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Landing Together

Pacific Amphibious Development and Implications for the U.S. Fleet

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Introduction

This study reflects a desire to better understand how investments in amphibious capabilities by numerous allies and partners across the Asia-Pacific region would affect the requirements for the amphibious forces of the U.S. Navy and Marine Corps. The study's focus on the Asia-Pacific region is spurred by the sizable investments that have been made across the region to acquire new amphibious capabilities and to improve capabilities that currently exist.

With that as a starting point, the study had two goals: first, to evaluate the effects of growing amphibious capability in the Asia-Pacific region on demand for U.S. amphibious assets, and second, to assess the policy and resource implications of various strategies to meet that demand. This required understanding what key partners and allies—Australia, India, Japan, the Philippines, Singapore, and South Korea—were doing regarding their amphibious capabilities and developing options for addressing this demand.

The methodology for this study involved developing an academic understanding of the current situation, followed by numerous interviews with current and former practitioners as well as outside subject matter experts with whom we tested preliminary findings and conclusions. We conducted outreach to representatives of foreign countries to refine our understanding of capability development priorities, including a public session with representatives from Japan and Australia. The discussion of options for alternative amphibious fleets is rooted in existing ship classes, as well as those considered but not acquired in the past.

The report begins with a section on the existing demand for the U.S. amphibious force, with a focus on how it is employed in the Asia Pacific. The second section describes current and historical supply of ships and includes a discussion of the current role of alternative platforms. The third section summarizes amphibious capabilities and their planned development by select allies and partners in the Asia Pacific. We assess the capabilities of the United States, allies, and partners in section four. In section five, we offer options for changes to both U.S. Marine Corps (USMC) processes and structures and the amphibious fleet to provide enhanced capabilities for varying conditions. The final section of the report provides the study team's recommendations.

Executive Summary

The United States amphibious force is flexible, scalable, and rapidly responsive. As a result, the amphibious force is frequently called on during the initial phase of a crisis response, whether the need is providing humanitarian assistