in the report are:

- ***A single naval battle approach.*** From force aggregation to combat employment, a single naval battle approach to campaign design provides opportunity to link the elements of naval power projection into a seamless web of integrated capabilities across air, maritime (surface and subsurface), land, space, cyber and cognitive domains. The integrated single naval battle begins with the Phase 0 battle for influence, allowing discriminating force application based on understanding gained from forward presence.
- ***Battle shaping through littoral maneuver.*** A sea-based force capable of littoral maneuver has a unique ability to control the timing and tempo of an engagement as well as battlespace geometry. Littoral maneuver is fundamental to modern amphibious operating concepts, and relies heavily on the air and surface platforms that make it possible.
- ***Deception and surprise as key elements.*** Using deception in multiple domains to affect surprise is a force-multiplying capability. This ability strains the situational awareness of an enemy and creates gaps in integrated systems. Naval forces can use this leverage against even poorly-armed opponents to minimize collateral damage, counter information operations, or reduce risk.
- ***Exercising the art of combined arms.*** The sophisticated enemies and battlefield complexity of 21st century warfighting demand a corresponding sophistication in the application of power and influence across the range of operations. Networked forces equipped with precision fires capabilities add a new dimension to naval combined arms, as do a broad range of other non-lethal actions. In future struggles for influence, understanding ‘combined arms’ means including the full range of non-lethal effects from across the interagency. These include indirect approaches that prevent the outbreak of conflict and contain its scale. Facing state or non-state enemies, naval forces must be prepared to patiently stimulate enemy systems, observe responses, then strike with precision and effectiveness where it is required. The domain-spanning capability of the maritime force gives it an innate advantage in every phase of a joint operation.
- ***Adaptive force packaging.*** Modern missions and response times suggest the utility of standing combined arms forces that only require tailoring on the margins when a specific mission is assigned. Standing MAGTFs, strike groups, or larger naval formations, complemented by a range of specialized mission modules, would allow mission tailoring around a well-trained and highly cohesive base. Creating opportunities to train to this standard is essential.

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Introduction

This country is at a strategic turning point after a decade of war and, therefore, we are shaping a Joint Force for the future that will be smaller and leaner, but will be agile, flexible, ready, and technologically advanced. It will have cutting edge capabilities, exploiting our technological, joint, and networked edge.

Sustaining U.S. Leadership: Priorities for 21st Century Defense

The January 2012 publication of *Sustaining U.S. Leadership: Priorities for 21st Century Defense* is premised on the interests of a maritime nation with global responsibilities and an imperative to lead. Simultaneously, it marks a strategic inflection point after a decade of sustained operations ashore. The U.S. will continue to lead, but will do so with new capabilities, in new places, with an eye toward new threats. Recognizing this changing tide, and the opportunities contained within it, Marine Corps senior leadership convened an Amphibious Capabilities Working Group (ACWG) to step back from the momentum created by current operations and programs. Service leadership, through the forum of the Marine Requirements Oversight Council (MROC), demanded a comprehensive review of Service concepts and capabilities through the lens of national strategic priorities and the newly emerging security environment. Recognizing the strategic partnership with the Navy, especially the amphibious component, the MROC included an important element of Navy participation in the ACWG.

Purpose

The ACWG, composed of Sailors and Marines, was chartered by the Commandant of the Marine Corps and supported by elements of the Navy and Fleet Forces staff. Its purpose was to assess the challenges and opportunities for amphibious operations within the context of 21st century naval and joint warfighting. The ACWG reviewed Service preparedness for the emerging security era, and in doing so considered complementary partnerships within the naval, joint, interagency and multinational force. It developed specific recommendations that maximized naval relevance to Combatant Commander challenges. The ACWG follows in the footsteps of notable Marine Corps analyses such as the Hogaboom board of 1956 and the Advanced Amphibious Study Group of 1984.

Method

The ACWG began with an assessment of the role of littoral power projection and amphibious capabilities in the current and future security environments. That assessment was filtered through the lens of global trends that shape the future operational environment. Insights from the assessment were researched, analyzed, and used to develop multiple options for operating concepts. These potential operating concepts were wargamed through multiple venues and scenarios. The findings were subjected to the professional military judgment of a wide range of military and non-military analysts. While the assessment considered equipment currently fielded (and planned within the Future Year Defense Program) it was not constrained by the existing program plan.

Recognizing the resource limitations likely to be imposed on future defense budgets, the ACWG made its recommendations from a *resource-informed, program-neutral* perspective. While the initial focus was applied to Marine Corps and amphibious capabilities, it rapidly expanded to reveal the enormous opportunity inherent in the integration of all naval capabilities into a *single naval battle* approach that spans multiple domains and enables the joint force. The relationship with Special Operations was likewise recognized as significant. The compelling opportunities posed through alignment of Marine Corps and Special Operations capabilities were thoroughly explored. Taking this approach to warfighting development revealed opportunities in partnership, organization, training, and integration that could have significant warfighting impact, even in a resource constrained environment. Although not directly

assessed in the ACWG's review, most of the observations contained in the report apply equally to expeditionary operations that are not amphibious.

Opportunity

Fiscal challenges notwithstanding, the Marine Corps and the naval amphibious force stand on the threshold of an era that will place high demands on the Nation's maritime capabilities. Protecting access in the littorals and the global commons remains fundamental to the continued influence of the Nation and the security of its citizens.

The naval services have been in this situation before. The interwar periods of this Nation's history are replete with examples of naval innovation in austere times. The naval force that innovated its way through the 1930s fought its way across two oceans in the worldwide conflict that followed. Simultaneously it developed the roots of modern counterinsurgency doctrine with the still referenced *Small Wars Manual*. Over generations, a flexible Marine Corps has adapted itself to the expeditionary needs of the Nation across a wide range of crises. Today, new threats and new enemies once again challenge us to rethink the ways and means of power projection and influence. Recognizing opportunity in adversity is a core competency of this Nation's naval warfighters, and the potential exists for great gains in the efficiency and effectiveness of the maritime components of the joint force. In the dynamic and rapidly changing security environment, these potential gains represent a necessary maturation of the warfighting capability of the Marine Corps and the naval services.

A Moment of Maritime Opportunity

At this moment, we are challenged, not just to do more with less, but to think of naval warfighting, campaign design, and maritime power projection in entirely new ways.

The recognition of opportunity in adversity is a hallmark of Marines on the battlefield. A compelling historical precedent for innovation under adversity was set by the amphibious experimentation of the Marine Corps in the decades following World War I, and the corresponding naval experimentation overseen by the Navy's General Board. In those cases, significant external constraints limited the ability of the naval services to perpetuate their normal ways of doing business. Fiscal limitations and a national reluctance to see the specter of another world war presented potential barriers to military modernization and innovation. Even then, however, forward-looking visionaries and future-oriented leaders were inspired by the inevitable changes in a rapidly globalizing world. The Nation's international role was on the ascendant, and its interests in global security were forever changed. Returning to a pre-war 'normal' was not an option. That world no longer existed. Faced with new threats and opportunities, forward-looking leaders at every level understood the strategic necessity for change. The results of their innovation resulted in the emergence of the United States as the dominant global power.

Marines and Sailors of today face an equally compelling reality. The economic, social, and technological forces of change are moving quickly, and accelerating. As in the past, a culture of innovation is challenged to identify opportunities in this changing environment. A decade of sustained combat operations have resulted in tremendous innovation in the conduct of irregular warfare (IW), counter-piracy, theater security shaping, and interagency processes. None of those lessons will become any less important in the emerging security environment. Those elements of the security environment have been simply augmented by resurgent regional power-politics, the emergence of competitors equipped with modern military capabilities, challenges to U.S. battlefield dominance, social movements that drive global instability and the potential for continued proliferation of WMD. Innovation under constraint is the comparative 'norm' for the naval services, and now there is opportunity to innovate to a new set of challenges. The ACWG provided a window of opportunity to identify the elements of the changing security environment that influence the maturation of naval amphibious warfare. In the second decade of the century and beyond, the Nation will pursue its security interests in new ways. National strategic dialogue makes clear that the U.S. is entering a renewed *maritime moment*, one in which the maritime components of the joint force will be increasingly called-upon to meet global security challenges. This moment of maritime opportunity is created by a number of near-simultaneous changes:

- *Renewed strategic emphasis on securing the underpinnings of the Nation's economic power by protecting the global commons and ensuring access in the littoral environment.*
- *Emerging threats that place increasing importance on forward-deployed, small footprint methods to create precise effects.*
- *A 'strategic pivot' in national focus to the demands of a rising Asia and the Pacific region.*
- *Significant reductions to defense investments for the foreseeable future.*
- *State adversaries armed with integrated A2AD capability that challenges U.S. dominance and potentially limit our freedom of action.*
- *Proliferation of modern precision weaponry and C2ISR to non-state adversaries that increase risks in smaller scale contingencies and crisis response.*

- *Ongoing global instability as a result of changes in the economic and social environments, increasing an already robust demand for forward-deployed crisis response forces.*
- *Expanded threat environments, including cyber and informational.*
- *Relief from a decade of force-straining operating tempo required by combat commitments to Iraq and Afghanistan.*
- *A generation of Marines, tempered through combat experience, who are comfortable operating across a dispersed battlefield, are culturally attuned to their operational environment, and have experience integrating their operations with the interagency and the rest of the joint force.*
- *A mandate to reinvigorate the special partnership between the Marine Corps and the Navy as we together reorient the naval force to exploit the special advantages it has in the emerging security environment.*
- *Moving beyond the capable but unaffordable Expeditionary Fighting Vehicle program to exploit opportunities for innovation in power projection and Service investment strategies.*
- *Realization of long-desired capabilities through new aviation platforms that dramatically enhance the maneuver capabilities of the MAGTF.*
- *A decade of combat experience that has increased the capabilities of the joint force, especially in intelligence, surveillance, and reconnaissance (ISR) and precision fires, potentially prompting change to MAGTF operating concepts.*

These changes present enormous opportunities for innovation and evolution of 21st century warfighting. In an austere fiscal environment, innovation must be bounded by both resource and operational realities. To be made most effective, innovation must be guided by specific challenges. When linked together through a *Service vector* that describes achievable and necessary evolution in combat capability, the institution can guide innovation to its desired ends. The ACWG used the following methodology to begin development of the Service vector, and to focus opportunity into specific challenges:

- *Anchor Marine Corps and amphibious innovation on the **security demands of a maritime nation** and the missions it most needs us to meet.*
- *Study those demands through the lens of the **emerging threat environment and new challenges** to understand the conditions under which those missions must be accomplished.*
- *Wargame a range of operating concepts to derive specific **warfighting observations** and associated opportunities.*
- *Create a **vision for the capabilities of the future naval force** to serve as a guide for innovation and opportunity development.*
- *Distill recommendations for **achieving the vision**.*
- ***Making the recommendations real** by generating implementation guidance.*

Strategic Requirements of a Maritime Nation

Amphibious capabilities are a flexible, relevant, cost-effective contribution to the security of the United States...central to the demands of a maritime nation protecting its interests in a world of uncertainty and instability...smoothly integrated into the larger naval and joint forces.

Over generations, Marines have adapted to a range of operations from counterinsurgency to amphibious assault. Marines and Sailors have demonstrated valor and ingenuity and their ability to solve the Nation's most difficult battlefield challenges. None of these unique adaptations completely defines the breadth of specialized forward deployed and expeditionary crisis response capabilities found in the modern amphibious MAGTF. The Marine Corps and the Navy's amphibious capabilities serve a central role in the defense of the global interests of a maritime nation. Amphibious forces are a multidomain force (land, maritime, air, cyber) that can rapidly deal with the unexpected or serve as the bridge to a more enduring joint operation. As a forward-deployed microcosm of the joint force, their unique role in preventing and containing conflict through engagement, strategic mobility and rapid crisis response directly serves the steady state demands of the geographic combatant commanders (GCC). Where U.S. citizens or interests are threatened, their crisis response capabilities support ready and rapid intervention whether or not there is armed opposition. Their ability to aggregate and escalate to the forcible entry demands of a major contingency serves as a rheostat for the application of military power. They buy time for strategic assessment, provide an immediate asymmetric capability, and smoothly integrate into the joint force. The 82d Congress exercised great foresight in tasking the Marine Corps to *be the most ready when the Nation is least ready*. The strategic security demands of this maritime nation create a sound basis upon which to define the relevance and utility of amphibious forces.

(1) *The United States is a maritime nation.* Even with economic headwinds, the United States remains the world's largest economy, critically dependent on the global commons for the exports and imports that sustain its livelihood. Disruptions in the global system have significant economic impacts on all Americans. The 90% of global commerce that travels by sea is most vulnerable where sea meets land in the littorals. Forward-deployed forces must remain agile to respond quickly to protect these vulnerable littoral chokepoints.

(2) *The littoral environment is the scene of relevant crisis.* In the densely populated littoral regions, the potential for instability is high. Because 80% of the world's population lives in close proximity to the sea, it provides a necessary and natural avenue for the U.S. to influence the global system, protect its citizens, assure its allies, and respond to crisis. Instability is a natural byproduct of demographic shifts, economic transitions, competition for resources, political upheaval, and a growing proliferation of advanced weapons. Although these threats exist globally, they impinge on the global community most readily in the littorals. In this environment, it will be difficult for the U.S. to predict exactly where, when, or how crises and threats to its national interests will emerge. The protection of U.S. citizens, allies and interests requires response forces that can smoothly cross the seams in the littoral environment without the need for infrastructure or large force buildups ashore. Response forces must be able to intervene quickly, contain crises, sustain themselves, and return to the sea without requiring an entangling footprint.

(3) *U.S. security must be adaptable to an uncertain world.* Just the last year has demonstrated the unpredictable tempo of political upheaval, natural disaster, rising instability, and emerging threats. Although extended ground campaigns are unlikely, threats to American embassies, interests and citizens will continue. Although the Nation seeks peace, enemies will frequently bring conflict, forcing the U.S. to respond. In this environment, the U.S. will likely need to separate warring factions, evacuate innocents,

or protect noncombatants. This demands agile, flexible and capable forces that can respond to crisis and project national power. The presence of hybrid enemies demands that intervention forces can meet the demands of Irregular Warfare, forcible entry, or crisis response with equal dispatch. The Nation requires a forward-deployed force poised for crisis response, not as a collateral duty, but as a steady-state commitment to security of the global commons and national interests around the globe. The necessity for forward deployed crisis response forces is potentially under-counted in force-sizing constructs based on defined operational plans alone.

(4) *U.S. global interests necessitate response forces that can provide options to strategic decision makers and 'buy time' for the joint force to organize and deploy.* In many cases, the Nation's rapid response to contain crises will be the difference-maker in preventing the spread of instability. Crisis response forces must be able to move rapidly to a position to influence potential crises, without forcing escalation or aggravating sovereignty concerns. They must be able to loiter unseen over the horizon or provide a visible deterrent, and give the joint force a range of ready response options. They must move rapidly by land, sea or air, but also sustain themselves for long periods without a dependence on local infrastructure. In an environment of decreasing U.S. fixed basing overseas, crisis response forces must be able to project influence without a destabilizing footprint ashore or other unintended consequences. They must be in a position to patiently gain situational awareness of emerging crises, rapidly gain initiative where required, and apply a full spectrum of lethal and non-lethal capabilities.

(5) *U.S. security demands the ability to gain littoral access, forcibly if necessary.* While large-scale combat operations and forcible entry are often the last resort in the strategic security calculus, they may become necessary in a variety of scenarios. When the capability for joint operational access is required, the ability to put a ground force of multiple conventional brigades ashore is a strategic necessity. The Nation's capacity for assuring this access in the littorals, already minimal, must include an inherently multidomain force that can conduct forcible entry without the need for infrastructure ashore. The assurance of sustained littoral access presents a cost-imposing deterrent to would-be opponents, and is a hedge against unforeseen requirements in a rapidly changing security environment. For a maritime nation with global interests, a minimal two brigade amphibious force represents a sound investment in ensuring access for the rest of the joint force.

(6) *Modern anti-access technologies make strategic flexibility more important, not less.* Modern missiles, integrated air defenses, and precision indirect fires threaten forces at sea. Even more so, they threaten fixed ports and airbases ashore and assembly areas for large ground forces. Where the campaign objectives of a military campaign require forces ashore, the Nation requires complementary forcible entry capabilities that can asymmetrically exploit seams in an enemy's defenses. Contingency forces must remain viable if fixed bases ashore are politically untenable or threatened by anti-access technologies. Countering anti-access technology is one enabling capability.

(7) *The U.S. must have the capability for credible strategic and tactical deterrence.* Strategic deterrence is provided by a range of capabilities in the joint force, but the proliferation of WMD and associated technologies calls for capabilities beyond the traditional nuclear triad to reinforce its deterrent posture. In a loose WMD scenario (chemical, biological, radiological, nuclear) forward-deployed naval forces offer opportunities for an extended deterrent that incorporates counterproliferation and inventory surety. For conventional deterrence, the ability to conduct forcible entry is a cost-imposing strategy that serves to deter regional powers from provocative behavior. Experience has demonstrated the limitations of firepower alone to deter threat actors in the human environment of the littorals. The deterrent effect of

ships poised to immediately conduct an amphibious operation (by air or surface) is more tangible than the threat of missile attack or a force that could arrive in months.

(8) *Preventing war and containing crises depend on flexible response forces.* America's forward strategy for maintaining the global commons, preventing regional conflict, and countering threats will rely more on meaningful global engagement by forces that tread lightly on partner nation sensitivities. Where conflict erupts, rapidity of response can be an important difference maker in containing it at its lowest level. There is great efficiency achieved by a flexible force able to conduct global presence, conflict prevention and crisis containment using platforms already forward deployed.

(9) *The U.S. will continue to intervene in humanitarian disasters.* Humanitarian disasters are clustered in the littoral, where the largest population centers are located. Often, the meager infrastructure and limited response capacity of affected nations are devastated in the event, limiting the ability of the international community to quickly respond. Although amphibious capabilities are designed to fight, their application to relieving human crisis will remain a natural extension of their wartime employment. Where getting relief ashore is not *opposed* but *impeded* by flooding, infrastructure devastation, or lack of distribution capabilities, the ability of response forces to employ air, ground, and sea resources will make them highly effective, and often the only option available. Relief forces must sustain themselves for long periods while avoiding impositions on damaged local infrastructure.

(10) *Each component of the U.S. joint force must naturally complement the others.* For economy and effectiveness, all elements of the joint force must smoothly integrate and leverage the complementary capabilities of the others. This is especially true in the relationship of naval forces to special operations forces. Complementary capabilities between highly specialized special operations forces and forward-deployed flexible and scalable conventional forces must be balanced for effectiveness and efficiency. The joint force must provide a continuously scalable expansion of power projection, from shaping operations to distributed team operations, to larger combined arms combat missions.

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New Challenges

The uneven pace of both horizontal and vertical shifts in global power will continue to create new instabilities and reignite old ones. Hybrid threats and unconventional area-denial methods must drive the joint force to think of 'threats' and 'enemies' in new ways; while regional competitors, WMD proliferators and terrorists continue to challenge. These challenges suggest an increased demand for forces that can respond rapidly from the global commons, providing a range of capabilities against threats posed by states, non-states, and hybrid proxies.

The threat environment has changed since the formulation of current amphibious doctrine, change that is likely to accelerate in the coming decades. As threats proliferate and become more complex, the only *constant* in this unstable environment is the very unpredictability of the specific threats to be faced. The maturation of Service doctrine and operating concepts into the 21st century must take full account of the inability to predict tomorrow's crisis with any degree of certainty. Maritime forces must maintain the capacity and resiliency to handle the surprises that will surely come. Fortunately, while future threats are inherently unpredictable, some emerging trends are clearly discernable.

Fundamentally, instability has accompanied global shifts in power, and these shifts continue to roil the operational environment. The bipolar world of the Cold War gave way to the unipolar world that followed, and the emergence of new measures of power and influence. That world continues its evolution into a multipolar one, as power shifts *horizontally* to new nations and regions. The horizontal shift has been increasingly accompanied by *vertical* shifts in power to non-state entities (social, economic, religious, criminal, ethnic) that challenge the very ideas of *sovereignty*, *threats*, and *security*. While the destructive power wielded by nation states had a certain predictability based on the rule of law, new actors may wield their power in unpredictable ways; unbounded by borders, convention or legality. While planning for conventional warfare remains a prudent responsibility of the naval force, planning for the unexpected and unconventional is an added necessity. The application of force to protect citizens, reinforce allies, regain the initiative from hybrid enemies, counter WMD proliferation, or hunt and kill terrorists will surely be required. Threat manifestations that should guide capability development for the Marine Corps, amphibious, and naval force include:

(1) *Instability and crisis will be a persistent feature of the new world.* Increasing global interconnectedness, shared awareness, information technology, and ubiquitous social media are predominant factors driving global change. Informed people are no longer willing to live under tyranny; be it secular or religious, tribal or criminal. Emerging democratic movements like the *Arab Spring* or increasing voices of protest in rigid autocracies are welcome evidence of the global appeal of the power of liberty, but remove the restraints on forces that have been unmoved under the surface. The forces of ethnic nationalism, militant religion, tribalism, corruption or criminality all emerge from the wreckage of autocratic order that had once suppressed them. Weak governments will struggle to control their sovereign spaces, giving sanctuary to those who threaten neighboring states or the global commons.

IMPACT: A core function of the naval force is the ability to respond to crisis through forward-deployed and rapidly concentrated forces. Protecting citizens and interests during local and regional instability will continue to place heavy demands on the naval force. Force capacity planning should include this significant aspect of steady state employment. Understanding threat and local conditions are important to determining 'relevant' combat power in crisis response. Forward-deployed maritime forces shape this operational environment through security assistance, combined training, and other low-cost, small-footprint activities. Removing potential sanctuaries for potential destabilizing entities is essential.

(2) Regional challengers may necessitate larger-scale interventions. With a perceived reduction in U.S. influence, regional political actors may consider the security environment conducive to expanding their own advantages. Economic competition will drive rising powers to compete for influence, resources, and operational advantage. Some regimes will continue to undertake external provocations to achieve domestic political advantage. Potentially, these provocations include seeking to limit U.S. freedom of action in international waters or the global commons. Provocation designed to appeal to internal audiences creates a high risk of miscalculation that may result in direct confrontation with the U.S. or one of its allies. Proxy conflicts through non-state actors are also likely to aggravate regional power struggles. Regional contingencies that impact the stability of the global system could occur near any of the major littoral chokepoints (Panama, Suez, Mandab, Hormuz, Malacca, Bosphorus, Cape Verde), necessitating a response by the U.S. and its global allies.

IMPACT: The interconnectedness of the global system creates vulnerabilities and unintended effects from even the smallest regional disruptions. Although small-scale crisis response may be the most likely mission for amphibious forces, a hedge must be maintained against escalation of regional conflicts. Efforts to ensure access to contested global commons will require the ability to gain local superiority in air, maritime, and land domains and electromagnetic and missile environments. A crisis response capability must roll-back aggression, deter further actions, separate warring parties, reinforce U.S. allies or protect civilians. Active security cooperation with regional allies will be an effective offset to emerging competitors. The ability to engage new allies through forces that do not require a large footprint ashore will maximize this opportunity.

(3) Non-state and hybrid actors increase the complexity of modern warfare. Non-state entities organized along social, economic, religious, criminal, or ethnic lines will pose threats and challenge access in fundamentally new ways. Hybrid actors will emerge, combining conventional military organization with irregular capabilities. Armed sub-state organizations will practice *de-facto* sovereignty over regions or peoples. Whether acting on their own, or as proxies for a nation-state, these actors will destabilize relations between nation states. Increasingly, non-state opponents – insurgents, terrorists, or criminally motivated organizations – will have access to sophisticated capabilities. The proliferation of A2AD technology (weapons, cyber or informational) to hybrid opponents will prove a disruptive challenge to U.S. strategic objectives. A web of social networks, religious sympathies, refugees and ethnic diasporas enable non-state actors to move assets, personnel, money, and even weapons across international borders, enabling them to create effects worldwide, often undetected. Irregular warfare will be practiced not only in remote deserts or jungles but also in urban areas with ready access to modern technology. Threat actors will use new information technology for communications, surveillance, intelligence gathering, remote control weapons, information operations, and command and control. Massively parallel information and social networks will enable these missions despite U.S. efforts to deny them. The cumulative effect of these trends is that hybrid enemies will be less predictable, more difficult to deter, and less susceptible to traditional forms of warfare.

IMPACT: Irregular warfare is here to stay, even if not practiced in sustained counterinsurgencies ashore. Despite a national inclination to avoid entanglement in crises, ground forces have historically been required to control situations in the human environment, even if their presence is transitory. Hybrid forces may be able to avoid many of the lethal effects of joint shaping by blending in with civilian populations, especially in urban environments. Although hybrid enemies have the ability to disrupt U.S. operations, their own human and information networks are vulnerable to exploitation. U.S. forces will not be able to control the information environment, so they must be able to operate within it, at a pace that out-cycles the enemy.

(4) *Anti-access and area denial capabilities will expand beyond purely military technology* Long-range anti-access and shorter range area-denial capabilities will continue to proliferate, potentially threatening naval forces approaching from the sea. Even more so, they will threaten forces using fixed airfields or ports. In the near term, the relatively few nations with modern, integrated systems will pose the most lethal long-range anti-access threat. State enemies may develop strategies for A2AD in an effort to achieve not only tactical victories, but also as a cost-imposing strategy to force a resource-challenged U.S. to respond. Countering an A2AD arms-race with symmetric responses alone could pose significant resource, diplomatic or credibility costs on the U.S. or her allies. A larger number of threats will employ shorter-range area-denial capabilities to impede access in crisis, cause U.S. casualties, intimidate allies, or gain a better bargaining position from a position of strength. States and non-states alike have demonstrated a willingness to accept casualties in an area denial campaign that leaves them politically stronger at home, more important in the region, or established as a credible counter to U.S. power. Challengers can exploit this temporary local advantage for (potentially) months if the U.S. response requires a ponderous U.S. force buildup. While military technology is the most obvious form of A2AD, unconventional methodologies will likely emerge, including civilian flash mobs, human shields, blocked infrastructure, diplomatic restraints, economic penalties, potential for lost commerce or increased oil prices. Presenting a thicket of A2AD obstacles through cyber attack, proxy organizations, attacks on re-arming sites, diplomatic maneuvering or ally intimidation forces the U.S. to think of power projection in new ways. 'Mutually assured economic disruption' will be a powerful consideration, and an effective anti-access tool in a more-connected global society.

IMPACT: The ability to plan and conduct a naval campaign that coordinates all the capabilities of the naval force gives commanders maximum flexibility. While the model of a technological 'pacing threat' is useful, solutions to access challenges must consider the multidomain advantage of the U.S. joint force. The joint force will generally conduct counter-A2AD to enable the objectives of a campaign, not as an endstate in itself. The naval force must consider multiple A2AD threat constructs to encourage a more comprehensive reaction capability, especially as forward basing is diminished and U.S. conventional dominance is no longer assured. A multidomain force operating from the sea has the ability to advance sea control through raids ashore against hidden targets, can disrupt integrated air defenses through naval surface fires, and can use fleet aviation to create conditions for placing forces ashore if required by the objectives of the campaign. Littoral maneuver, as a methodology to bypass fixed defenses and exploit enemy seams, must overcome the potentially widening gap between ship and shore. The naval force must outmaneuver the enemy in the intellectual environment, not present an overmatch in firepower alone.

(5) *Terrorism will continue to be a methodology for the disenfranchised, and could become an even greater threat by the proliferation of WMD.* For local and regional actors, terrorism will remain a common tactic. Although global Islamic terrorism has been dealt recent setbacks, it could reassert itself if left unaddressed. Regional state-sponsored or proxy terrorism campaigns against the U.S. or its allies could also be rapidly substituted. The vertical diffusion of power to non-state entities potentially creates some with capabilities formerly reserved by states. The most coveted of these is the possession and capability to employ WMD. The presence of this threat in non-state portfolios risks circumvention of many of the careful restraints practiced by states, and making retaliatory response difficult. The risk of proliferation of WMD into terrorist hands makes a deadly combination, one of extreme concern.

IMPACT: The naval force must better align complementary capabilities to those of special operations forces in order to be more effective as part of a global counterterrorism campaign. Forward deployed amphibious forces may be first-responders to terrorist attacks or play a role in intercepting or containing

the spread of WMD. Force protection remains an important element of all operational planning, especially for forces ashore. The utility of forces that can operate without a large footprint ashore and can sustain themselves from the sea puts them at lower force protection risk.

(6) Proliferation of precision indirect and direct fires forces a 'battle of signatures' that changes the dynamic of littoral power projection. Afloat and ashore, avoiding detection will enable successful engagements with conventional or hybrid foes. Units and platforms carry electronic, visual, audible, thermal and informational signatures that must be managed. The increasing technical sophistication of enemies presents direct threats to massed buildup of forces in or near a theater of operations, closing with enemy forces, and traditional military objectives of taking and holding territory. Proliferation of precision battlefield weapons make the consequences of being discovered hazardous, whether at the tactical or operational level. Many states have significant over-the-horizon, precision strike systems, and the proliferation of precision weapons on the tactical battlefield is even more widespread. In this environment, a detected signature creates a target.

IMPACT: The battle of signatures presents an opportunity to learn from an enemy, who has long practiced signature management to avoid U.S. conventional dominance. In the 'battle of signatures', deception, camouflage, mobility, dispersion, emission control, and other signature management capabilities will increase in importance. Where detection is likely, survivability from the effects of first-strike weapons is a primary consideration.

(7) Low-Cost Area Denial capabilities remain a significant obstacle to littoral maneuver and landward survivability. Afloat and ashore, the mine (or improvised explosive device (IED)), provides a proven first-strike capability that has an outsized impact on the operations of modern maneuver forces. By disrupting tempo and creating casualties, mines and IEDs serve to counter the advantages of a maneuver force, whether afloat or ashore. Similar impedance can be introduced through destruction of infrastructure, mob action, or deception. These low-cost methodologies will remain a significant battlefield presence, whether fighting state or non-state opponents. The asymmetric value of these weapons/techniques has been clearly demonstrated, and their use will not be constrained to stabilization (Phase IV) operations.

IMPACT: While maneuver tenets call for detection and avoidance of mined areas, clearing will eventually be necessary. Countermine capabilities remain a priority for the maneuver force, whether on land or at sea. Force protection against first-strike becomes a significant consideration in vehicle design, but must be balanced with the advantages of lightweight mobility and maneuver when operating on poor infrastructure, in urban environments, or in complex terrain. The Nation's strategic pivot to the Asia-Pacific will have significant effect on the efficacy and application of mines and IED warfare.

Warfighting Observations

The Marines can't do it without the Navy. The Navy can't do it without the Marines. The Nation can't do without it.

The ACWG analysis focused on the warfighting effectiveness of the whole of the naval force through an evolution of concepts, methods, partnerships and investments. Through three wargaming series, the ACWG considered naval power projection in its entirety, from force aggregation to accomplishment of joint campaign objectives (frequently ashore.) MAGTF capabilities were considered in the context of amphibious operations. Amphibious operations, in turn, were considered within the increasingly complex interweave of sea control and littoral power projection. The ACWG found that the moment of maritime opportunity includes game-changing potential for increasing the efficiency and effectiveness of the naval force. Those impacts readily extend to the joint force. The ACWG's analysis found that many prospective areas of innovation have less to do with programmatics than with better naval partnering, matured warfighting concepts, relevant training, seamless integration of effects, and intelligent organizational design. Recommendations derived from these warfighting observations are develop in a subsequent chapter, *Achieving the Vision*.

Warfighting Observations

These observations were gained over the course of the ACWG analysis through a syllabus of wargaming, study, seminars and professional debate. They serve as a useful backdrop to Service objectives for naval partnership, capability development, training priorities, experimentation, concept maturation, and issue prioritization.

- *Approaching the maritime domain as a singular battlespace (containing land, sea, air, space and cyber components) offers opportunities for naval warfighting effectiveness through a **single naval battle** approach that integrates all elements of sea control and naval power projection into a cohesive whole. Within this approach, consideration must be made for force aggregation and C2 relationships. A joint force maritime component commander (JFMCC) would likely manage battlespace at sea and ashore for periods of time during the early stages of a joint operation.*
- *Against modern irregular and hybrid opponents, '**relevant**' combat power must be calculated by careful consideration of effects. Firepower and mass may be less critical in selected scenarios than mobility or precision. ISR and command and control may enable small teams to achieve the effects of larger formations. Against irregular opponents, a careful integration of a range of lethal and non-lethal effects enables the joint force to gain influence with minimal collateral damage or unintended consequences. Cyber or information capabilities may change the nature of an operation. Tradeoffs among domain capabilities, either as part of the deployed force and as a reach back capability, must be carefully considered in campaign planning.*
- ***Domain dominance cannot be assumed** by the U.S. joint force. Fighting for localized dominance in time and space lies at the heart of countering A2AD threat. This can be achieved through deception, tempo, littoral maneuver, mass, multidomain effects and the planned presentation of asymmetric capabilities against less nimble opponents.*
- ***Hybrid and irregular enemies** will avoid presenting a conventional surface for U.S. forces to strike, challenging access through unconventional tactics. Key to addressing these opponents is gaining understanding. When they can gain access to advanced weapons, these threats will use them in ambush against targets afloat or ashore.*

- *Information availability, ubiquitous global media and accelerating global interconnections will **transform the security environment**, increasing the complexity of threats. Complex threats will seek advantage through unconventional environments and effects.*
- ***Crisis response is a 'come as you are' endeavor.** Threats present themselves on unexpected timelines, necessitating crisis response with resources already forward deployed. The requirement to respond to crisis requires careful consideration of all elements of the force posture. Amphibious ship loading, for example, will dictate the composition and sustainability of the response force. Crisis response will require the rapid aggregation of Navy and Marine units under a relevant and effective command and control structure, one that must be conceptualized and rehearsed together.*
- *Strategic mobility and rapidity of response serve to contain crisis at its lowest levels. Forward deployed forces with the ability to offer a range of options provide this **'stitch in time.'***
- *Forward deployed forces on amphibious ships provide strategically, operationally, and tactically mobile response capabilities, serving as 'mobile' bases afloat rather than fixed bases ashore. This force presence can move rapidly among crisis flashpoints, and can develop situations without destabilizing intrusion ashore.*
- *Getting there quickly is not enough. In an austere environment, **sustainment is the true measure of an 'expeditionary' force**, and is a unique characteristic of maritime forces operating from the sea, supported through a seabase afloat.*
- ***Operational preparation of the environment** occurs across a much wider range of activities than legacy concepts of battlefield shaping. Operational preparation through information operations, cyber capabilities, social networks, and standing relationships becomes a significant enabler. Sustained engagement by forward deployed forces builds shared values, enhances partnership, denies sanctuaries to threats, and prevents conflict.*
- *The U.S. joint force must, of necessity, be prepared to integrate a range of interagency effects as part of a combined arms approach to warfighting and campaigning.*
- *The naturally **complementary capabilities between special operations and amphibious forces** provide a mechanism for environment shaping, and a sliding scalability in crisis prevention. Together, this joint capability provides immediate responsiveness to global challenges in counterterrorism, counterproliferation, or larger contingencies.*
- *The proliferation of precision battlefield weapons creates a **'battle of signatures'** for forces whose signature is detected either afloat or ashore. Signatures (visual, audible, electromagnetic, thermal, hyperspectral) must be reduced, obscured or disguised as an essential element of force protection and maneuver advantage. Naval forces prevail in the battle of signatures through disciplined use of the electromagnetic spectrum, utilization of emissions control, light discipline, camouflage, deception, and obscurants.*
- *Irregular warfare against urban opponents will be practiced on a new technological level. Without the ability to control the information environment, Marines will have to operate within it at a tempo that outstrips the enemy.*
- *Access ashore for the ground element of a multidomain force may be required to execute **missions in the human domain** (protect, influence, deny, enable, raid, capture, reinforce, contain, secure, recover). Lasting effects in this environment often match desired joint campaign objectives, necessitating a littoral access component of the multidomain joint force.*

- **Landing site superiority.** *Future operations require a new way of thinking about achieving landing site superiority, akin to air or sea superiority. With an estimated 85% of an amphibious MEB's vehicles and equipment coming ashore via connector, the key issue for getting the MEB ashore is achieving landing site superiority for the period it takes to do so. Landing site superiority can be gained by multiple means such as vertical envelopment, boat-insertion, and swimming amphibians. While domain dominance is not assured, conditions can be set to gain localized superiority in time and space, sufficient to project distributed forces ashore. Modern operating concepts already provide innovative alternatives for avoiding linear frontal assaults across defended beaches and are the established norm for amphibious operations. Conditions can be set for closing non-assault craft through littoral maneuver, bypassing enemy strengths, vertical envelopment, offset, and deception.*
- **Operating terrain in the Asia-Pacific theater** *will differ from that of recent experience, presenting increased opportunities for tactical maneuver inshore and on littoral waterways. A balanced set of maneuver options for gaining entry and operating ashore is necessary to accomplish the full range of crisis response and contingency employments. Aircraft, small-craft, tracked-amphibians, wheeled vehicles, tanks and internally transportable vehicles all have a place.*
- *The modern amphibious force can employ a variety of mobility options to conduct littoral maneuver at distances to hundreds of miles. The **stand-off range** for amphibious operations is the result of a careful calculus that includes battlespace geometry, risk, threat, and conditions. Innovation in power projection creates new opportunities for operating at increased standoff, or in setting localized superiority to allow for closer approaches.*
- *Enemy employment of guided rockets, artillery, missiles and mortars (G-RAMM), whether at sea or ashore, relies on a **battle network of observation, tracking and targeting**. This network contains vulnerabilities potentially exploited in the fight for localized dominance.*
- *Future littoral maneuver and low footprint operating concepts trade mass for precision effects. They depend fundamentally on **persistent situational awareness** of enemy disposition, noncombatant activities, and potential threat actions. The capability for continuous knowledge of the battlespace must leverage an ISR Enterprise that serves forces both afloat and ashore.*
- **The modern aviation combat element (ACE)** *provides significant capability gains that have not yet been fully incorporated into operating concepts. The MV-22B, AH-1Z, UH-1Y, and the coming F-35B all provide significant MAGTF enhancements over legacy platforms. These provide unprecedented capability for littoral maneuver and fire support through the depth of the operating area.*
- **Operationalized seabase.** *An operationalized seabase integrated into steady state operating concepts would leverage the tremendous potential utility of the seabase as a joint and interagency resource. The seabase provides a ready platform to link the naturally complementary capabilities of the MAGTF and special operations forces in order to conduct the full range of primary and supporting missions. The idea of afloat prepositioned resources as relevant only to major theater war masks its greater potential. The naval force must develop innovative new concepts for employing intratheater sea lift/seabase platforms in littoral operations to enable unprecedented operational distances.*
- **Operating concepts** *including Operational Maneuver from the Sea (OMFTS), Ship-to-Objective Maneuver (STOM), and Distributed Operations (DO) are well-aligned to the 21st century security environment, but require **continued innovation** in organization, equipment and execution.*

The Future of Amphibious Operations and Naval Warfighting

The increasing complexity of littoral warfare, and the diversity of missions that maritime forces are assigned preclude templated approaches to amphibious operations. The warfighting observations contained in this report do, however, suggest some naval warfighting ‘principles.’ The future naval force should consider the following principles in force development, training, exercises, and application:

- **A single naval battle approach.** Single naval battle is an approach to the integration of all elements of sea control and naval power projection into a cohesive whole, removing artificial seams in the application of naval power. It is premised on approaching the maritime domain as a singular battlespace, containing land, sea and air components. From force aggregation to combat employment, a single naval battle approach seeks to link the elements of naval power projection through campaign design. Where the objectives of a joint or (nested) naval campaign span the seaward and landward sides of the littoral, the single naval battle allows the naval component to apply force with flexibility and precision, using its inherent multidomain and cyber capabilities. The same approach can be applied for missions across the range of military operations, beginning with the operational preparation of the environment, building relationships, and training of credible security partners through forward-deployed engagement. It is an approach to maximizing naval effectiveness within the joint force, and offers an integrated domain-spanning littoral capability to enable the joint campaign.
- **Exercising the art of combined arms.** The sophisticated enemies and battlefield complexity of 21st century warfighting demand a corresponding sophistication in the application of power and influence across the range of operations. Facing hybrid or non-state enemies, naval forces must be prepared to patiently stimulate enemy systems, observe responses, then strike with precision and effectiveness. Baiting an enemy with false targets, deceiving him through littoral maneuver, and off-balancing him through multidomain effects becomes the art of combined arms. The inherent advantages of the naval force in air, maritime, and land domains is complemented by cyber capabilities, information operations, electronic warfare, littoral maneuver, rapid mobility, deception and stealth. Precision firepower and massed capabilities remain essential. Complex future operational environments add the mandate for the integration of a range of interagency capabilities into the concept of combined arms.
- **Battlespace shaping through littoral maneuver.** A sea-based force capable of littoral maneuver has a unique ability to control the timing and tempo of an engagement as well as the geometry of the battlespace. It creates options for the force to apply strength against weakness, and to present a threat through the depth of the enemy’s battlespace. Naval forces choose when to give battle, and exploit advantage in one domain to create opportunity in another. Littoral maneuver can be employed to defeat A2AD threats, create conditions for sea control and enable subsequent naval operations. Littoral maneuver is fundamental to modern amphibious operating concepts, and relies heavily on the air and surface platforms that make it possible.
- **Deception and surprise as key elements.** Against a wide variety of opponents, naval forces have the inherent ability to pose threats over wide areas and at a tempo that off-balances most enemies. Using deception in multiple domains to effect surprise is a force-multiplying capability. This ability strains the situational awareness of an enemy and creates gaps in integrated systems. Naval forces can use this leverage against even poorly-armed opponents to minimize collateral damage, counter information campaigns, or reduce risk.

- **Relevant combat power.** Relevant combat power metrics based on expected threats and conditions are more useful than generalized combat power metrics when assessing the efficacy of combat systems and their associated schemes of maneuver. Often, smaller units or a transitory presence ashore can create effects on an enemy once thought possible only through larger formations. Firepower and mass may be less critical in selected scenarios than mobility or precision. ISR and command and control may enable small teams to achieve the effects of larger formations. The composition of an assault echelon and the ratios of various modes of littoral maneuver must be dynamically determined through analysis of the threat and conditions.
- **Operational preparation of the environment.** With increased global connectivity; anticipating, deterring, and preventing conflict through OPE becomes more possible and necessary. The U.S. joint force must provide a forward-leaning focus on denying threat sanctuary, enabling partner nation capabilities, strengthening regional alliances, and creating relationships that will endure through crisis. An organized, practiced interagency campaign of OPE activities leverage all elements of engagement toward a unified end-state.
- **Scalability and efficiency of the naval expeditionary system (NES).** The NES describes the principle of bringing the many components of the expeditionary force into predictable, practiced, packages that can be rapidly applied to the requirements of the security situation. A mature NES would synchronize the training, readiness, and deployment of naval expeditionary forces. Its components would be premised on warfighting demand, steady-state missions, and training requirements. The NES is mature for the frequently deployed mid-scale expeditionary forces such as amphibious ready groups and Marine expeditionary units (ARG/MEU). Expanding this concept to the components of the expeditionary strike group (ESG) and Marine expeditionary brigade (MEB) would be a natural progression. Where rapid aggregation of larger forces is required, the NES would provide building blocks that have trained to the same standards, understand C2 relationships, have interoperable equipment and operate with common battlefield understanding. NES provides the common tactics, techniques, and procedures for intelligence, C2, fires, maneuver, logistics, and force protection. While this approach appears prescriptive, it is, in fact, the essential enabling element of task-organized arrangements in combat. Forces must be trained and exercised at each level to allow for orderly aggregation into a capable contingency or crisis response force.
- **Adaptive force packaging.** The Navy and Marine Corps have long recognized that the most effective way to build a force is through the flexible task organization of combined arms teams. Modern missions and response times suggest the utility of standing combined arms forces that only require tailoring on-the-margins when a specific mission is assigned. Standing MAGTFs, strike groups, or larger naval formations, complemented by a range of specialized mission modules, would allow mission tailoring around a well-trained and highly cohesive base. This principle would ensure necessary proficiency and unit cohesion and would serve to enable sufficiently rapid force generation and deployment.

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Vignette: A Vision for the Future

The following is the transcript of an oral history provided by LtCol Ellis, Operations Officer, Naval Expeditionary Force II (Experimental), Norfolk, Virginia recounting his experiences in Operation Eastern Entrance.

We received the Warning Order at 1900, 11 December 2024. I was notified at 1930 and immediately returned to the integrated Navy/ Marine Corps operational headquarters at the Naval Expeditionary Force (NEF). Shortly thereafter, the NEF Commander, Vice Admiral Howard, and the Deputy Commander, Major General Mayne convened a principal's staff meeting to develop an initial estimate.

Throughout the preceding decade we had made solid progress in achieving a single naval battle approach to warfighting. Closely coordinated command and control between Marine Corps and Navy expeditionary forces was one of the most significant results. This was a vast improvement over the separate and loosely coordinated arrangements pre-2014. We held the meeting in the Force Command Center so we could see the real-time feeds from the forward deployed expeditionary strike group (ESG) just off shore of our threatened ally - Cyan. ESG I had been working with forward deployed Marines and SOF in country just last week and had a summary assessment of the condition of the host nation forces we were being asked to support. The payoff of having Marines experienced and familiar with the lay of the land in a variety of potential trouble-spots was well-worth the investment. After scanning the knowledge wall for weather, unit locations, and the latest shared Joint intelligence assessment, we began mission analysis. Things were already moving quicker than usual.

The warning order was short and to the point: On order, the NEF will conduct combat operations to defeat Tan aggression and restore territorial integrity of Cyan in order to restore government of Cyan sovereignty. We were also told to coordinate with and support Cyan forces to the greatest extent possible.

The attaché assessment made clear that our Cyan allies were short on command and control capabilities able to leverage supporting arms. Also, our integrated naval intelligence enterprise gave us a range of reports from multiple sources that indicated there would likely be significant indigenous insurgent support to Tan forces operating in Cyan. The NEF Intel Officer provided a full situation report. Now, all the years of engagement and foreign internal defense activities were going to pay off for us in terms of enhanced situational awareness and a network of personal relations.

VADM Howard's first order was to get forces moving. I recall MajGen Mayne saying, "Since we've all trained together, we'll figure out the detailed concept of operations (CONOPS) en route." ESG I and ESG II were organic elements of the NEF under VADM Howard's command. ESG I was forward deployed one steaming day from Cyan, while ESG II was completing workups near the United Kingdom as the nucleus of the NATO Amphibious Ready Brigade.

Our force level pre-deployment training, which had included the NEF headquarters and ESG's I and II, was going to get a real world test. Of course, this is why we had a Naval Expeditionary System – pre-defined components of the force, used to working together and practiced in aggregation, planning and warfighting. Fortunately, an early focus of the experimental NEF headquarters was development of plans to aggregate two ESGs into a single Navy/Marine Corps task force. It was reassuring that Carrier Strike Group (CSG) II had also participated in our workups and was going to be chopped to us. We knew all the players, so emails were flying amongst counterparts of both ESGs and the CSG - syncing up in near-real time. I can't overstate how important it was that we had all worked together just four months earlier.

Thankfully, after the Horn of Africa (HOA) debacle of 2014, we started organizing as we train and training as we fight. Implicit communications and solid training are essential to effective rapid response – we learned that in spades in HOA.

At 0800, 12 December, we departed Naval Air Station Norfolk. ESG II was already enroute to the Mediterranean Sea from its forward deployed force posture position southeast of the United Kingdom. We would fly to Rota and hop an MV-22 to the USS America in the Med. As United States Central Command had indicated, we received the execute order (EXORD) at 1000 12 Dec while airborne. VADM Howard immediately gave the go ahead to ESG I to begin bolstering Cyan forces by placing combined arms support teams with Cyan brigade headquarters to start tactical air (TACAIR) support with the ESG's Joint Strike Fighters (JSF). We would add Air Force TACAIR once it was in position. Thanks to one of those emails I mentioned earlier, CSG II had sent two E2Ds forward and land-based them nearby in Yellow so they were able to provide surveillance, targeting, and airspace management in support of ESG I. The ESG's organic medium endurance, medium altitude early warning and battlespace management unmanned aircraft was fine for a MEU fight, but the E2Ds were a welcome addition and would allow for seamless transition when the CSG arrived. That added capability, in effect, tripled the number of flight decks we could bring to bear in the integrated single naval battle.

After a couple of flight glitches the suitcase staff arrived aboard USS America 14 December. Thanks to portable and airborne en route command and control systems we were still in the loop and had used the flight to sketch out the plan. Our common flag plot knowledge wall made us feel right at home. The Ford CSG would pass through the Suez and join us in the Mediterranean Sea on 19 December.

So, we would have a NEF of two ESGs and a CSG constituted by C+12. I'm still amazed when I look back on my lieutenant days when we thought we could do this with a pick up team of strangers who had never trained together for such a complex littoral operation. Of course, the threat has gotten more sophisticated, but still....

I'll start with our assessment of the threat and then describe our basic plan in chronological order. Tan and their insurgent allies provided us with a pretty robust hybrid threat. It was not the most sophisticated or capable A2AD capability, but it knew no boundaries between land, sea, and air. They had sufficient ISR to cover out to about 200 miles and had patrol craft, small boats, and antiship cruise missiles (ASCM) capable of hitting us at that range. In HOA 14, employing operational maneuver from the sea, we looked at sea control and maneuver ashore as two complementary but separate operations. Our command arrangements still separated the decisions and staff actions for ashore and afloat operations. This arrangement was conceived at a time when there was a relatively clear distinction between threats ashore and threats afloat. As we found out in HOA, the proliferation of ISR, A2AD threats and in particular, long-range strike capability, erased that distinction. You'll recall that we came in fast to surprise al Shabaab forces and landed a large force through multiple penetration points. While we were focused on the ground forces, al Shabaab focused on the most vulnerable concentrations of power – our ships at sea. While we were maneuvering deep inland, the enemy was positioning a combined arms hybrid threat to strike at sea, thus taking advantage of our inland focus. That's how they damaged a LPD with a suicide craft, nearly sank an LHD with a hidden ASCM, and initially isolated landing forces at their littoral penetration points. Pretty galling that a terrorist group exploited what we now call the single naval battle approach before we did.

So, we were fortunate really, to have had the lessons of HOA 14 when we entered this fight. With the single naval battle concept, VADM Howard and MajGen Mayne each understood the realities of fighting

in the littoral environment - both at sea and ashore. We approached our planning from a holistic viewpoint that eliminated seams that hybrid adversaries are so adept at exploiting. While there were only two SOF officers, three Army officers, and four Air Force officers assigned permanently to the NEF staff, their contributions in the planning phases were disproportionate to their numbers. Early on, we were particularly interested in Air Force ISR and strike capabilities, and of course, SOF always plays a major role in supporting operations to shape the environment and provided important reinforcement to our organic beach reconnaissance and very shallow mine clearing capabilities.

We created a single integrated battle plan that bolstered threatened Cyan forces with liaison teams and CAS. We gained sea control that allowed us to maneuver throughout the depth of maritime domain, and we supported maneuver ashore to create a lodgment for follow-on joint forces.

The tactical situation dictated that we take significant risk to support beleaguered Cyan forces before we had fully taken down the integrated air defense system (IADS) threat. We did this through integrated packages of sea-based Tomahawk land attack missiles (TLAMS), nuclear aircraft carriers (CVN), and LHA/D launched F-35B/Cs, fleet and airborne electronic warfare, as well as newly developed space and cyber capabilities, all launched from beyond Tan's effective range. This created a window of suppression for adversary defenses to allow insertion of ANGLICO and SOF teams and safe recovery of the MV-22s. Until the JFACC took down the identified IADS, the TLAMs and F-35s bore the brunt of close air support (CAS) and direct support fires to Cyan. Using sea-based maneuver and extensive deception, we were able to launch successive waves of MV-22s from various points, to various points, and at staggered intervals, thus not allowing the adversary to competently anticipate or mass against us. Since Tan's A2AD capability extended out only to 200 miles, we simply launched our forces and strikes from beyond that range initially. This allowed us to create effects within hours of receiving the EXORD, despite Tan's A2AD capabilities. The inherent maneuverability of naval forces allowed us to pick the time and place of the engagement and to adjust the battlespace to our advantage dynamically, without having to first address the A2AD threat in total. Of course, we wouldn't have been able to respond so quickly without forward deployed forces in the areas familiar with the country through previous engagement activities.

These preliminary operations were not the usual order of events when confronted with an A2AD challenge, but the tactical situation would have been lost had we not prevented Cyan's collapse. Our naval maneuverability gave us that option.

We initially established our seabase 300 miles from Cyan and targeted suspected ASCM locations and boat sanctuaries, while clandestinely inserting SOF to find and flush well hidden and withheld A2AD assets. This disposition gave us ample maneuver space at sea while employing beyond the reach of Tan's A2AD systems. The line between shaping and assault phases was a bit blurry since the enemy maintained strict signature control and did not expose himself without the chance of a high-payoff attack. Although our technical ISR could "see" a lot, the fact that our hybrid foe was hidden in plain sight among the population meant that we would have to provide him with a good reason to show his cards. We found that Navy-Marine tactical forces, combined at the small unit level, could be both the "bait" and the "trap" for the enemy. Pushing both air and surface strike packages toward the enemy at various times and over differing routes, we were able to continually prod Tan forces into exposing themselves. It was a 'stimulate and measure the response' methodology enabled by persistent organic and joint ISR with "quickfire" capabilities from on-station aircraft. A kill chain optimized to support the distributed operations team allowed for a speed of engagement which overwhelmed the insurgents.

The experimentation in the teens had led us to unprecedented innovation in application of unmanned capabilities across all warfighting functions. We certainly found it more effective and less risky to put a gadget in harm's way rather than a team of Marines. Unmanned systems were really important during this phase to conduct low signature surveillance and reconnaissance without putting any personnel at risk. We dropped our low signature wave powered sensors to begin instrumenting the approaches and provide cueing for small boat threats. Most significantly, the unmanned systems allowed for 24x7 persistent coverage in named areas of interest over land and sea, something very difficult to accomplish with manned platforms. This coverage was important since the enemy had significant numbers of small boats, some equipped with very capable anti-ship missiles. Again, having learned from HOA, we created sea – air task forces with our small unit riverine craft (SURC), armed helicopters, and embarked Marines and Sailors. We had regained the edge in riverine and inshore small craft capabilities (it seems so natural now) that had atrophied during the counterinsurgency wars. These task forces augmented a layered defense and provided ability to search and patrol for hybrid threats in the thick swamps and wetlands along the coast. Once we gained sea control, our patrols were essential to maintaining it since the bar is pretty low for getting a boat out of a hide and successfully engaging a ship.

In short order, Tan forces found that shooting invited rapid and deadly retribution. Initially, Tan was encouraged by turning back what they considered our assault wave, but was actually our unmanned assault feint. This aided us in locating their counterassault capabilities. After we had reduced these newly exposed forces, we began launching the first surface assault forces. These forces added to the Tan dilemma by moving in strength through the best launching areas, and forcing the rocket/ASCM forces to either move or "go to ground" to avoid being swept up. Either way, those units could not place effective fires to sea. When they stopped shooting, we continued to prod them into revealing themselves by using their own information technology networks.

Tan forces included mechanized forces, but the complex environment was made for infantry. The urban littorals, with numerous waterways surrounded by compartmented rural terrain with rocky and rugged outcroppings made this ideal for lighter agile forces. We made our initial assault through multiple entry points with platoon sized infantry teams. Our relevant combat power (RCP) assessment during problem framing made it clear that the environment, nature of the enemy, and the G-RAMM capability possessed by both Tan and the insurgents made the entry operation a real challenge. The key word is relevant—meaning relevant to the tactical situation at hand. It is an assessment of what friendly combat power is most relevant to success for a given tactical mission. It requires good tactical intelligence and a highly adaptable force structure to allow for rapid tailoring. Accordingly, we developed a distributed operations plan to attack them asymmetrically – infantry vertically bypassing their armor and mechanized formations to seize key terrain and isolate the enemy with fires. What we have come to appreciate is that technology now allows greater separation between Marines and supporting weapon systems – now we equip the Marine physically and virtually. A company of Marines can harness the relative combat power of a battalion if done correctly. By focusing on the threat and assessing what joint force components we had that were most relevant to addressing our various tactical challenges, we avoided rote, templated force dispositions and used flexible mission tasking to tailor our assault element.

With that brief digression aside, our light infantry approach turned out to be key; when we began consolidating our gains after the initial vertical assault we uncovered numerous fire cauldrons the insurgents had prepared in anticipation of a mechanized assault. During the defense drawdown of the mid-teens we were forced to use commercially available all terrain vehicles as a replacement for the internally transportable vehicle. Remarkably, we have modified them very little since then and their low cost allowed us to provide them to all teams that needed them – based upon their task and the terrain. The

resultant communications capability, sustainability, and suppression weapons systems allowed the company landing team to move quickly without carrying a lot of supplies on their backs.

Our diversity of fires principle was also a big contributor to our light infantry success. Direct support ISR and direct or networked, responsive, general fire support shortened the kill chain such that we could strike fleeting targets to a degree unanticipated by the insurgent forces. It took Tan very little time to pull a mortar tube from a hide site and loose off a couple of precision guided mortar rounds. Our ability to provide mensurated imagery correlated to radar tracks, generated from airborne systems, allowed for counter-battery fires within seconds of the enemy firing. This ability to leverage a range of ISR and fires capabilities at the team level gave us tremendous advantage. We were much more agile than the enemy expected.

We supported the initial vertical assault main effort with distributed surface operations, taking advantage of the speed and maneuverability of our connectors and the agility of our combat vehicles. These platoon and company sized maneuver formations helped set the conditions for gaining beach superiority. While we had beach/air delivered autonomous suppression systems to assist in securing the landing area and landing zones, we also needed to maintain control of both the seaward approaches and the landing areas, and this required synchronized air, sea, and land maneuver. We leveraged the Littoral Combat Ship and coastal battlefield reconnaissance and analysis (COBRA) mission modules to discover where mining had not occurred.

Given the significant man portable air defense system (MANPADS) threat, we planned our vertical assault routes to avoid predictability. We made use of small scatterable sensors to instrument planned landing zones (LZs). This was our first chance to employ the LZ autonomous suppression systems which we dropped in 10 minutes before landing. They are programmed to provide suppressive fires against an enemy that moves or has an infrared signature. They automatically network with the previously emplaced sensors and fire on their cue, in addition to detections from their onboard sensors.

Once we had isolated the beach landing zone through surface and vertical maneuver, we used multiple company task forces to gain beach superiority to enable heavier forces and logistics to move ashore. Unmanned assault scouts lead the way for the initial ship-to-shore connector (SSC) landing. Even with security established at the beach, we conducted a deliberate surface assault. Our SSCs moved as the core of a seaborne combined arms team. DDG-51s provided Aegis coverage for movement from blue into green water. LCS (SUW) provided "close escort" to the SSCs, for protection from small craft while also providing a platform for joint terminal attack controllers (JTACs) to control CAS. In the air, helicopter gunships provided escort and F-35s stood ready in CAS stacks. Each surface wave was commanded and controlled from the nearby DDG, by both Navy and Marine commanders, imitating the ESG/MEB and ARG/MEU blue-green integration at the small tactical levels. The SSC landings went without a hiccup. We prioritized our self-propelled 155 arty right after our engineer and assault breaching vehicles. Since we were inevitably becoming more fixed with establishment of a lodgment, we needed to have significant counterbattery capability - that's why we wanted the self-propelled's in early. We also established a forward arming and refueling point (FARP) within the lodgment and supplied it from surface connectors. The FARP really allowed for significant flexibility in our air assault operations and increased our JSF sortie rate by about 1/3.

Joint precision firepower was a complete game-changer for us. Our loitering munitions were especially effective.

By D+10 there was no question which way the game was headed. We had broken Tan's A2AD system, destroyed most of their mechanized forces, and had seriously thrown the insurgents off their strike and hide game. Since your recorder is blinking, I'll just summarize what was most important from my standpoint.

- a. We were a trained and ready standing organization focused on our forward deployed elements when the balloon went up – thus our fast response timeline.
 - b. We executed a single naval battle, allowing no seams for exploitation.
 - c. We did a quick mission analysis and used adaptive task organization to tailor our force with specialized capabilities.
 - d. Flexible mission tasking allowed us to leverage the full set of joint capabilities in a way most relevant to the specific tactical challenge.
 - e. Diversity of fires allowed us to support our lowest tactical units with the right fires at the right time.
 - f. Our naval maneuver allowed us to engage at the time and place of our choosing and to create nearly immediate effects once the EXORD was received.
 - g. Our NES allowed us to aggregate a complete force by C+12.
 - h. Finally, it's all about the infantry. Enabled with the right intelligence, communications, mobility and fires, their low signature makes them very difficult to target and their diversity of fire options makes them uncommonly deadly with discriminating accuracy.
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Single Naval Battle

“In the maritime pattern of thought, the sailor sees his task falling into two major fields [...] so closely interwoven that it is hard to tell where one stops and the other starts. One half of the task is the establishment of control of the sea [...]the other half is the exploitation of that control of the sea toward extension of control from the sea onto the land.” **RDML J. C. Wylie**

“At all echelons of command, we must enhance our ability to conduct integrated planning, execution, and assessment.” **Cooperative Strategy for 21st Century Seapower**

Single-battle is a unifying perspective of operations, which holds that actions anywhere in the operational environment can affect actions elsewhere.” **MCDP 1-0 Marine Corps Operations**

The naval services are faced with a new era of both increasing global relevance and significant emerging challenges. The interconnected global system that underpins the Nation’s economic power demands the ability to influence not only the sea itself, but also the human environment that crowds the shores of the littoral regions. A strategic mandate for protecting freedom of access in the global commons is coupled with the emergence of sophisticated threats, both at sea and on land. Competitors will emerge to threaten access at sea and in the littorals through an ever increasing web of capabilities. Nontraditional and irregular challenges will continue to augment the role of sophisticated A2AD technologies. Fighting from a position of dominance can no longer be assumed.

The emerging security environment demands a corresponding approach to naval warfighting that matches the enemy’s growing sophistication. Fortunately, that sophistication is a natural extension of the multidomain naval force. This integrated multidomain advantage allows the naval force to present a less nimble opponent with a series of asymmetries that he cannot match, disrupting or dismembering his defenses. It allows the naval force to play a central role in pre-crisis theater shaping and influence operations. That multidomain advantage, however, must be honed to a razor’s edge. The application of air, surface, undersea, cyber, informational and amphibious capabilities must become the multiple tools of a single battle plan. Their seamless combination and choreography in time, space and tempo gives the U.S. force its advantage. While strong enough to fight strength-to-strength against many opponents, the naval force must gain the ability to off-balance and defeat an opponent without resorting to a toe-to-toe slugfest.

Given the range of modern systems, power projection in the littoral battle covers hundreds of miles in both directions and extends into the air and cyberspace. The maritime domain -- which has always had a landward component -- now extends much further, and encompasses a much more complex set of challenges. In order to gain freedom of action on the sea and on land, maritime commanders will play an increasingly important role in all theaters, even those once considered continental in character. This increasing role will begin with pre-conflict theater shaping, where naval forces can gain enduring partnerships, influence, and familiarity – without the requirement for enduring fixed bases ashore.

These challenges point out the dangers inherent in seams in U.S joint capabilities. For the naval force, this suggests the single naval battle approach to warfighting as part of the joint fight. Naval commanders must have the spectrum of naval power projection capabilities at their fingertips in a nimble and practiced force, ready to project power at sea and ashore. Projecting force swiftly from a menu of forward deployed options that includes a robust, scalable crisis response capability makes the naval force an appealing option to joint commanders at any level.

A single naval battle approach views the maritime domain as an indivisible whole, allowing us to express the actions and forces within it as inherently integrated in effect. It provides a unifying perspective for naval operations and bridges the seams between air, land, and sea. It allows the commander to effectively focus the effort of all elements of the naval force in the greater context of the Joint operation.

Single naval battle is an *approach* to the integration of all elements of sea control and naval power projection into a cohesive whole. The purpose of this approach is to strengthen the naval force and its efficacy in achieving the ends of a joint campaign by providing an approach to planning and execution that removes seams in the application of naval power. This approach allows functional warfare communities and individual naval services to understand their relationship to the broader naval force, identify critical dependencies, optimize force aggregation, ensure compatibility, increase partnerships and conduct planning with the end in mind. It spans the entirety of the naval mission, from force aggregation to achievement of applicable objectives within the joint campaign. Where the objectives of a joint or (nested) naval campaign span the seaward and landward sides of the littoral, the single naval battle allows the naval component to apply force with flexibility and precision, using its inherent multidomain (air, maritime, land) capabilities. It does not displace the multidomain advantages of the joint force, but offers a joint commander an integrated domain-spanning littoral capability to enable the ends of a campaign. In the future operational environment, complex domain-spanning threats create a necessity for a littoral force with the ability for a more discerning, scalable, and practiced application of power.

Highlighting the single naval battle approach is an effort to correct the unfortunate trend that has allowed separate naval capabilities, organizations, sub-domains, specialties, and warfare areas to drive creation of operational concepts, doctrine and plans in relative isolation from one another. We have thought primarily in categories: Navy or Marine Corps, power projection or sea control, amphibious warfare or strike warfare. Thinking across the breadth of naval capabilities, and across the whole of the maritime domain has come afterwards. Although a valuable construct for force relationships, a *supported/supporting* mentality encourages singular domain thinking, "We do *our* thing separately of them doing *their* thing." Thinking single naval battle impels thinking of integrated naval combined arms from campaign inception. It links *our* thing and *their* thing through purpose, timing and location. It increases the sophistication of naval combined arms against 21st century opponents through the integration of intelligence collection, fires, cyber effects, information operations, presence activities, humanitarian interventions or clandestine missions. The value of the part is measured in its value to the whole. The value of the whole exceeds the sum of the parts.

A single naval battle approach does not displace the concept of Air-Sea Battle (ASB). In fact, ASB serves as an excellent example of the power of a unified campaign approach. Countering A2AD threats generally represent enabling functions for the joint campaign, not its endstate. A single naval battle approach puts ASB into context for the rest of the naval force. A 21st century naval force does not do its shaping and condition-setting in isolation from the rest of the campaign. Rather, it stitches together supporting elements across the force with campaign objectives in mind. How do the demands of countering A2AD impact force aggregation and crisis response timelines? How do we leverage the multidomain capabilities of the naval force to asymmetrically dismantle A2AD capabilities, whether wielded by state or non-state actors? How could the naval force use the amphibious component to enable sea control? In some cases, limited objective power projection (strikes, raids, lodgments) might enable

the fight for access. Placing elements of the U.S. naval force on allied soil or in allied ports may complicate the enemy's escalation calculus. The naval counter A2AD campaign might include a small footprint ground force to deny key terrain to the enemy, influence populations, close selected chokepoints, seize and defend forward missile defense sites or establish expeditionary airfields. Amphibious forces might facilitate sea control by operating on the landward side of a littoral shoreline, seeking out hidden A2AD capabilities, denying enemy sanctuary, or preventing the enemy's use of key terrain. A strategic perspective of access challenges includes the consideration of both sophisticated military technology and an expanding set of unconventional approaches to denying access. Is the single naval battle force prepared for anti-access attacks on forces while still in port, or the blocking of key chokepoints? Does the counter A2AD campaign adequately consider the human shield or informational components of the enemy's A2AD strategy? The full range of multidomain power projection capability allows an asymmetric application of force to an enemy who proves resistant to a single method. A 21st century naval force must be as nimble and sophisticated in the application of combined arms as the enemy.

The effects of sea control are often measured in the human environment ashore. The interwoven nature of sea control and power projection is fundamental to understanding single naval battle, as is the ability to sustain the force for the duration of the campaign. Sea control sets conditions for power projection, while power projection often enables or shapes the objectives of sea control. Single naval battle appreciates the complexity of the relationship, and integrates all aspects of naval power to create the desired effects in the maritime environment. Through a single naval battle approach, integrated naval task forces relate actions to one another in time, space and purpose. Single naval battle requires that the Marine Corps embrace a role in operations at sea, and operations ashore that support the Navy at sea, while the Navy must embrace its role in supporting and conducting operations ashore. While the single naval battle approach is not an organizing principle in itself, it requires an integrated approach to how we deploy, posture, aggregate, plan, command, control, employ, and sustain naval forces.

While single naval battle is primarily a warfighting approach, its tenets can be extended to the supporting establishment as well. Single naval battle has direct implications for shared naval doctrinal development. Likewise, it might have significant impacts on the way the Navy and Marine Corps train and educate the force. At senior levels, the approach creates a vector for the development of operationally focused littoral warfighters from both Services. Taking a single naval battle approach might influence course content for JFMCCs, Top Level Schools, Intermediate Level Schools, and other venues. In time, a shared single naval battle approach to expeditionary warfare may spur the creation of a center of excellence or combined Navy/Marine Corps combat development entity. Potential applications cover a wide range.

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Achieving the Vision: A Service Vector for Future Amphibious Warfighting

Although presented as a fictional account, the vignette presented earlier establishes a vision for what is possible as the naval force continues to adjust its warfighting capabilities to the demands of the future. That vision, shaped by strategic opportunities, strategic imperatives and the coming security environment, outlines a vector for potential refinements to *how we will fight* in the future. A vector provides both direction and magnitude. The *Service vector's* direction will be established through development priorities. Its magnitude, the scale and pace of change, is constrained by current operations, fiscal realities, and competing demands. While detailed planning is vulnerable to being derailed by changes in the operating (or developmental) environment, a Service vector is robust enough to tolerate the inevitable impositions of daily challenges. ***A well-understood Service vector for change serves as a mission-type order for the entire force***, allowing local commanders to continue to advance Service capability even in the presence of severe crosswinds. What follows is the ACWG's consideration for the elements of a Marine Corps Service vector. Its core strength is established through partnership with the Navy. Thus, many of these elements have immediate relevance across the amphibious force, the larger naval force, and the joint force. Each of the elements presents an opportunity for progress in achieving the vision for the future of amphibious warfighting. The remainder of this report builds on the observations of the ACWG to shape a vision for future naval warfighting and articulate a Service vector for achieving the vision of 21st century amphibious operations.

Fundamental to ***achieving the vision*** is the unifying perspective of a single naval battle approach. Fully described in a previous chapter, this approach serves as an organizing principle for the maritime domain, and places every element of the Service vector into the context of the naval and joint force. Within that context, the ACWG organized the elements of the vision into a number of broad themes:

- *Service Organization*
- *Achieving the Single Naval Battle*
- *Littoral Maneuver and Mobility*
- *Force Posture and Aggregation*
- *MAGTF Capabilities*

(1) Service Organization. By character and reputation, the Marine Corps is an organization that rises to challenge by adapting to change and overcoming obstacles. At the Service level, there are a number of opportunities that present themselves for making rapid progress in achieving the envisioned future warfighting capability.

Elements of Opportunity:

- a. **Expand naval partnership.** The opportunities presented by a single naval battle approach to naval warfighting have ramifications at the Service level for both the Marine Corps and the Navy. Opportunities exist for expanding the scope and leverage of the Naval Board, improving staff relationships between Headquarters, Marine Corps (HQMC) and Office of the Chief of Naval Operations (OPNAV), and defining shared exercise/experimentation objectives. Improved collaboration on strategies, concepts, plans, and wargames all present opportunities for increasing naval warfighting effectiveness. While Service connections for ship building and ship configuration are well established, creating a center for amphibious and littoral *operational* integration would be a significant tool to achieving naval partnership across a series of operational issues. Expanded opportunities exist for the utilization of the Expeditionary Warfare Collaborative Teams, the Expeditionary Warfare Training Groups, and the Naval War College for enhanced training and education development in amphibious capabilities and single naval battle warfighting. Initial coordination among a newly formed Marine Corps Ellis Group, its Navy counterpart, the Naval War College and the Naval Warfare Development Command promise renewed opportunity for combined concepts for littoral maneuver and gaining a single naval battle approach. Gaining a forum for improved coordination that expands this cooperation to the OPNAV N3/5 staff, MCWAR, and MCWL might create additional opportunities. A jointly-defined path for cooperative priorities should be established, with oversight by the Naval Board. There is additional opportunity to establish O-6 and O-7 level executive steering groups that might refine issues and products prior to their consideration by the Naval Board.
- b. **Create interoperability to facilitate integration with SOF.** Marines and SOF are highly complementary and have several similar characteristics. A combined SOF-Marine team provides national decision makers and GCCs scalable options that leverage Marine mobility (strategic, operational and tactical), maneuver, ISR, sustainment, C2, force protection and fires. The integration of Marine multicapable capacity with SOF authorities and specialized skills provides for an efficient and effective means to project influence and power across a broad range of missions. Working in a partnership that includes the Navy, they together create a swift, lethal, and scalable capability that can rapidly respond to strategic threats. Marine/Navy/SOF can integrate planning and de-conflict execution in the tactical environment by employing flexible command and support relationships based on mission requirements. SOF provides specialized skill sets, precision effects and a global steady-state security presence. The Navy/Marine Corps team provides forward-deployed platforms, integrated aviation, manpower, firepower, trained staff planners, scalable ground reinforcement, and supporting missions/functions. There is opportunity to develop institutional collaboration, new concepts for interoperability and build joint force awareness of the combined potential for these reinforcing mission areas. Marines comfortable with the indirect approaches required for Irregular Warfare and the pre-crisis struggle for influence will smoothly integrate with special operations perspectives that place a premium on preventing conflict or employing indirect approaches to shaping it. There is significant opportunity to make the unique relationship even more powerful and responsive through a three-way multi-service concept among the United States Special Operations Command (USSOCOM),

the Navy, and the Marine Corps. A detailed review of Marine Corps and SOF integration is included as a supporting issue paper.

- c. **Sustain focus on learning as an organization.** For the last decade, the demands of wartime counterinsurgency and IW have served as a strong catalyst for Service innovation and education. Sustainment of these efforts post-OEF requires a defined *Service vector* substituting as the catalyst. The alignment of experimentation, exercises, and education through a Service vector would allow for sustained and prioritized focus on future capabilities, and for seizing opportunities in the operational environment. Within the Marine Corps, an innovative drive to develop relevant capability requires a tight alignment and feedback between the Marine Corps Warfighting Lab, PP&O, Marine Corps Intelligence Activity, Center for Naval Analysis, MCCDC G3/5 Concepts, Marine Forces, Training and Education Command, Capability Development Directorate and the Ellis Group. This drive for learning must extend to our Navy and joint partners (e.g., Naval War College, Naval Warfare Development Center, SOCOM, etc.). Existing operational advisory groups and operations summits serve as another mechanism to generate and filter innovation priorities for action. Maturation of Service wargaming capability would allow for the combination of live and virtual exercises, sustained wargame series focused on Service priorities, broad fleet participation in progressive wargaming on specific operating forces challenges, and real-time investigation of the impact of threats or technology on operating concepts. School war games would keep pace with and inform working threat models, concepts, CONOPS and scenarios. The forward-looking energy we have applied to combat innovation must become the norm. The institutional culture of identifying and seizing opportunity exists. A mechanism to guide and track the multiple aspects of Service innovation is required.
- d. **Advance the operational art of naval warfighting.** Advancing operational art is one component to ensuring its continued direct relevance to the challenges and opportunities of geographic and functional combatant commanders. A persistent and ready presence as a component, fully engaged and present in CCDR decision making forums is another. In partnership with the Navy, establishing an *institutional* approach to continuous vision and concept refinement is necessary. This focus on identifying opportunities and challenges in the operational environment should have a mechanism to directly translate the results into Service capability development organizations. The 'flash to bang' for operational needs or shortfalls could be greatly accelerated through the role of the Ellis Group and its Navy counterpart. These organizations can identify opportunities for focused CONOPs or capability development that provides solutions directly relevant to emerging challenges. This would augment and support MARFOR actions with GCC staffs to address near-term planning/operations by using the challenges of today to directly shape the force of tomorrow. An additional element of sustained advancement in the operational art might be reestablishment of centers of excellence for priority mission sets. In the past, the Marine Corps had aligned specific mission-sets with regimental headquarters elements (riverine, long-range heliborne, cold weather, etc.). When operating tempo allows, it may be possible to identify similar mechanisms for tactical refinement and sustained advocacy of key mission areas. Above all, we must educate Marines to operate, command and control, and employ combined arms at the COCOM, JFMCC and MAGTF levels to include integrating SOF, interagency and multinational forces.
- e. **Expand potential for innovation.** A decade of tactical innovation in irregular warfare has occurred in a natural combat laboratory, supported by the urgent needs process. The opportunity in the operating forces for low-cost innovative approaches to the challenges of future amphibious

warfare is ripe for exploitation, but requires an analogous focusing mechanism. An organized but decentralized approach to innovation could leverage the modern information environment, enhanced collaboration techniques, competitive innovation, and laboratories for concept experimentation. The Marine Corps Warfighting Lab, a close partner in this report, is already sponsoring innovation and creating the opportunity to harvest new ideas, support operating force experimentation, conduct competitive innovation in tactics, techniques, and procedures (TTP) development, and fund fleet innovative experimentation. As operating tempo allows, broader inclusion of operating forces in innovating concepts and capabilities would be instrumental in gaining the enthusiasm and institutional alignment. While Service material development policies and programs are shaped by statute, policy and regulation, great latitude exists for innovation in iterative requirements refinement, commercial off-the-shelf experimentation, integration laboratories, and nontraditional mechanisms for decreasing the 'need to fulfillment' timeline. A planned series of experimentation with commercial off-the-shelf equipment through field user evaluations could identify low-cost alternatives to the conventional acquisition process. Innovation for smaller scale developments might avoid the cumbersome acquisition process designed for major systems development.

- f. **Articulate and track a Service vector.** Service-defined priorities establish a unifying vector for experimentation, exercise objectives, capability development, training, and strategic engagement. Multiple guidance mechanisms exist to form the Service vector. Together, the *Commandant's Planning Guidance*, *Marine Corps Vision and Strategy 2025*, and the *United States Marine Corps Service Campaign Plan* provide developmental priorities. The *Expeditionary Force Development System* and the *MAGTF Integration Plan* seek to link combat development and integration with the mandates of these articulated Service priorities. Gaining clear alignment among these elements of guidance would ensure a well-understood Service vector. Renewed Service focus on naval partnership and amphibious missions after a decade of sustained combat operations ashore might require modification to the existing priorities for experimentation, exercise objectives, material development and concept refinement. Clearly articulating this renewed focus in existing guidance documentation or through supplemental guidance would make the outlines of the Service vector clear for the operating forces and the various elements of the supporting establishment. A tracking mechanism for measuring the force's progress along the desired vector might be incorporated into measures like the Strategic Health Assessment and be made subject of a recurring review by the MROC or Executive Off-Site (EOS). A progression of supporting boards may create an effective network of reinforcement for the Service vector. OAGs, the operations summit, MAGTF integration operational planning team, and EOS provide a scaled process for sustained focus on established Service priorities.

(2) ***Achieving the Single Naval Battle.*** The potential for warfighting alignment is strongest through the application of the single naval battle approach.

Elements of Opportunity:

- a. **Seamlessly integrate sea control and littoral power projection.** Sea control and power projection are interdependent naval capabilities that together support the achievement of joint campaign objectives. Warfighting seams develop through isolated perspectives within warfare communities and naval services. Full integration requires that the Marine Corps embrace its role as the extension of sea control into the human environment ashore, and the Navy embrace its role in condition setting for freedom of action both afloat and ashore. Together, a naval force with

integrated capabilities and operating with unified purpose creates a force of choice for the joint force commander. Achieving this level of integration would be enhanced by common concepts for littoral power projection developed through the Ellis Group, Marine Corps Combat Development Command (MCCDC) G3/5 and the Navy Warfare Development Command (NWDC). Links to combined naval service wargames and large scale exercise programs could be created through U.S. Fleet Forces Command, numbered fleets, and the MARFORs. Strong Marine Corps participation in the Air Sea Battle Office continues to ensure that this enabling concept is placed in the context of joint campaign objectives.

- b. **Integrate naval fires capability afloat and ashore.** The single naval battle demands fires networks that link all elements of naval power projection. The integration of carrier-strike aviation, submarines, expeditionary fixed-wing capabilities, missile defense, rotary-wing fires, and surface fire support and ground fires capabilities would provide a powerful tool to the joint force. Once interconnected through common observation, targeting, and fires coordination systems, naval commanders could exploit the power inherent in a large pool of mutually-supporting distributed platforms to achieve a range of effects ashore. There may be opportunity to utilize the Marine Corps Fires OAG as a mechanism for increasing effective integration of fires capabilities.
- c. **Share situational awareness across the littoral battlespace.** The capability for detailed and relevant situational awareness is fundamental to the precision application of firepower, maneuver, and landward effects. Modern amphibious operating concepts depend fundamentally on refined situational awareness. A global naval ISR enterprise that links all elements of the force, afloat and ashore, is achievable and necessary. The enterprise requires easily understood common displays across the force, readily tailored content, integration of multiple data sources, unconventional (open source) information, large volume data-set processing through afloat bandwidth, and a federated maritime operating picture. A global naval ISR enterprise would have mechanisms to share analytic techniques, system technologies, and relevant information with the rest of the joint force, allies, and partners. The Marine Corps Intelligence Surveillance Reconnaissance Enterprise (MCISR-E) is well-postured to create this necessary enabler for littoral operating concepts, and potentially serves as a model for naval integration. Appropriate investment to make situational awareness an indispensable 'commodity' for the MAGTF rather than a specialized 'enabler' establishes the foundation for execution of operations that are precise, lethal and effective.
- d. **Gain full interoperability among C4 systems.** There is considerable opportunity for better integration of Marine Corps communications and command and control systems with Navy systems. Ideally, the naval force would be able to project power from afloat to ashore and back again, without the necessity to establish disparate C2 nodes ashore. The Command Element Advocacy Board (CEAB) may serve as a means for tracking this element of the Service vector. Personnel investments that ensure adequate Marine Corps systems representation and advocacy at the waterfront are a necessity.
- e. **Refine operational level cooperation.** Refinement of JFMCC concepts presents significant opportunities. Maturation of the practice of conducting naval campaigning, managing naval battlespace ashore, combining education, and increased staff integration between Services are required. The art of naval campaigning within the joint force has suffered with recent focus on other necessary priorities. Restoring it would guide the naval force to an efficiency and

effectiveness that would allow it to nimbly defeat even the most sophisticated enemies. Marine participation in regionally focused maritime operations centers or integrated blue-green education and training centers offer potential gains in efficiency and effectiveness. Further exploration of these concepts is necessary, possibly through a naval integration element within MCCDC that expands on the shipbuilding integration already in-place. A single naval battle combined arms exercise, based on a major operation, might become the norm through which we could unambiguously train as we fight as a naval force.

- f. **Integrate mine warfare.** While mine countermeasures (MCM) receive a modicum of investment, a detailed CONOPS that describes “how” the single naval battle force will conduct MCM operations does not exist. Naval forces remain challenged in their ability to conduct amphibious operations within acceptable timelines when mines and obstacles are present. Naval forces must continue to work towards overcoming this deficiency by identifying TTPs, programs, and technologies that have promising potential for use in improving MCM from blue water to the landing beach exit and beyond. There is room for significant innovation beyond existing programs in the MCM mission set.
- g. **Create naval logistics enhancements.** MAGTF logistics (ground and aviation) will remain part of the larger naval logistics umbrella but will soon move from being platform-centric to a logistics capability that is process-centric, expeditionary ready, and flexible with more options in naval support of joint operations from the sea or on land. Experimentation and development of combat service support capabilities that project from platforms at sea should be an essential element of naval experimentation and wargaming. Refined concepts for support to distributed forces must be articulated, experimented, and exercised. Innovative logistics concepts that support lightening combat loads, conduct steady-state support from an operationalized seabase, and provide self-protecting combat logistics capabilities without large footprints ashore require refinement.

(3) ***Littoral Maneuver and Mobility.*** While the Marine Corps is sometimes misperceived as only an 'amphibious assault' force, the vast majority of amphibious operations do not employ large-scale formations attacking frontally from the sea. Naval professionals long ago abandoned linear approaches in favor of littoral maneuver concepts such as OMFTS and STOM. Analogous to maneuver warfare principles ashore, modern amphibious forces use the sea as maneuver space to avoid enemy strengths, bypass fixed defenses, exploit gaps, and create advantage. The rapid deployment of forces from the sea over unimproved coastline or through degraded ports, without reliance on host-nation support, is a unique contribution of the amphibious force to the joint force. Littoral maneuver benefits from a range of mobility options that include aviation, boats, self-propelled amphibians, and surface connectors that can maneuver across the breadth of a littoral operating area. In littoral maneuver, the tempo advantage over the enemy's ability to detect or respond is of greater direct relevance than the absolute speed of the conveyance. Amphibious forces retain their ability to employ littoral maneuver through a number of conveyances, even if threat conditions dictate greater stand-off ranges. Ensuring access (afloat or ashore) in contested global commons requires the ability to gain local superiority against littoral threats in the air, maritime, and land domains. Naval forces use their inherent multidomain agility to deceive, overcome or out-tempo threats ashore. *Graphical representations of the range rings of threat systems are at times erroneously perceived as impenetrable barriers.* The naval force has the mission to overcome access challenges through exploitation of time, space, tempo, and multidomain asymmetry.

Elements of Opportunity:

- a. **Shape the fight through littoral maneuver.** A seabased force has a unique ability to control the timing and tempo of an engagement as well as the battlespace geometry. Naval forces choose when and where to give battle. These characteristics of naval maneuver convey significant advantages to naval forces when they are confronted with A2AD challenges. Amphibious capabilities allow seizure of advanced expeditionary air or seabases, or deny them to an enemy. Naval fires create conditions for ensuring access ashore. Strikes and raids projected ashore can eliminate hidden or protected antiship weapons systems. Combined with the advantages of ASB, littoral maneuver capabilities provide the naval force with the ability to defeat or create gaps in the adversary A2AD system by striking across multiple domains. SOCOM and specifically a maritime MARSOC capability provide for advanced force operations in conjunction with naval assets.
- b. **Incorporate deception and surprise as key elements.** Against a wide variety of opponents, naval forces have the inherent ability to create dilemmas for the enemy over wide areas. Using deception in multiple domains to affect surprise is a force multiplier. This ability strains the situational awareness of an enemy, and creates gaps in integrated systems. Naval forces can use this leverage against poorly organized, irregular, or unconventional opponents to minimize collateral damage or keep opposition off balance.
- c. **Gain landing site superiority.** Future operations require a new way of thinking about achieving landing site superiority, akin to air or sea superiority. Littoral maneuver, bypassing enemy strengths, envelopment, offset, and deception create viable alternatives to linear frontal assault across defended beaches. This superiority does not have to extend across the entirety of the battlespace. Local superiority at the time and place of the commander's choosing is frequently sufficient to project distributed forces ashore. The tenets of this approach include using initial vertical insertions or clandestine teams as the initial element of an operation and as needed, with distributed surface operations taking advantage of the speed and maneuverability of surface

connectors and self-propelled amphibious combat vehicles to quickly reinforce initial progress. Securing landing site superiority requires control of seaward approaches, landing areas, and the ability to inhibit threat reactions. A single naval battle approach provides the detailed synchronization of air, sea, and land maneuver. Study, innovation and experimentation in the principles of achieving temporary landing site superiority lie at the core of modern amphibious concepts. Detailed modeling and experimentation along a clearly-defined Service vector is necessary.

- d. **Build a comprehensive surface amphibious lift system.** Viewing the amphibious lift challenge as a *system* enables the force to create alternative solutions. The ability of the amphibious force to place landing force elements ashore is shaped and constrained by the sealift platforms that transport them. Modern platforms, such as the Mobile Landing Platform (MLP) and Joint High Speed Vessel (JHSV) significantly expand the utility and responsiveness of naval forces and must be fully integrated into modern operating concepts. Employing unconventional capabilities for maneuver could create potentially game-changing advancements. For instance, the capability to conduct rapid ship-to-ship transfers between cargo ships and amphibious ships could transform an amphibious ship into a *reloadable connector*, enabling the immediate reinforcement of an assault echelon ashore without the seizure of port facilities. The tactical and operational utility of maritime prepositioning ships is dramatically increased by the over the horizon, in-stream offload enabled by the MLP.
- e. **Ensure the continued health of the surface connector fleet.** The ability to maneuver swiftly at sea over long distances to deliver large volumes of combat power and cargo directly over an unimproved shoreline opens a wide range of options for the joint force. Surface connectors are a critical dependency of the current force, and will become even more so in future A2AD environments. Today, only a portion of the infantry assault echelon of the MAGTF goes ashore via air or AAVs. For larger operations or those requiring heavy equipment, weapons or transportation assets, the majority of MAGTF ground combat power and combat service/support requires surface connectors (landing craft and lighterage) for ship-to-shore deployment and sustainment. This dependency will likely increase in the future, but connector inventories are anticipated to decline to below required capacity by 2019. Increased standoff ranges imposed by the threat coupled with a gap in forecasted fleet inventories challenge littoral maneuver assumptions and naval warfighting capabilities. Recognizing the central dependency of littoral power projection on a sustained fleet of air and surface connector craft is essential. A stable fleet of surface connectors is one of the most vital Navy investments impacting the Navy and Marine Corps team's ability to conduct littoral maneuver. Maintaining a coordinated capability development effort with shared focus and advocacy to fully fund the connector fleet is essential. A more detailed treatment of surface connectors is found in the *Supporting Issue Papers* section of the ACWG report.

(4) *Force Posture and Aggregation.* The elements of force posture and aggregation describe how the force organizes for combat while at home station, how it plans to aggregate for large scale employment, and how it postures itself forward to ensure it remains ready to immediately respond to crisis and reinforce initial capabilities. These concepts are essential to warfighting effectiveness, and dictate the terms upon which naval forces are integrated into the joint campaign. Command and support relationships must not be first developed while under the guns of the enemy. A naval expeditionary system (NES) describes the principle of bringing the many components of the expeditionary force into predictable and practiced packages that can be rapidly applied to the requirements of the security situation. A mature NES would synchronize the training, readiness, and deployment of naval expeditionary forces, premised on warfighting demand and steady-state mission requirements.

Elements of Opportunity:

- a. **Explore alternatives to expand capacity for forward presence.** In FY11, forward deployed ARG/MEUs were able to satisfy just over half of GCC demand for amphibious forces. With a limited availability of amphibious shipping, and an increasing mandate for forward-deployed capabilities for Marines, innovative mechanisms for satisfying GCC demand must be considered. While MCM remains a priority for the Littoral Combat Ship, other platforms may enhance forward presence and operational preparation of the environment. Integration of standing MEB headquarters, JHSV and the future utilization of MLP offer potential options for providing flexible response options from the sea. Combining these innovation approaches with the opportunity to gain greater integration with special operations offers increased ability to meet the specific demands of GCCs.
- b. **Enhance the naval expeditionary system.** The capabilities necessary to operate in the littorals are made most effective when components of the naval force have trained to leverage each other's capabilities. Synchronizing training, readiness, and deployment to maximize limited shipping ensures relevant response timelines. Where rapid aggregation of forces is required, the NES must provide building blocks that have trained to the same standards, understand C2 relationships, have interoperable equipment, and operate with common battlefield understanding. NES provides the common tactics, techniques, and procedures for intelligence, command and control, fires, maneuver, logistics, and force protection. The NES is an essential enabling element of ad-hoc task-organized arrangements in combat. Component elements of a naval force that understand and have practiced their role in a networked force can more readily support ad-hoc task organizations or mission-tailored formations. Forces must be trained and exercised at each level to allow for orderly aggregation into a capable contingency or crisis response force.
- c. **Expand concepts for standing MAGTFs.** The Navy and Marine Corps have long recognized that the most effective way to build a force is through the flexible task organization of combined arms teams. Modern missions and response times suggest the utility of standing combined arms forces that only require tailoring on the margins when a specific mission is assigned. Standing MAGTFs and larger naval formations, complemented by a range of specialized mission modules, would allow mission tailoring around a well-trained and highly cohesive base. While standing MEFs are the norm, experimentation with adaptive force packaging options at other echelons of the MAGTF may be useful. Similarly innovation in flexible task organization beyond the standard MEU/MEB/MEF constructs may facilitate external understanding of the utility and flexibility of the amphibious team.

- d. **Aggregate combat formations effectively.** Arrival of forces during crisis response operations requires an aggregation plan that integrates capabilities into a flexible and adaptable force. In most cases, crisis response missions will require us to build a force around a forward deployed ARG/MEU. Widely dispersed elements must rapidly aggregate to achieve combat mass, underscoring the need for trained and practiced units with common tactics, techniques, and procedures. Modular supporting teams with specialized skill sets can rapidly increase the effectiveness of a deploying force. Various force enhancement modules, such as maritime prepositioned assets, ACE enhancement packages, air alert forces, and specialized capability force modules may be pre-identified and available to meet emergent missions. The identification of reinforcing elements for deployed MAGTFs on a variant of 'ready MAGTF' or 'strip alert' status would also increase responsiveness in larger contingencies. Assault follow-on echelons (AFOEs) and fly-in echelons affiliated with standing plans and foreseeable contingencies should be predefined and exercised regularly. Crafting and rehearsing these elements will speed response times, eliminate friction in employment, and better prepare the utilizing force. Combined training and systems interoperability across the force must ensure sufficient operational readiness of the adaptively-packaged forces that follow the assault echelon. Integrating these concepts, including necessary shipping, into exercise plans is necessary. A single naval battle combined arms exercise, based on a major operation, might become the norm through which we could unambiguously train as we would fight as a naval force.
- e. **Operationalize the seabase as a joint, interagency, and littoral enabler.** Getting there quickly is not enough. In an austere environment, sustainment is the true measure of an 'expeditionary' force, and is a unique characteristic of maritime forces operating from the sea. An operationalized seabase integrated into steady state operating concepts would leverage the tremendous potential utility of the seabase. In many missions the seabase could serve as a joint or interagency resource. For linking the naturally complementary capabilities of the MAGTF and special operations forces, the seabase provides a ready platform from which to conduct the full range of primary and supporting missions. Reserving afloat prepositioned resources for only major contingencies masks this potential. The naval force must develop innovative new concepts for employing intra-theater sea lift/seabase platforms in amphibious and littoral operations. This would enable unprecedented freedom of maneuver for projecting forces and sustaining them over significant operational distances. By combining the cargo capacity of prepositioned ships and the speed of transport aircraft and high speed connectors, together with a fly-in echelon of Marines, the naval service and naval amphibious force could quickly construct a capability immediately relevant to steady-state operations and contingencies, greatly increasing the efficacy and efficiency of prepositioned stocks.

(5) **MAGTF Capabilities.** Core MAGTF capabilities remain at the center of the combat effectiveness of a littoral crisis response or forcible entry force. The ACWG efforts suggest additional considerations for the development of specific capability sets.

Elements of Opportunity:

- a. **Enhance military deception, obscurants, camouflage, and emissions control.** As modern enemies close the technological gap, gaining some level of precision capability, methods to reduce unit and platform signatures (visual, electromagnetic, thermal, hyper spectral, audible and informational) must be investigated. Signature reduction or disguise is essential to force protection and maneuver advantage in a modern A2AD or hybrid threat environment. The ‘battle of signatures’ requires a return to force discipline and investment in methods that deny the enemy the ability to target the littoral naval force, and identify enemy signatures. Especially in the presence of A2AD or G-RAMM threats, naval forces must gain and maintain dominance in the battle of signatures through disciplined use of the electromagnetic spectrum, utilization of emissions control, light discipline, camouflage, deception, and obscurants.
- b. **Incorporate full capabilities of the modern aviation combat element (ACE).** The operating concepts that leverage littoral maneuver are greatly enabled by the successful advancement in ACE capabilities. New capabilities, including the MV-22B, enable critical elements of the landing force to launch from hundreds of miles out to sea. The speed and increased capacity (double the CH-46) of the MV-22B enable increased sorties and greater lift per sortie. In the case of raids or other precision or limited-objective operations for which the ground force consists largely of Marine infantry, reconnaissance, or special operations forces, the ACE can often lift the entire ground force for the duration of the operation, including littoral maneuver, insertion, maneuver across land, extraction, and return to the sea. Even in the case of larger operations such as amphibious assaults, the modern ACE has the capacity to lift a significantly larger portion of the infantry assault echelon during the initial hours of an operation, enabling the landing force to bypass defenses, rapidly seize penetration points and maneuver deep inland. In some cases, such aviation delivered forces can fight their way back to secure surface landing areas to allow the flow of MAGTF combat power/support over the beach. While modern aviation platforms have been realized, the experimentation with their potential impact on operating concepts is not yet complete. The impacts of the MV-22B, Small Tactical Unmanned Air Systems (STUAS), CH-53K, AH-1Z, UH-1Y, and F-35B must be fully assessed from a MAGTF perspective.
- c. **Realize persistent ISR and situational awareness.** Modern amphibious operations are premised on striking gaps and seams in threat capabilities, offsetting and enveloping fixed defenses, and using smaller formations distributed over the depth of the battlespace. These concepts are premised on robust tactical intelligence collection capabilities, persistent surveillance of threats, advanced analytical capabilities, and immediate dissemination of relevant tactical information. A standing battlefield challenge is the fact that Marines furthest forward, away from battlefield command and control nodes, require the greatest fidelity of intelligence information. Battlefield decision makers, from Team Leader to Commanding General, must gain from automated knowledge generation that allows the MAGTF to ‘see, understand and act.’ ISR has undergone dramatic improvements in just the last decade, but remains insufficient to support modern operating concepts to the full degree desired. Innovation in intelligence collection, integration of joint assets, nonstandard intelligence sources, advanced analytics and automated ‘smart’ push techniques are necessary. Intelligence architecture must be defined to incorporate

these elements, train with them, and habituate the operating forces to the level of battlefield fidelity they can expect from the intelligence enterprise. MAGTF, SOF, naval and joint ISR must be fused to provide real time, integrated intelligence.

- d. **Increase the role of unmanned systems.** The potential for unmanned systems to reduce the requirement for putting Marines into dangerous situations is high. These technologies are applicable across a wide range of sizes and missions. While unmanned aircraft systems are becoming more commonplace, explosive ordnance disposal (EOD) robots, PACBOTs, and other small-scale gadgets offer useful examples of expanded utility for the automation of dangerous combat tasks. Many unmanned capabilities would be an extremely cost effective means of protecting Marines. A family of affordable unmanned systems need not be particularly sophisticated, intelligent or costly to accomplish the mission. Unmanned systems used to conduct minefield detection and breaching could improve survivability in assault echelons. The very shallow water (VSW) mine threat presents an opportunity for focused experimentation by the naval services. Unmanned combat systems that provided landing zone suppression could similarly expand the viability of vertical envelopments. A swarm of reconnaissance robots under the control of a small team could expand coverage area for screening and scouting missions. The potential scope of these systems is all-encompassing. Logistics tasks, mobility-enablers, remote intelligence collection, language translators, biometric systems, deception tools, and force protection surveillance are all suggestive areas for concept development. These combat enablers might be employed across every physical domain: air, maritime, and land.
- e. **Embrace enhanced MAGTF operations (EMO), distributed operations (DO) and alternative landing team compositions.** The emerging ability to truly integrate the effects and capabilities of the naval/joint force may enable smaller landing forces to operate as self-contained and self-supporting combined arms teams. With emerging battlefield capabilities, small teams may now have the ability to generate the effects once associated with much larger formations. Landing force elements must be able to be emplaced in single waves, with immediate command and control, combined arms, and relevant mobility capabilities. The infantry company is one option for consideration as the core of such a capability - small enough to be inserted in a single wave, but large enough to present a capable force immediately. Company landing teams (CLT) can be formed for either surface or vertical assault, and can be tailored to foot, waterborne, heliborne, or motorized/mechanized mobility. A CLT-based approach to the landing force (or another alternative sizing) will have significant impacts on the organization of the landing force, the embarkation of the force, and the scheme of maneuver across the entire ship to objective spectrum. While these concepts have been foundational for Marine Corps operations for more than a decade, additional analysis is required to ascertain if organizational changes are required to facilitate training and execution of these mission sets. An implication of smaller teams conducting more advanced mission sets is the increased maturity and experience of the team members. Guided experimentation and innovation in the operating forces (when combat operating tempo allows) will accelerate the maturation of these concepts, and rapidly identify organizational changes or equipment shortfalls that must be pursued through the combat development process.
- f. **Train to a broader range of amphibious mission sets.** CONOPS refinement for mission sets normally associated only with MEU operations may gain greater importance for the larger force. If smaller landing teams are created, more specialized skillsets may be required to support them. If Navy investment in littoral capabilities wanes (or increasing parts of these capabilities are

placed in reserve), it may be necessary for Marines to take a larger role in a variety of essential enabling expeditionary skills. Riverine operations, littoral patrolling, amphibious reconnaissance, visit board search seizure (VBSS), combat cargo handling, well deck operations, amphibious planning, pre-assault operations, coxswains, small-boat tactics (particularly in the Pacific region and Southeast Asia), defeat of fast inshore attack craft (FIAC), and MAGTF support to special operations are skill sets that have been under emphasized over the last ten years. Many of these have historical alignment with the role of Marines. Defining and prioritizing these missions and developing a comprehensive approach to meeting their requirements are essential. Establishing training facilities, courses, and opportunities would require additional attention.

- g. **Refine the amphibious raid force.** Prioritization of the global commons and littoral access in national strategic guidance creates high potential demand for an amphibious raid force. That demand is reinforced by mandates for small-footprint operations ashore, without undesired entanglement or basing requirements. Small-scale amphibious raids are an historical forte for the Marine Corps. Raid forces go ashore only for the duration of the mission objectives, then expeditiously return to the sea. They also play a key role in the alignment of capabilities of the Marine Corps and SOF. Amphibious raids (small or large in scale) to deny terrorist sanctuary, secure potential WMD sites, conduct raids of ships, eliminate pirate safe havens or destroy threat capabilities in port are essential national capabilities. Whether aviation or small craft based, launched from amphibious shipping or shore-to-shore, these are complex operations, requiring extensive training and rehearsal. Gaining and maintaining the equipment sets, training, CONOPS, and organizational billets associated with this capability is a pressing requirement of the Nation's strategic pivot and the emerging security environment.
- h. **Build reachback elements for the MAGTF and interagency support.** The demand for low-footprint operations ashore and limited amphibious lift capacity may necessitate increased reliance on reachback elements of deployed MAGTFs. Similarly, the first-responder force will require reachback to the other elements of the joint and interagency communities to align all of the elements of national power with the mission at hand. The development of intelligence reachback to MCIA and the regional MAGTF Intelligence Centers is an example of an enterprise approach to MAGTF support. Expanding this idea may identify additional elements of capability that can be supported from a distance, tethered to deployed forces in forward locations (similar to KC-130 support concepts) or on a rapid reinforcement standby timeline in CONUS for support activities not part of the assault echelon. Direct tie-ins to standing Joint Interagency Task Forces (JIATF) in the continental United States (or in-theater) facilitate Marine forces as the execution arm for a wide variety of national capabilities. Careful selection of Marine Corps members of larger JIATF or JTF staffs facilitates this utilization. Marines on key staffs and in high-leverage billets are solid investments in force relevance and alignment with decision-making processes.
- i. **Educate and train *littoral warriors* comfortable operating in the littoral environment.** Operations in the maritime domain are inherently challenging. Training and educating littoral warriors must prepare them to out-think sophisticated enemies, not only overpower them. Sailors and Marines must possess a high level of professional knowledge and intellectual acumen, and be carefully attuned to the demands of the physical and human dimensions of the maritime environment. While this has always been true, strategic priorities mandate that training, education, and professional development (both officer and enlisted) must be undertaken from a profoundly naval perspective. To effectively bridge the seams between water and land in the 21st century, Marines must understand the art and science of naval campaigning. Building on that

naval character, they must be capable of effectively working with the other services, other government agencies, nongovernmental organizations, U.S. allies, or other international partners. Increasingly complex threats necessitate Marines and Sailors that are comfortable operating overseas, in remote locations, in a human environment populated by cultures unlike their own. Enhancement and prioritization of regional expertise will gain in importance as Marines become instruments of theater engagement. Investment in programs such as the regional area officer, foreign area officer, foreign exchange programs to non-western nations, increasing opportunities for coalition experience, and nonstandard foreign education opportunities would all contribute to a sustained high maturity and experience level across the force, especially in its mid-grade leaders. Relevant foreign language skills remain a key shortfall across the force, and might be further incentivized. Future advances in realistic training might make greater use of languages and culture, similar to those found in immersion trainers today.

- j. **Develop new CONOPS focused on defeating future threats.** Strategic priorities, joint concepts, and changing threat environments demand continued innovation in littoral power projection. The maturation of amphibious assault capabilities for the 21st century must build on existing and programmed systems, and balance a range of mobility options for multiple employment scenarios. Modern operating concepts seek to avoid frontal assaults on defended beaches, but more modeling, analysis, and experimentation with a variety of assault means is needed to refine the tactics and capabilities needed to defeat future A2/AD systems. An agile and versatile portfolio of assault delivery means is an important element of a joint amphibious combined-arms system. The amphibious component must be able to create effects in the littorals in all domains simultaneously. For example, the ability to project power from sea to shore via surface and air will cause an enemy to distribute his defenses across likely penetration points - beach landing sites and inland landing zones. Given the variability of missions and terrain, it is useful to have multiple means of projecting power ashore to include a variety of surface effects and displacement craft, boats, helicopters, and airborne forces. In many circumstances, unmanned systems will create the desired effects in surface, sub-surface, and air domains and should be considered first. Delivery of forces by small craft allows leveraging complex terrain where typical beaches are not available, and where the enemy cannot effectively defend. Air-delivered assault, airborne forces, and joint fires create depth in the battlespace, requiring an enemy to defend in depth. It is the synergy of effects these various capabilities provide that make the naval expeditionary system such a useful asset to the combatant commander. Additional analysis and wargaming is required to identify necessary adjustments to CONOPs, organizational design, and equipment.
- k. **Expand mobility options for STOM and distributed operations.** Landing forces have mobility requirements beyond the mechanized vehicles that provide protected mobility to infantry battalions. STOM and distributed operations are designed to project combat power inland up to hundreds of miles from the sea with forces distributed throughout the depth of the battlespace. Through STOM and distributed operations, battlefield effects historically associated with larger units can be achieved by smaller formations with enhanced capabilities. Individual Marines can move quickly over difficult terrain by foot, but small formations carrying the additional unit equipment, multi-day logistics and increased communications capabilities associated with their enhanced battlefield role, will require some level of battlefield mobility. External sling-loading of support vehicles in an environment containing a MANPAD threat is challenging, and places both aircraft and the supported force at some risk. Having internally-transportable support vehicles in the hands of light infantry units would dramatically increase the viability of modern

operating concepts. Commercially-developed all terrain vehicle technology has been adapted to military use by SOF already, and might provide a readily-transportable mobility solution for some distributed missions. Similarly, recent demonstrations by MCWL of satellite networking capability mounted in internally transportable vehicles provide an example of this mission potential. Commercially-derived all terrain vehicles, internally transportable vehicles, and other potentially cost-effective methods must be explored to augment the vehicle portfolio for these light units operating at long distance. Additional innovation in mobility and support is necessary, and should be the subject of a specific capability based assessment.

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Supporting Issue Papers

Marines and Special Operations

Thesis. The Marine Corps and SOCOM should examine current capabilities and missions in order to leverage the unique capabilities of each organization, thus enhancing interoperability; establish and continue the interface between CONUS-based and theater based special operations forces and deploying Marine Air Ground Task Forces. Consideration should be given to further leverage their complementary nature, increase interoperability, and work toward improved integration in forward engagement, crisis response, shaping the environment, and combat operations in order to achieve geographical and functional combatant commander's goals. SOCOM's maritime SOF capability and the MAGTF have a naturally complementary relationship in the littorals that could be better exploited through better interoperability and coordinated efforts in forward presence and military engagement, crisis response, and contingency and major operations. The interoperability and integration of SOF (and their authorities) and multi-capable, strategically mobile Marines provide the Geographic Combatant Commander a cost-effective means to project influence and power across a broad range of compelling missions to include security force assistance, deterrence, sanctuary denial, counterterrorism and counter-proliferation.

1. Complementary Nature. Marines and SOF are naturally, mutually, and highly complementary. They share a number of unique characteristics, and have demonstrated their complementary capabilities and interoperability with impressive results since the inception of USSOCOM, including during combat operations of the past decade.

a. Marines and SOF both ...

- Are forward deployed in areas of national concern or adjacent littorals
- Minimize U.S. footprint on the ground
- Conduct forward engagement (FE) actively and continuously
- Deter conflict through security force assistance (SFA)
- Respond immediately to crisis from their uniquely forward-deployed positions
- Bring multi-domain force with integrated sea, air, and ground capability
- Contain brushfires from becoming conflagrations
- Shape the operating environment for follow-on forces
- Emphasize small unit leadership
- Share a strong cultural affinity derived in part from their commitment and ability to accomplish challenging missions across all domains in austere and expeditionary.

b. Marines can complement SOF with...

- ***Rapid Scalability and Complementary Capability.*** MAGTFs provide complementary capacity and capability in C2, ISR, sustainment, fires, force protection, maneuver and mobility (strategic, operational and tactical). Marines can flexibly integrate SOF capability when missions require joint capability and capacity. The opening stages of Afghanistan in 2001 demonstrate the value of an integrated approach in which SOF and Marines coordinated an attack on the Taliban / Al Qaeda network and influenced Afghan allies. These fast paced and flexible operations extended the operating area beyond the enemy's ability to cope. In this dynamic and irregular battlefield, SOF and Marines flexibly shifted between supported and supporting operational relationships.

- Marines and MAGTFs are forward deployed as part of the naval amphibious force, positioned in close proximity to SOF. Because the amphibious force requires no foreign basing for staging or sustainment, Marines minimize the U.S. footprint on the ground and obviate the need for the negotiation of sovereign approval from an adjacent country for over-flight or basing rights. From there, they can provide the CCDR or TSOC with an immediate and adjustable rheostat of response options that blend smoothly with SOF. They can escalate quickly and flexibly with adjustable and appropriate levels of force.
 - Beginning with persuasive deterrence, the Marines can escalate with scalable intelligence, surveillance, reconnaissance, shaping, and – when the situation demands – overwhelming combat power. Marines can bring to bear the full, self-contained, joint-like organic sea, air, and ground combat capabilities of the MAGTF as well as those of the ships of the accompanying naval amphibious force. Throughout a crisis or operation, they can maintain as light a presence ashore as the situation will permit. Upon completion, they can withdraw as quickly as they landed, return to the ships, and depart the area.
 - Many security force assistance (SFA) missions do not require specialized SOF skills or are enhanced by a joint approach. These SFA missions should be carefully assigned according to national interest, required capability and the potential to support a rapid transition to crisis and contingency response. They are an essential means to regional influence and preparation of the environment.
- ***Irregular warfare Capabilities.*** The MAGTF is more capable than ever of executing and supporting Irregular Warfare (IW), including missions such as counterinsurgency, security force assistance training advising and mentoring, security cooperation, stability operations, civil military operations, law enforcement in support of IW, intelligence and counterintelligence, and support to counter-terrorism. With the Marine Corps' historical institutional commitment to "Small Wars" in general, the MAGTF brings an important, committed IW capability to the littoral security environment and is a ready USSOCOM partner in that arena.
 - ***Enablers, Support, and Sustainment.*** The MAGTF and amphibious force can provide powerful enablers, support, and sustainment to provide strategic mobility and loiter to SOF and to significantly extend the range and capabilities of SOF. The MAGTF and SOF together can maintain a far more enduring presence in an area, focusing on the steady state and crisis response operational environments. When task-organized to do so, the sea-based Navy-Marine force can provide instant basing and sustainment for SOF. In addition, Marines can generate and provide SOF ashore with scalable, responsive, and flexible enablers from the sea through the self-contained joint-like capabilities of the MAGTF, such as ISR, maneuver, sea/air/ground mobility, fires, attack air, logistics, and command and control.
 - ***Broader and Reinforced Missions.*** The Marine Corps can integrate with SOF to broaden and reinforce the range, scope and scale of SOF missions. Capacity and capabilities of Marines and MAGTFs that directly reinforce SOF include:
 - Shaping the operating environment
 - Amphibious pre-assault operations
 - Supporting counter-terror (CT) missions by denying sanctuary.
 - Supporting counter-proliferation (CP) missions by controlling areas.

- Visit, board, search and seizure (VBSS) operations against hostile ships, boats, platforms, or other targets in the littorals
- Tactical recovery of aircraft and personnel (TRAP) operations
- Security force assistance (SFA) in support of SOF foreign internal defense (FID)
- Reconnaissance, including beach studies, deep reconnaissance, surveillance, strike support
- Clandestine insertion and extraction
- Production of joint force intelligence, surveillance, and reconnaissance (ISR) products
- Signals intelligence operations
- Electronic warfare (EW)
- Scalable Raids to include target sets that exceed SOF capacity
- Forward control of air and fires in support of coalition or foreign military forces
- Noncombatant evacuation operations (NEO)
- Airfield seizure
- Seizure of advance naval base or port
- Information operations (IO)
- Force protection for SOF (e.g., objective area isolation and security)

- **Critical SOF Component.** MARSOC Marines are SOF. Under the combatant command of USSOCOM, they provide a critical component to USSOCOM, especially during periods of significantly expanded special operations. The Marine Corps mans MARSOC with mature, well trained Marines and equips them with a myriad of Service common items. They bring to SOCOM the committed culture and professional character of U.S. Marines. Their roots in the amphibious force position them potentially to assist SOCOM interoperability with the MAGTF and the naval force—especially in advanced force operations. MARSOC is also an important and fundamental foundation to the relationship between Marines and SOF. Marines who serve with MARSOC and subsequently return to Marine general purpose forces facilitate increased interoperability between SOF and the Marine Corps. MARSOC's presence and success within USSOCOM reinforces the relationship between Marines and SOF.

c. SOF can complement Marines with...

- **Pre-Existing Presence.** SOF placement and access across the globe often translates into a pre-existing forward presence in an amphibious force objective area. SOF often have specialized knowledge and relationships in the area that can help a naval amphibious force and the Marines of its MAGTF plan and prepare for an expeditionary operation.
- **Shaping of the Operating Environment.** As a forward and regionally attuned force, SOF often can assist strategically mobile amphibious forces through preparation of the environment that enables littoral maneuver and MAGTF operations. When directed, SOF can help the amphibious force shape the littoral environment to enable sea control and power projection across the MAGTF domains of maritime, air, and land, whether for a small Marine raid operation or a larger MAGTF amphibious operation. Effectively combining these capabilities requires joint strategic planning, transparent operational command and control and prior tactical interoperability training.
- **Support to Crisis Response and Contingency Operations.** When directed, SOF can complement the MAGTF with special operations executed in support of amphibious operations, from small raids to major combat.

2. Obstacles to improved interoperability. Currently there are some obstacles that prevent SOF from fully leveraging the complementary capabilities of Marines and MAGTFs to reinforce SOF missions. Fortunately, the Marine Corps, USSOCOM, and the Navy can collaborate to reduce them.

a. The joint force is not fully informed about MAGTF capabilities. In particular, the TSOCs, GCCs, and USSOCOM staffs often are not fully informed of the capabilities and characteristics that differentiate MAGTFs and make them so especially effective in providing forward deployed SOF with direct reinforcement, enabling support, and rapid scalability. As a result at times, the TSOCs and GCCs may not request or employ Marines, MAGTFs, or amphibious forces when those forces could well complement SOF in its forward engagement, crisis response, and operational preparation of the environment, especially where there is limited SOF capacity.

b. Interoperability as a basis for integration. Although Marines and SOF have integrated and demonstrated interoperability for years, especially in Iraq and Afghanistan, they have done so largely on an ad hoc basis, without formal institutional policies, doctrine, or training. Interoperability has been based largely on personalities that have simply leveraged the natural complementary capabilities and cultural affinities. We lack a concept describing how naval services and USSOCOM might collaborate with regard to forward engagement, crisis response, preparation of the environment, and advance force operations or that establishes mutual expectations regarding operations and interoperability training prior to deployment. While the Multi-Service Concept for Irregular Warfare (IW) that the Marine Corps and USSOCOM published together in 2006 could serve a model for future concepts, it is limited in scope to IW and does not explicitly address amphibious, expeditionary or special operations. The concept would form the basis for DOTMLP-F change leading to better support of the common (GCC, JTF, functional component) commander.

There is an historic opportunity now for the Marine Corps (and its MARFORs and MAGTFs) to collaborate with USSOCOM (and its TSOCs), to institutionalize the interoperability between Marines and SOF, to make it enduring, to ensure that any CCDR can exploit it anytime or anywhere, to further leverage the complementary capabilities, to fully integrate where appropriate, and to best meet CCDR requirements and national objectives. By leveraging their common forward posture, expeditionary capability, and inherent flexibility, USSOCOM, Navy, and Marine Corps could significantly increase the capability, capacity, and availability of the joint force to meet GCC requirements.

c. Institutional coordination is limited. Although USSOCOM and the Marine Corps already coordinate on a number of institutional topics, important topics remain relatively unexplored:

- **Seabasing.** National constraints in amphibious and other shipping limit the ability of both the Marine Corps and USSOCOM to have all the sea platforms they would like. But the Marine Corps, USSOCOM, and Navy have not collaborated fully to leverage the existing seabasing assets in a coordinated manner that ensures optimal multi-Service capacity, capability, compatibility, and maritime interoperability.
- **Capacity and Capability Gaps**
 - USSOCOM currently is seeking supporting Service capability for forward deployed SOF. Greater Marine Corps and USSOCOM collaboration is a potentially cost-effective means to

field complementary capability. Importantly, USSOCOM could close these potential gaps in capacity without adding force structure.

- Marines and amphibious forces, including ARG/MEUs, are more capable now than ever. However, USSOCOM can provide special operations capabilities and authorities that are complementary. Importantly, the Marine Corps can close potential gaps in areas such as reconnaissance and advance force operations without adding force structure.

d. Terminology is inconsistent. Marines and SOF use some inconsistent terminology. This is partly because terms such as special operations and advance force operations have evolved over the past decade. This has led to occasional confusion within the GCCs and the joint force. This has limited interoperability, increased operational friction and limited the potential for integrated operations.

3. Recommendations. There are five areas of recommendation designed to remove obstacles and make the unique relationship between amphibious and special operations forces even more valuable to national security.

- a. **Inform the joint force.** Inform and educate TSOCs, USSOCOM, GCCs, and other national security policy and decision makers regarding the unique expeditionary capabilities of Marines, MAGTFs, and the Marine Corps. Emphasize specifically their ability to interoperate with and complement SOF, the TSOCs, and USSOCOM.

Conduct a manpower assessment and adjust officer assignments, including joint duty assignments, to ensure every combatant command, component, and subordinate organization has sufficient Marine and joint billets to fully inform the joint force of Marine and MAGTF capabilities. Ensure that Marine officers are assigned to every appropriate billet at the combatant commands and TSOCs.

In addition to other established billets, review each CCDR's TSOC manning to ensure the assignment of a full-time senior Marine representative to serve as the permanent co-located liaison of the MARFOR.

- b. **Formalize interoperability.** Collaborate with USSOCOM (as well as Navy and Coast Guard) to create a Multi-Service Concept to describe how naval services and USSOCOM can coordinate and mutually support the conduct of forward engagement, crisis response, preparation of the environment, distributed operations, and combat operations in order to achieve GCC goals, objectives and effects today and in the future environment.

Include in the Concept: how the MAGTF and amphibious force can support SOF operations; how SOF can support MAGTF and naval force operations; how SOF and naval amphibious forces can smoothly blend their complementary capabilities; how SOF and the amphibious force can conduct multi-Service pre-deployment training and exercises together; and how the reporting relationships might work, including placing a MAGTF under the command and control of a TSOC, or placing a SOF force in support of a naval force for an amphibious operation.

The Concept should exploit the complementary forward posture, expeditionary capability, and inherent flexibility of USSOCOM and the naval force. It should serve as a launching pad for integrated experimentation, wargaming, exercises, forward engagement, deployments, and

operations. It should provide a solid framework for implementing the integration through conformed terminology, Title 10 and 50 functions, training, education, and command and control. It should result in significantly increased capability and capacity to meet GCC requirements.

While developing the Concept, continue to coordinate with SOCOM to sustain a close working relationship in steady state and crisis response. Seek to partner with SOCOM on the interoperability of SOF and MAGTF requirements, architecture, and acquisition, in order to leverage their mutually complementary capabilities. Importantly, continue to embrace and grow MARSOC as an institutional priority of the Marine Corps.

- c. ***Collaborate institutionally.*** Collaborate with USSOCOM (as well as Navy and Coast Guard) to develop a mutually supportive solution for SOF and Marines on topics related to the intersections of their respective roles and responsibilities. Include how the amphibious force can coordinate seabasing and provide ESS such as combined arms scalability by leveraging existing MAGTF and amphibious force capabilities.
- d. ***Create common terminology.*** Coordinate with SOCOM and the joint force to develop mutually agreed-upon multi-Service terminology and joint doctrinal definitions for terms related to special operations and the other intersections of Marine and SOF capabilities. Create consistency between Marines and SOF, reduce historic friction, enhance mutual credibility, reinforce a collaborative working relationship, and accelerate execution of the other recommendations to inform the joint force, formalize the interoperability, collaborate institutionally with SOCOM, and close potential gaps in MAGTF capability.
- e. ***Integrate ISR.*** Enable internal unity of effort and external alignment with SOF across MAGTF ISR and shaping functions. Consider unifying relevant Marine ISR and shaping units such as intelligence battalion, radio battalion, reconnaissance battalion, and air and naval gunfire liaison company.

4. Recent Vignettes. Recent history is replete with powerful examples of Marines conducting missions that can uniquely complement SOF. Marines with MARSOC, as a component of USCOCOM, have continuously conducted successful SOF missions. At the same time, Marines with MAGTFs and other fleet forces have executed missions that effectively complement SOF through scalability, support, and direct reinforcement. Examples:

- In 2011 in Libya, Marines from the USS Kearsarge board Marine MV-22 Osprey tilt-rotors and fly 130 nautical miles on a **TRAP** mission to rescue a downed USAF pilot, accompanied by Marine AV-8B Harrier jump jets that drop munitions to deter approaching enemy. The MEU is prepared to conduct **counter-proliferation** missions as the situation destabilizes.
- In 2010 off the Yemen coast, Marines from the USS Dubuque conduct a **VBSS** mission to launch a raid on the Magellan Star, tactically defeat and detain **pirates**, and free their **hostages**.
- In 2010 in Uganda, Marines **train the soldiers** of Uganda in tactics, techniques, and procedures to counter improvised explosive devices in preparation for deployment to Mogadishu.
- In 2006 in Lebanon, Marines and sailors on a **NEO** mission use Marine helicopters, Marine ground forces, and Navy landing craft to evacuate almost 14,000 American citizens during war.
- In 2003 in Iraq, the Marines of 26th MEU **seize the airfield** in Mosul and, under **operational control** of 10th Special Forces Group, conduct **full-spectrum operations in support of SOF**.

- In 2001 in Afghanistan, Marines of Task Force 58, aggregated from two MEU/ARGs, conduct **ship-to-objective-maneuver** by air from ships 400 miles inland to **seize an airstrip**, conduct **strikes and raids**, and work in close **integration with SOF**--all **enabled, supported and sustained** from TF58's **seabase** 450 miles away.

Marines and amphibious forces will continue to conduct forward engagement, shaping of the environment, irregular warfare, and crisis response around the world. They will also continue to be ready to conduct expeditionary operations. Conducting all these activities from their forward deployed positions around the globe, Marines will continue to be a uniquely natural partner for SOF.

U.S. Naval Surface Connector Assessment

1. Purpose and Summary Findings. Assess the connector dependency of current and future littoral power projection capabilities, and review the adequacy of existing connector programs to meet this dependency, especially during the connector capability gap from FY17-FY26. Key findings contained in this document include:

- *The naval surface connector fleet is now, and will increasingly become, essential to amphibious operations, especially amphibious assault.*
- *Although surface connectors are not assault craft, amphibious assault using the existing connector fleet is quite possible when integrated with air, boat, or amphibian capabilities that secure landing sites in advance.*
- *There is a significant gap in the planned surface connector inventory from FY17-FY26 that will limit the capacity for amphibious assault.*
- *The 74 ton capacity of the planned LCAC-replacement has implications for the ground vehicle portfolio. Combat power buildup ashore is significantly accelerated with an armored maneuver platform that can fit three per LCAC rather than two. This requires a vehicle weight-limited to less than 24.5 tons.*
- *There is significant opportunity for innovation in power projection through an expanded concept for connectors that includes the Mobile Landing Platform (MLP) and other prepositioned ships. This would enable sustained operations from over the horizon for a variety of Joint and Interagency operations, but would require an increased inventory of connectors.*
- *Significant cost savings and increased capability may be available through alternative connector options, enough so to warrant reconsideration of the connector portfolio.*

2. Background

- a. **General.** The Navy and Marine Corps have long employed a combination of vertical and surface conveyances to provide the flexibility needed for amphibious operations under a wide range of tactical, geographic, hydrographic, and weather conditions. In the mid-1950s, foreseeing the need to initiate operations from further offshore, the Navy and Marine Corps sought higher speed, longer range craft able to maneuver in the littorals. Those efforts yielded the two principal surface connectors in use today - the Landing Craft Air Cushioned (LCAC) and the Landing Craft, Utility (LCU). The LCAC provides the speed and range to maneuver throughout the littorals. The LCU provides a larger load-carrying capability - although generally at lower speeds.

The majority of amphibious operations do not involve a large scale amphibious assault. In most cases (counterterrorism, tactical recovery of aircraft/personnel, security cooperation, crisis response, disaster relief, aviation missions) elements of a smaller MAGTF (primarily the MEU) utilize a range of mobility options to achieve mission objectives. The flexibility of the maneuver portfolio (air, sea, land) of the MAGTF gives it utility across a wide spectrum of missions. Projecting larger-scale combat forces ashore is a relatively infrequent, but critical capability to achieving the strategic objective of operational access in the littorals, and protecting the interests of the U.S. ashore around the globe.

In these larger amphibious assaults, the majority of the combat power of the MAGTF, its combat service/support, and sustainment maneuvers ashore via LCAC or LCU. Assault infantrymen, light cargo, and medium weapons are maneuvered by air, small-craft or self-propelled tracked amphibians. This combination of conveyances allows for securing of the landing sites by early entry forces, with a rapid follow-on of high-capacity surface connectors to transport tanks, LAVs, artillery, other vehicles and the combat support assets of the MAGTF. It is estimated that 85% of the 2015 MEB's vehicles and equipment need to be carried ashore via surface assets in an assault.

With the preponderance of MEB equipment coming ashore via surface connectors, the challenge in amphibious assault is finding the right methodology (or portfolio of options) for the lead elements (primarily assault infantrymen) to set conditions ashore for the approach of the primary combat power of the force.

Historically, up to two-thirds of the infantry element of the assault echelon was planned to move by self-propelled tracked amphibians launching from 3,000 to 8,000 yards from the shore—the remaining infantry would maneuver in helicopters. These forces would secure surface and vertical penetration points and craft landing zones to enable maneuver of the remainder of the force.

In the last decades, there have been significant changes in the methodology and equipment available to conduct amphibious operations. The capabilities of the modern ACE, particularly the MV-22B and the CH-53K, present a greatly expanded capability that promises to reverse the historical lift ratios. These also support an expanded capability to launch amphibious operations from over the horizon, even hundreds of miles from the coast. Likewise, modern amphibious doctrine places a premium on littoral maneuver, using the sea as maneuver space to strike at gaps in the enemy's defenses.

- b. **Littoral maneuver.** The concept of littoral maneuver uses the sea, air, and land as maneuver space. This allows a fast-moving amphibious force to maneuver on the sea in order to exploit gaps in the enemy's defenses ashore. Littoral maneuver enables modern amphibious doctrine by avoiding attacking frontally onto a defended beach. It presents a cost-imposing asymmetry for the enemy that forces him to defend many places at once. The essence of littoral maneuver and modern amphibious assault is to defeat an enemy ashore through a rapid tempo of operations over a wide/deep battlespace, presenting dilemmas to the enemy faster than he can react. This is a unique and significant capability of the U.S. joint force. An amphibious force that can rapidly project its force from far at sea to the place and time of its choosing will create uncertainty and confusion in the enemy regarding the force's intention and reduce the overall force required to accomplish the objectives of the joint force ashore. The principles of littoral maneuver apply across the range of military operations, even to irregular environments and natural disaster response.

The amphibious force achieves littoral maneuver with its amphibious ships and the air and ground connectors that link these ships to the shore. Amphibious ships can move rapidly along an extended coastline, providing a significant component of littoral maneuver. From those ships, the Navy and Marine Corps have long employed a combination of vertical (air) and surface (sea) connectors to move troops and equipment between sea and land and to facilitate littoral maneuver. Vertical connectors (helicopters and tilt-rotors) can move a landing force rapidly from over the horizon to depths up to hundreds of miles behind the coastline. This capability allows the amphibious force to react quickly from the sea, moving directly to desired objectives inland.

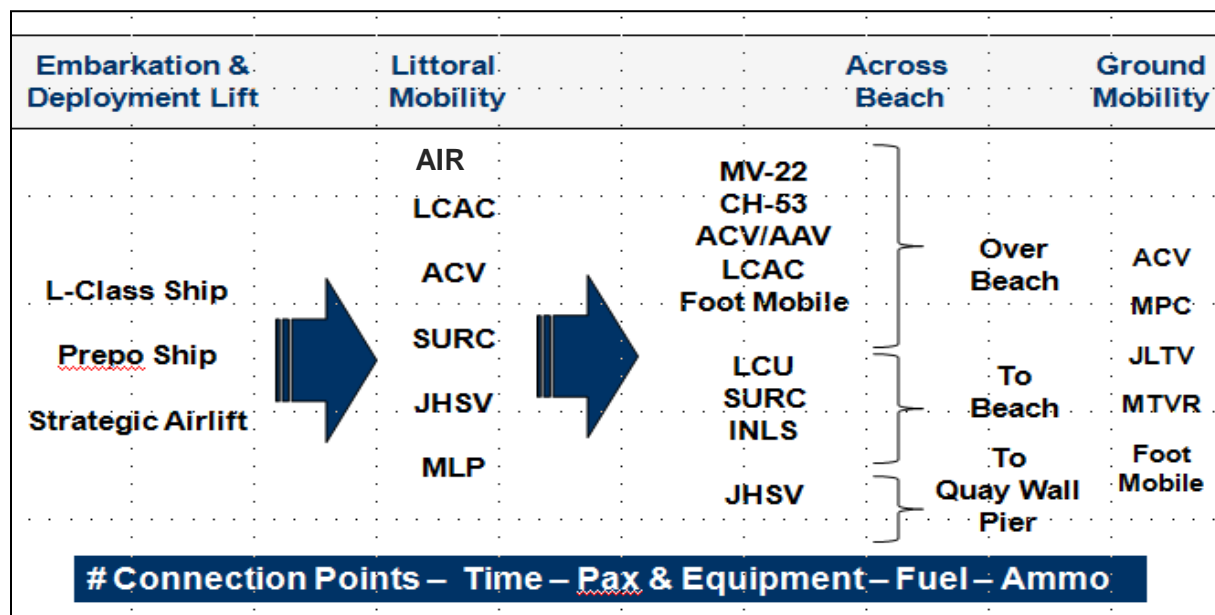
Surface connectors (boats, self-propelled tracked amphibians, and naval surface connectors) can move between ships and shore, with speed, agility and heavy lift. Moving a large combat force directly over the beach allows the joint force access prior to the seizure of major ports or airfields. An assault mobility portfolio that includes multiple conveyances creates a combined arms dilemma for an opponent ashore.

- c. **Challenges.** Littoral maneuver and approaches to defended coastlines depend on the joint force to set conditions. Where the joint force objectives lie ashore, setting conditions for the approach of the landing force becomes the enabling objective for the joint force, executed through enabling concepts such as Air-Sea-Battle. Although most opponents and likely crisis scenarios do not currently possess complex A2AD capabilities, this threat will grow more prolific as technology advances and spreads to a broader number of state and non-state enemies. In the future, proliferation of precision weapons and munitions will challenge the ability of the amphibious force to close to near-shore, or under-the-horizon.

While the joint force has significant shaping capabilities, the poor track record of past “SCUD hunts” suggests that completely eliminating coastal defense threats to amphibious shipping may be challenging, especially when confronted with the complex terrain of the littoral environment. When G-RAMM are in the hands of hybrid enemies, they can be especially very difficult to detect. Reducing the threat sufficiently will require persistent ISR, sufficient strike capacity, and time. There are many times, however, where the enemy, time, mission, or capability gaps will not allow meeting those conditions. Notably, in crisis response scenarios where U.S. citizens or national interests are at high risk, it may be necessary to maneuver from greater distance or accept increased risk by maneuvering ships to operate at closer than desired distances. As a result amphibious operations in mid- to high-threat scenarios may be frequently launched from increasingly greater distances, including from over the horizon. This will impair the ability for swimming amphibians to conduct effective littoral maneuver.

During the movement from ship-to-shore, landing forces (either in self-propelled amphibians or carried on surface connectors) are vulnerable to the effects of mines, fast-attack boats and precision indirect fires. Naval mines are a relatively inexpensive, but can significantly bog down littoral maneuver or invalidate surprise. The availability of top-attack munitions and self-guiding anti-tank bomblets increases the risk to landing forces. In this environment, time spent within the effective range of these systems is a significant force protection consideration. While swimming amphibians spend longer time moving through these threat envelopes, they have small signatures in the water. Payloads on surface connectors move much faster, but have higher signatures and are a more lucrative target. These advantages are nearly reversed once the force reaches the shore. Wheeled platforms delivered by surface connectors have relatively smaller signatures and are more survivable than larger and lightly armored tracked amphibians (a necessary tradeoff to gain swimming performance). Aviation platforms have their own threat envelopes that must be considered. Future amphibious forces must exploit their range and speed to gain maneuver advantage on their adversaries, and seek optimal balance (condition dependent) of mobility options optimized for the ship-to-shore movement or sustained operations ashore. Connector methods are a key consideration in littoral maneuver.

3. Connector Methods in Littoral Maneuver. Each connector method has certain unique comparative advantages that may be particularly relevant depending on the situation. The combination of the methods, including multiple surface and air options, provides the commander with inherent flexibility needed to conduct amphibious operations across a wide range of potential political, tactical, geographic, tidal, and weather conditions in an uncertain world. The multiple methods complement and reinforce one another, making the matrix of ship-to-shore options greater than the sum of its parts.



A Matrixed Portfolio of Connector Methods

Below is a summary of the major connectors currently in or planned for the inventory and a comparison of their comparative advantages in littoral maneuver:

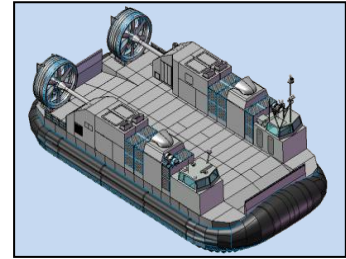
- a. **Vertical connectors.** The naval service has developed a modern portfolio of air connectors, principally the MV-22 Osprey tilt-rotor and the CH-53K helicopter. The new capabilities of the MV-22B change the amphibious force's littoral maneuver options. Not only can the force assault from hundreds of miles out at sea but its vertical assault capacity is significantly increased. The MV-22B speed and increased capacity (double the older CH-46) enable increased sorties and greater lift per sortie. The MV-22B has more than doubled the vertical maneuver capacity and capability enabling rapid seizure of penetration points and cushion landing zones (CLZ). The result is the ability to support maneuvering two-thirds of the MAGTF's assault echelon infantry, enabling the landing force to bypass defenses, rapidly seize penetration points and maneuver deep inland. These connectors enable a vertically-inserted infantry force to secure landing sites for follow-on surface craft. Dismounted infantry has inherent maneuverability in complex terrain, but subsequent protected mobility on land is tied to the ability to reinforce the landing force with armored vehicles from the sea using surface connectors.
- b. **Boats.** The SURC, or "littoral craft", which is currently used by the Navy's RIVRONs and operated by Sailors, provides a tremendous capability to support littoral maneuver. These craft provide immense benefit in fast amphibious lift and littoral flexibility when operating from amphibious ships, especially for patrolling, raiding, maneuver ashore and sea control. For larger operations they are especially useful during ship-to-shore movement in hybrid threat

environments. Their comparative advantages relative to other connector methods include speed of maneuver (relative to AAVs), agility (relative to all other surface connectors), low signature, and more affordable cost. They have special utility in complex littoral terrain containing swamps, rivers, and small islands. Their comparative disadvantages include less armor protection against threats ashore (relative to AAVs) and less lift capacity (relative to naval surface connectors). Given their value in littoral maneuver, especially in supporting deception, surprise and maneuver in in-shore waters, this capability must be given serious consideration in the portfolio of available connector options.

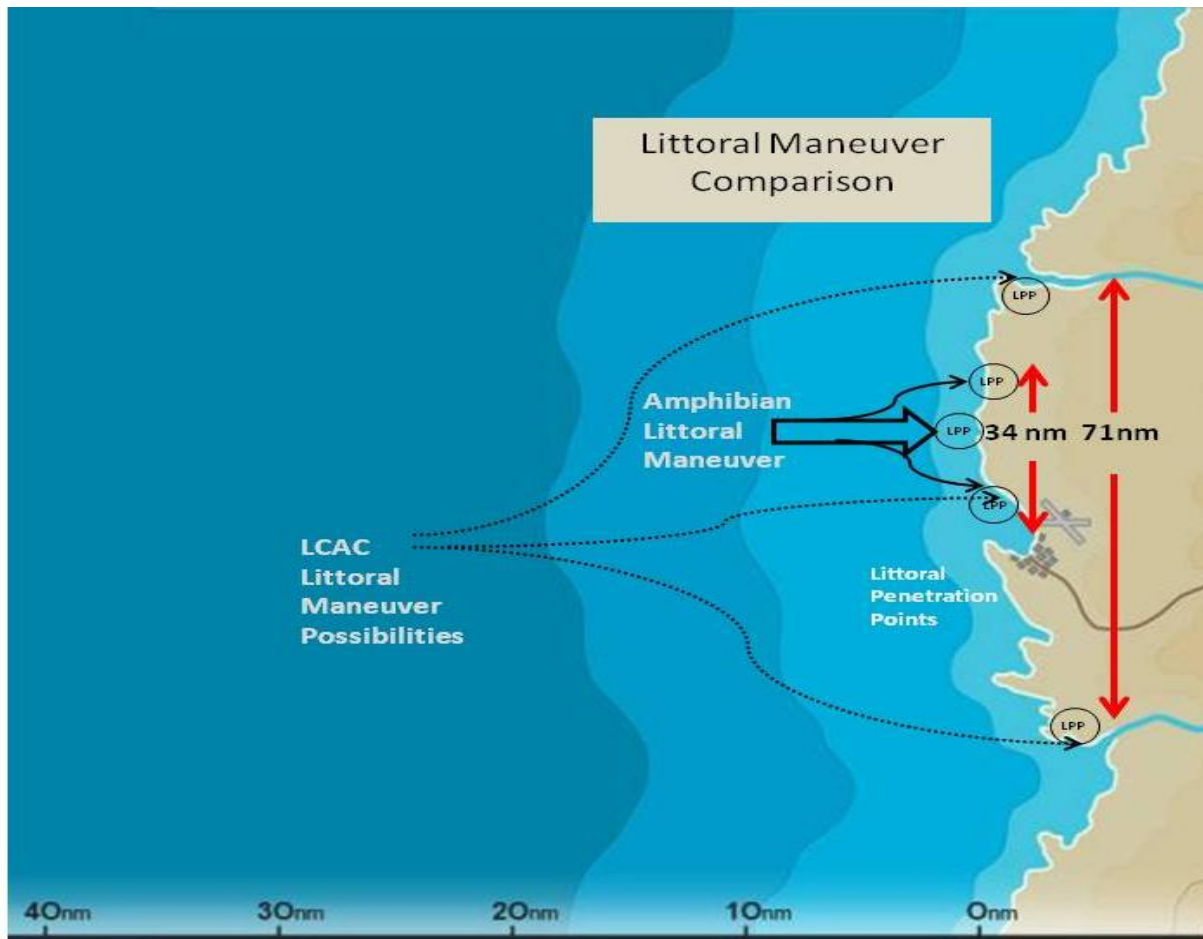
- c. **Self-propelled tracked amphibians.** The self-propelled tracked amphibian has great utility as a connector when operating from close to shore. They have the inherent ability to carry Marines, logistics, ammunition and a variety of cargos to well inshore. The current self-propelled tracked amphibian is the Amphibious Assault Vehicle (AAV). Of the principle connector methods, the AAV is the only that can conduct self-contained maneuver of Marines from the ship to the shore and points inland. Amphibians have unique tractor ability to crawl over reefs or other obstacles in the water. They have light armor protection on all sides and require no necessary pause upon arrival on landing site. Amphibians are designed to conform to embarkation parameters of amphibious shipping, and can operate in high sea-states. They are limited, however, by relatively slow speed in the water. Once launched from the amphibious ships, these vehicles are generally constrained to a straight-line movement directly to the shore. Littoral maneuver is still possible through the movement of amphibious ships and selection of the launching point, but the adversary may have greater opportunity to observe and react to the final leg of ship-to-shore movement. Amphibians suffer from relatively poor survivability once ashore due to the weight/protection tradeoffs necessary to gain swimming capability. Although it has a respectable swimming range, the AAV is increasingly challenged in its ability to organize assault waves and conduct an assault as distances exceed five nautical miles. If threat conditions ashore prevent the closure of amphibious shipping to within acceptable range for the AAV, its utility as a ship-to-shore connector is significantly degraded.

The Marine Corps has long required a replacement for current AAV that would offer greater speed, range, and littoral maneuver capability from ship-to-shore. The capability requirements for the Advanced Amphibious Assault Vehicle (AAAV) and Expeditionary Fighting Vehicle (EFV) were predicated on the ability to maneuver from 25NM or greater to an inland objective at high speeds. This would have greatly enhanced the ability of the amphibious force to surprise, deceive, bypass or out-tempo a defending force. The 2011 cancellation of the EFV program left a gap in this level of capability. This gap also revealed the critical role that surface connectors play in making an amphibious assault possible. For the Amphibious Combat Vehicle (ACV) concept, currently undergoing an Analysis of Alternatives (AOA), the Marine Corps has identified a required self-deploying range of 25 nautical miles from shore, at a speed of 8 knots.

- d. **Naval surface connectors.** Naval surface connectors, which currently comprise LCACs and LCUs generally have an advantage in heavy lift relative to air or other surface connectors. With LCACs, there is also a significant speed advantage, giving it more effective littoral maneuver capability. For smaller amphibious operations such as team insertions, reconnaissance, and raids, the naval surface connectors give the commander options. For larger amphibious operations, requiring the transport of significant combat power from ship to shore, these naval surface connectors are essential. While LCACs and LCUs are both naval surface connectors, they have very different characteristics in support of littoral maneuver.

Naval Surface Connector Fleets**LCAC****LCU****SSC/LCAC-100**

- (1) **LCAC.** Relative to the AAV or the ACV currently under consideration, the LCAC contributes greater lift capacity and faster speed to littoral maneuver. The LCAC combines high speed maneuver with heavy lift (up to 40 kts with 74 tons.) It travels over the surface of the water, avoiding reefs and underwater obstructions. LCACs are not ‘assault’ craft, and therefore must land in a secured craft-landing zone. They require a beach of sufficient depth and width to de-plane and turn around. Although highly-capable, they suffer from poor availability rates, and have crew limitations that impact capacity for amphibious assault. When secure landing zones are seized by air, amphibian or boat-launched elements, an LCAC connector-mounted force can provide rapid buildup of combat power shore, including heavy vehicles optimized for land combat directly across the beach. The LCAC range and speed provides the amphibious force with flexibility and agility, even when operating from over the horizon. Fully-loaded LCACs can provide round-trip transport from over 50 miles at sea. As shown in the figure below, an assault element loaded on LCAC surface connectors has the ability to land across a much wider range of coastline, taking advantage of gaps and seams in an adversary’s defenses. When combined with air or boat-delivered infantry to secure landing zones, the LCAC creates a much more significant dilemma for a defender. It enhances the landing force’s ability to deceive, feint, and create ambiguity regarding its intended landing site, and allows the LCAC connector-based force to land in proximity to its objectives, or in a position to maneuver against an enemy ashore. When coupled with the increased capability of modern aviation platforms like the MV-22, the LCAC can thwart the efforts of a less-nimble enemy to establish effective defenses against the force’s landing sites and littoral penetration points.



LCAC versus ACV in Littoral Maneuver

- (2) **LCAC Replacement – SSC/LCAC-100.** The LCAC-100, program is forecasted to replace the current fleet of LCAC and LCAC (SLEP) with an Initial Operational Capability (IOC) of 2020 and a Full Operational Capability (FOC) of 2029. The SSC/LCAC-100 program is scheduled to achieve Milestone B (MS-B) in May 2012, which should result in contract action in June 2012. The SSC/LCAC-100 will provide a wider range of capabilities over the LCAC/LCAC(SLEP), including more powerful engines, increased reliability, greater resistance to corrosion, advanced navigation and engineering control systems, and more payload to transport troops and equipment from ships to over-the-shore. It will have a maximum load carrying capacity of 74 tons at a significant wave height of 4.1 ft with a maximum ambient temp of 100 degrees Fahrenheit. The SSC is planned to have a main cargo deck 64 feet long and 24 feet wide. It will use increased automation to allow for a two-person pilot/copilot cockpit configuration with advanced human-system interface designs. The program has faced a number of programmatic challenges, requiring continuous attention to ensure continued funding. The continued operation and prompt replacement of the LCAC program are among the most critical Navy programs for enabling the nation's capability to gain littoral access and conduct amphibious operations.
- (3) **LCU.** The current LCU-1600s provide a very capable platform for littoral maneuver especially from 12NM or less. Its disadvantage relative to an LCAC is its slower speed, with a maximum speed of 10 knots. The LCU's ability to carry over 200 tons of payload makes it the

workhorse of the Navy's connector fleet. With greater passive protection than the LCAC, the LCU is an assault craft; it has the capability to protect itself and provide nominal protection to the personnel / equipment embarked. As a general purpose vessel, its capacity, survivability, and flexibility together provide significant capacity for crises response across the range of military operations. The current LCU-1600 inventory is projected to remain at 32 craft for the foreseeable future, though this would seem unrealistic without a dedicated service life extension program (SLEP). The average LCU age is greater than 38 years, and the oldest craft more than 50 years old. The LCU's highest utility is operating within 12 nm of shore, performing independent transits, and using its endurance. Additionally, this independence and endurance provides a capability from which to operate a variety of small craft. Absent a SLEP, it is critical that the service continue sustainment funding for overhauls through the out-years in order to maintain the 32 craft inventory. The Navy has completed an LCU recapitalization capabilities based assessment (CBA) and is finalizing a draft initial capabilities document, but there does not appear to be funding allocated in the out-years for SLEP. The Marine Corps should work closely with the Navy to sustain the LCU fleet.

- (4) **LCU Replacement.** A comprehensive assessment of a possible replacement for the LCU would consider existing and developmental commercial or allied military craft. There are also several commercial of the shelf (COTS) alternatives that trade some of the LCU's current lift capacity for double or triple its current speed. Further analysis is required to determine overall suitability and affordability, but the potential exists to substantially reduce surface lift force closure times, specifically in the movement of heavy equipment and materiel. The number LCUs is projected to remain constant for the foreseeable future. While there is no funded program to replace them, the Navy has completed a capability based assessment and is in the drafting stage of an initial capabilities document for recapitalizing them.

"No one craft can do it all."	LCAC (SLEP)	SSC	LCU
High Speed (>25 kts)	●	●	●
Beach landings in Assault Echelon	●	●	●
Access to world beaches	●	●	●
Dry-Well Operations	●	●	●
Heavy-Lift	74 ST*	74 ST*	147 ST
Platform for buoyant hose fuel systems	●	●	●
Beach landings in AFOE	●	●	●
Extended (10 day) Ops (SOF/Riverine)	●	●	●
Independent Operations	●	●	●
Afloat Forward Staging Base (small boats)	●	●	●
Peacetime port operations	●	●	●
Passenger (400 per craft) Ferry	●	●	●

* Limited by temp and sea state

Complementary Comparative Advantages of the LCAC and LCU

4. ACWG's Assessment of Surface Connectors. Through a series of crisis response wargames, the ACWG assessed the relevance, importance, utility, and capacity of connectors as part of the amphibious force in projecting power and prosecuting a campaign in the current and future operating environment.

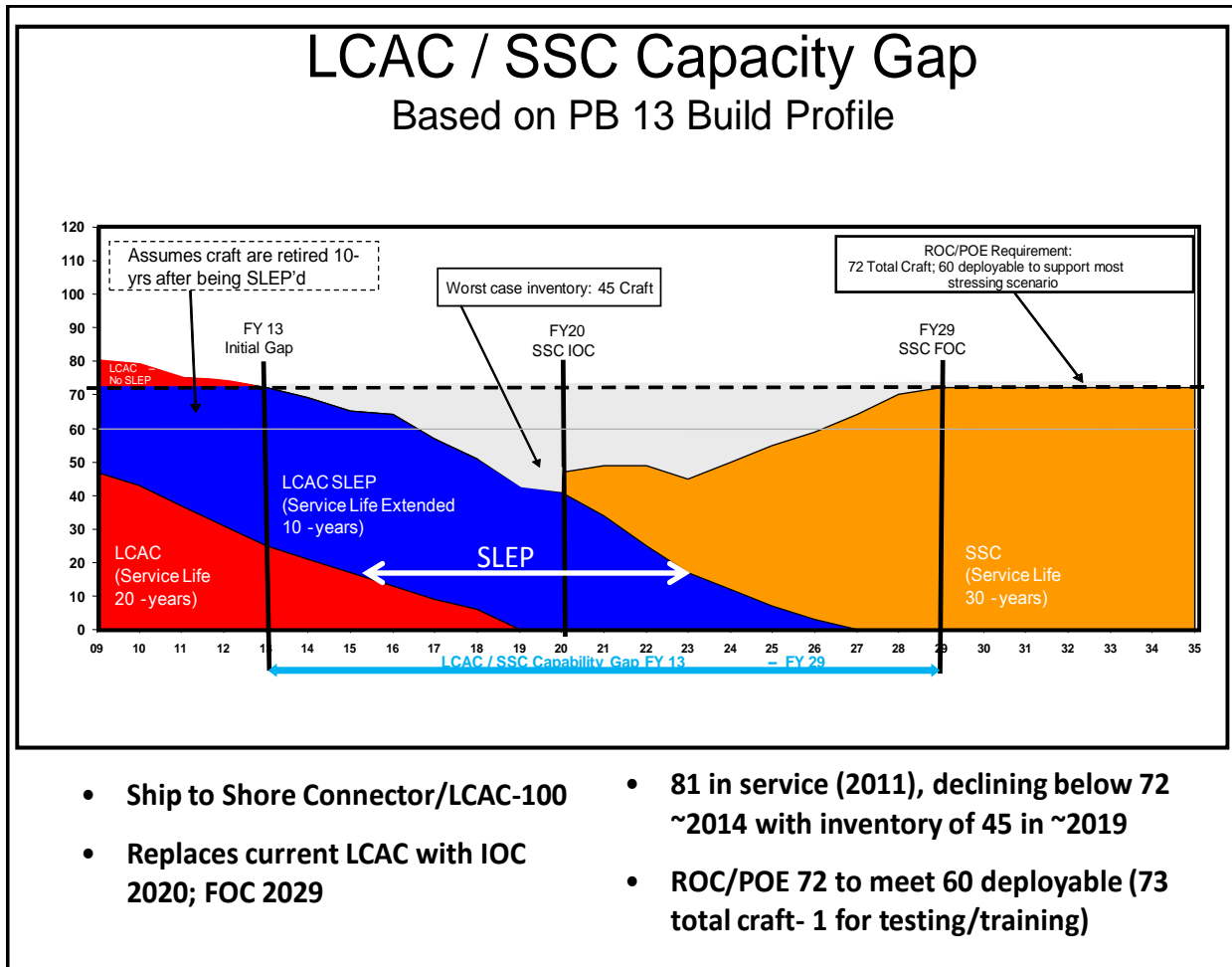
- a. **Wargame scenarios.** The wargames used scenarios derived from the approved defense planning scenarios. They differed by mission, geographical location, and size. Each incorporated all the modern challenges that the current and future environment present to the amphibious force, as described in the section on “Challenges” above, including the increased A2AD threat. The first wargame scenario required an ARG/MEU to conduct littoral mobility and maneuver, execute amphibious raids, and buy time. This smaller force would then aggregate into an amphibious force with 12 amphibious ships and a small MEB containing two MEUs to gain access, counter piracy, and conduct humanitarian assistance. The second medium-sized wargame scenario required the aggregation and subsequent littoral maneuver of an amphibious force with 19 amphibious ships and a Marine Expeditionary Force (Forward) (MEF(Fwd)). The scenario involved a hybrid threat with significant A2AD capability and capacity. It required rapid crisis response, gaining and maintaining sea control, countering A2AD, and securing and defeating both irregular and conventional adversaries. The third and largest wargame scenario required the aggregation of a force with 28 amphibious ships and a MEF containing two MEBs. In this scenario, the ACWG examined the differences between using an ACV-led and an MPC-led mobile assault force. The scenario included a major combat operation (MCO) and campaign, including initial amphibious raids to help counter A2AD capabilities, as well as subsequent littoral maneuver to help establish lodgments and control the littorals.
- b. **Conclusions.** The wargames demonstrated the continuing national requirement for, unique relevance, and broad utility of littoral maneuver in power projection. The wargames also demonstrated the essential role of connectors, the value of having a portfolio of them, the comparative advantages associated with each method. In each case the participants determined that the scenario required an amphibious force with littoral maneuver capability and the connectors to make that possible.

Importantly, the wargames also confirmed and demonstrated that the naval service and nation face a critical looming shortfall in the capacity of naval surface connectors, specifically LCACs. At the end of FY11, there were 81 LCACs in the fleet inventory. However, the inventory of LCACs (including current LCAC, LCAC (SLEP), and SSC LCAC-100) is scheduled under PB-13 to begin declining gradually from 81 in FY11 to a low of 45 in FY19/20, before increasing again gradually through production of the replacement SSC/LCSC-100 back to 72 (60 operationally available, or OA) in FY29. This reduced inventory simply will not provide an adequate number of LCACs to support full capacity of future potential sea based amphibious operations. The low of 45 is significantly below the 72 (60 OA) that the force needs to meet the requirement in the Required Operational Capability / Projected Operational Environment (ROC/POE). The “operational” shortfall could be even greater than the “inventory” shortfall, for three reasons. Non-deployed LCACs currently are funded and manned only to 60% OA, even though LCACs can exceed 80% OA if properly maintained. The number of crews, combined with crew rest requirements, is not sufficient to conduct 12-hour operations with current or future inventories. LCACs generally are not forward positioned in theater to more rapidly reinforce the amphibious force. The low of 45 also falls significantly below the number that wargaming determined would be required to accomplish a MEF(-) assault. The mid-range wargame scenario required 36 LCACs OA. Even this lower level could be strained by readiness rates with an FY19/20 inventory of only 45. The large wargame scenario required 51 LCACs OA. This would exceed the FY19/20 inventory. Unless the naval services were to begin taking action today to mitigate the inventory gap, the large operation simply would not be feasible from FY17 through FY26.

The figure below summarizes the LCAC and LCU connectors required to support the three crisis response wargame scenarios. In the case of the three LCACs assigned to operate with each MPSRON, the scenarios assumed that the LCACs would be pre-positioned in theater to operate from the MPSRON MLPs, because the naval service does not currently plan for the MLPs to husband LCACs.

SCENARIO #1			SCENARIO #2			SCENARIO #3		
MEB (12 amphibs)	LCAC	LCU	MEF (Fwd) (19 amphibs)	LCAC	LCU	MEF (28 amphibs)	LCAC	LCU
15th MEU (3 ships)	5	1	15th MEU (3 ships)	5	1	15th MEU (3 ships)	5	1
31st MEU (4 ships)	5	2	24th MEU (3 ships)	5	1	24th MEU (3 ships)	5	1
AF-W (5 ships)	7	2	22d MEU (3 ships)	5	1	22d MEU (3 ships)	5	1
FDNF (1)			AF-E (6 ships)	10	2	31st MEU (3 ships)	5	1
MPSRON-2	3		AF-W (4 ships)	5	3	AF-E (7 ships)	10	2
			MPSRON-2	3		AF-W (9 ships)	15	3
			MPSRON-3	3		MPSRON-2	3	
						MPSRON-3	3	
Totals	LCAC	LCU		LCAC	LCU		LCAC	LCU
	20	5		36	8		51	9

LCAC and LCU Requirements for the Wargames



The Gap in LCAC Inventory

It may be possible to mitigate the shortfall by reducing LCAC and LCAC(SLEP) retirement rates and/or increasing SSC/LCAC-100 production rates. Specifically, the Navy could continue to fund the LCAC SLEP, could also fund a post-SLEP sustainment program to reduce fleet inventory attrition, and could increase SSC production from 5 per year to 8 per year beginning in FY19. The Marine Corps should coordinate and collaborate with the Navy to emphasize the importance of these three projects and to gain the required support within the Navy program. The Marine Corps could also coordinate with the Navy in an effort to fund and man the non-deployed LCACs at 80% versus 60% OA. (By design, the LCAC-100 is expected to increase both fleet availability and operational availability while reducing costs if properly manned.) The Marine Corps could also collaborate with the Navy to increase the number of LCAC crews available, possibly using Marines as well as additional Sailors. Fixing the crew shortfall would increase the utility of a diminishing fleet and serve an area for potential naval partnership. Finally, to the extent additional LCACs are retained, the Marine Corps could work with the Navy to position some of them forward in theater in order to augment the amphibious force and other sea based operations as they arise.

5. Relationships between Connectors and Ground Vehicles. Because of the central role of connectors in supporting littoral maneuver and amphibious assault, the physical characteristics of a naval surface connector are an important influence on the portfolio of ground vehicles. Ideally, strategies, concepts, and designs for connectors and ground vehicles would be integrated; a ground vehicle would meet the combat requirements of the landing force while also being deliverable via connectors. The figure below presents the current relationship between characteristics of Marine Corps ground vehicles (current and planned) and the capacity of the naval surface connectors that carry them.

S/T = Short Ton = 2,000 lbs				30 knots		8 knots			
				1810 SqFt		1850 SqFt			
				STANAG		74 S/T Max		140 S/T Max	
		Weight	Weight	Level	148K lbs	280K lbs	Sq		
		(lbs)	(S/T)	Protect	# in LCAC	# in LCU	Feet	PAX	Crew
ACV*		70,000	35		2	4	291	13	3
MTVR		60,800	30.4		2	4	263	20	3
AAV		55,000	27.5		2	5	291	13	3
MPC "W/ Applique"	*	55,000	27.5	4/4a/4b	2	5	251	8	3
MPC "W/o Applique"	*	47,000	23.5	4/4a/4b	3	5	251	8	3
Light Armor Carrier		35,000	17.5	4/4a/4b	4	8	220	8	3
JLTV**		19,500	9.75		6	13	147	4	2
LAV		28,300	14.15		4	9	182	4-6	3
HMMWV/ECV**		12,100	6.05		12	12	123	2-12	2
ITV-LSV		5,000	2.5		24	24	68	5	1
* ACV and MPC based on planned dimensions -- not firm									
** Avg dimension; actual weights of variants may be greater/less than average									

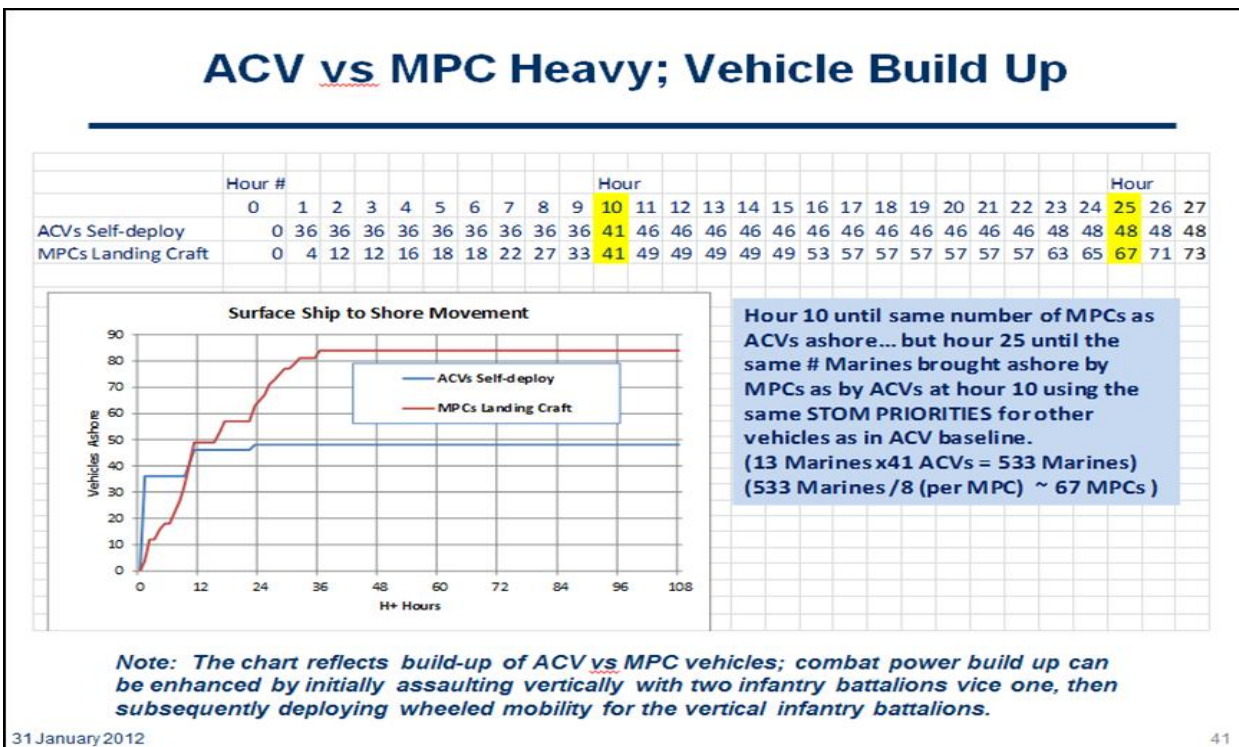
USMC Ground Vehicles and USN Surface Connectors

- Maximizing lift per connector.** While currently developing its design for the future MPC, the service should challenge industry to help meet the requirement for a light armor protected personnel carrier that fits within desired weight, square footage, price and protection constraints; has a swim capacity; provides robust mine, direct fire, and indirect fire protection; and fits three MPCs on each connector. There is a specific opportunity to optimize the weight of the MPC in order to maximize the number that could be placed on an existing LCAC. An MPC weight of under 49,000 pounds would enable each LCAC to carry three MPCs instead of two. This could make a critical difference in the speed with which an amphibious force would deliver and build combat power ashore.
- Building total combat power ashore.** In building up combat power ashore, speed is critical. Speed in this case is a product of multiple factors including: the mix of air and surface connectors; the speed of each connector; the lift capacity of each connector; whether surface connectors are self-propelled amphibians that can deploy ashore and remain; or surface connectors offload embarked ground vehicles and return to the ships for more; and the capacity of each ground vehicle that the surface connectors carry. In its wargames, the ACWG examined the speed with which an amphibious force could build up combat power using various air and surface connectors, as well as various ground vehicles representing different versions of the planned MPC. The wargames compared two different possible variations of the MPC –heavy MPC (with increased armor) and a medium MPC – and compared each of those with each other and with the build-up speed of an ACV-delivered force.

There are two relevant intersections in the data. Because each MPC is smaller, it carries fewer Marines per platform than the ACV. The point where both forces (ACV or MPC) have the same number of protected mobility seats available is a relevant consideration. Another important consideration is when there are the same number of platforms available ashore. Since each platform carries heavy weapons support (machine guns, grenade launchers), each represents an increment in combat power. Similarly, each vehicle ashore represents an additional maneuver element. The number of vehicles, therefore, is also a meaningful metric (not just the number of seats.) The increased ability for Marines to move by air with the modern ACE, and the more-lethal battlefield of the future (suggesting mounting fewer Marines in each platform that can be targeted) both reinforce the relevance of the number of vehicles ashore.

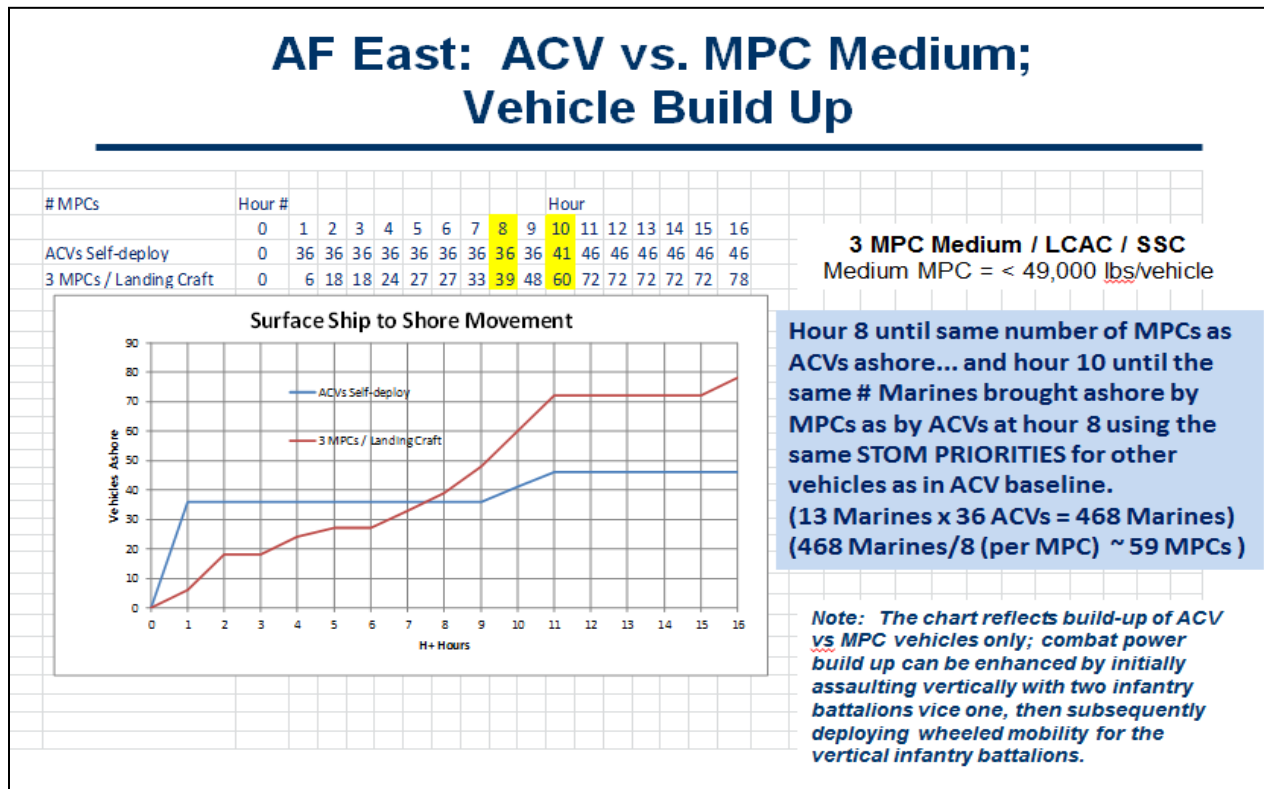
In this comparison, the heavy MPC has significantly more armor protection and better mobility ashore. The vehicle parity intersection represents the 'cost' in time for gaining that additional protection and mobility.

The figure below presents a heavy-MPC-delivered force and compares it with an ACV-delivered force. It assumes that each LCAC carries 2 heavy-MPCs, and it uses 10 LCACs in total to support of the amphibious force. (This number of LCACs used does not represent capacity beyond the existing LCAC program, nor does it require additional connector investment.) The figure shows the build-up of protected mobility assets ashore over a period of time. The two forces achieve parity in number of vehicles ashore at hour 10; the number of vehicle seats ashore achieves parity at hour 25.



2 Heavy MPC per LCAC

The figure below illustrates embarking 3 medium MPCs (weighing less than 49,000 lbs each) per LCAC. The number of vehicles ashore achieves parity at hour 8; the number of Marines ashore achieves parity at hour 10. The lighter MPC variant has a level of armor protection and IED survivability well-above the existing AAV. The ACV program may achieve additional gains in protection over the AAV.



3 Medium MPCs per LCAC

These MPC/ACV comparisons are illustrative only. They use the ACWG's larger wargame scenario as a basis for case study. They assume the same vehicle loading priorities and the delivery ashore of a balanced force appropriate for the mission and the operating environment. Neither represent optimal combat loading, which would be scenario specific. Timelines could be considerably shortened by loading and pre-boating all the LCACs and LCUs with MPCs. Similarly, these models do not represent the faster buildup of infantry forces by employing the increased capability and capacity of the MV-22B to vertically maneuver infantry forces ashore. In both case, the connector fleet would be required to lift the remaining vehicles and combat support elements of the MEB. These examples, do serve as useful points of comparison to evaluate some of the performance/time tradeoffs involved in building-up combat power ashore.

In this case, these illustrative examples demonstrate that there is a penalty of multiple hours to achieve combat power parity when using the amphibious force's connectors as the primary ship-to-shore connector. For this penalty, the force ashore gains significant gains in protected mobility.

6. Considerations for a Comprehensive Future Connector Strategy. The Navy and Marine Corps have long employed a combination of vertical and surface means of littoral maneuver, thereby providing the flexibility to conduct amphibious operations in a variety of conditions. Today, the naval services have a *program* for surface connectors. In a maritime moment that compels service innovation, there appears to be fewer operating areas more ripe for consideration and partnership in littoral power projection than a robust connector *strategy*. The fundamental operating concepts and utilization strategies for connector programs requires a fresh look from a warfighting perspective. Emerging technologies and potential game-changing operational considerations might have a significant impact. Some considerations for innovation in a refined connector strategy include:

- The availability of the MLP provides a potentially game-changing capability for the naval force in sustained power projection. The MLP would create a capability for the seabase to support a variety of Joint and Interagency missions. Similarly, the seabase could serve as a low-footprint methodology for steady-state engagement operations and a forward deployed naval force presence.
- Current connector acquisition objectives are driven by well-deck spots in amphibious shipping. Expanded seabase concepts would benefit from a connector fleet apart from those carried in amphibious shipping. Connector elements husbanded and tethered to MLPs, or otherwise forward deployed in key locations would augment those required directly for amphibious operations. If available, these connectors could also augment the fleet during amphibious operations, greatly speeding throughput and the generation of combat power ashore.
- While Connector programs are funded and managed by the Navy, they serve as critical elements to support amphibious operations and littoral power projection. The Marine Corps might be able to aid in mitigating connector risk through assignment of personnel, cost trades, or other assistance.
- Projected scenarios and locations for the likely employment of amphibious forces call for greater ship-to-ship, ship-to-shore, and riverine maneuver capabilities, along with an increased probability of operations ashore involving dismounted maneuver. The open mission deck and flexibility of amphibious connectors make them highly capable for a number of mission sets. These include support to SOF, interagency operations, and the multiple phases of a seabased operation.
- Surface connectors that could provide in-stream launch/recovery of tracked amphibians, small craft (boats) or unmanned systems to clear mines in very shallow water would add a significant dimension and capacity to the naval force's ability to conduct littoral operations.
- Surface connectors that are self-deployable and capable of long-range open water transits, with inherent crew life support spaces are essential. While the LCU fleet currently has this capability, other connector designs that combine the capacity/self-supportability of the LCU with the high speeds associated with the LCAC are readily available and affordably priced. While the looming connector shortfall and maturity of the LCAC-SSC program suggest it should not be disrupted, the LCU-replacement program represents a key entry point for a more economical and operationally relevant connector capability.
- Technological advances have enabled the development of surface connector craft with greater speed and range than currently programmed. Many of these options appear to be an economical investment:

- The L-CAT landing catamaran is an innovative fast shore-connecting concept developed by the French and produced in the United States. It is currently operated from within well-decks of French LPD / LHD vessels to meet 'over the horizon logistics and force projecting requirements. The L-CAT consists of a full length mobile platform operated by hydraulic jacks, which is suspended between the two hulls. During landing operations the platform lowers into the sea thereby lifting the vessel out of the water reducing its draft to approximately 0.8m allowing the vessel to navigate in shallow water and come to shore and beach. During high-speed navigation the platform is lifted in its highest position, improving the vessel's sea-going capacities and allowing it to be deployed up to 200 miles from shore. The L-CAT is designed to fit within the minimized space provided in existing well-deck spaces, and provides full Ro-Ro capacities and open sea door-to-door logistics. The L-CAT has a capacity similar to the LCAC, and can travel at 20+ knots, with a 20 hour endurance. It is currently fielded in the French Navy, and was recently employed during Bold Alligator 2012. L-CAT purchase costs are significantly lower than the SSC. Significant analysis is required to measure the merit of this particular program, but its potential game-changing capability warrants consideration.
- A craft in a different class that bears further analysis and consideration is the T-CRAFT being developed by Office of Naval Research. This is a larger vessel designed for intra-theater lift or as a seabase connector, much like the JHSV, but with one key difference; it can land on a beach. This craft is projected to have between 300-700 tons of lift capacity and travel at 40 knots. This capability coupled with the speed and versatility of the smaller connectors mentioned above could be a significant force multiplier in a distributed littoral maneuver environment, especially in the movement of non self-deploying combat vehicles.
- UHAC. Another new capability (in experimentation phase) is the Ultra Heavy-lift Amphibious Connector (UHAC). The UHAC is a concept connector being designed (ONR project) to provide a heavy-lift capability that is able to transport large amounts of cargo and/or troops from sea to shore, or directly from the sea to an objective area. It is expected to provide an over the beach capability with three times the payload of the LCAC as well as three or more times the obstacle clearance of the LCAC. UHAC is being designed to carry 210 S/T at a speed exceeding 20 knots. Due to time limitations and the experimental nature of this program, no embarkation and employment analysis was conducted with the UHAC.

7. Conclusion. There is no more important capability to the viability of an amphibious assault than the surface connectors that lift 85% of the vehicles and equipment of the MAGTF. This capability will become even more important in future operating environments where the ability of amphibious ships to close with the shore are limited. Ensuring the health and capacity of connector programs is an essential interest for both the Marine Corps and the Navy. While procuring new fleets of connectors are likely infeasible in the present fiscal environment, there are compelling emerging technologies and capabilities that could prove to be game-changers. The period of innovation (vice investment) over the next decade may present a window of opportunity for the generation of a comprehensive connector strategy that incorporates warfighting analysis and the potential for new utilization opportunities. In the interim, restoring a minimum capacity of 60 connectors from FY17-FY26 is an essential combat requirement.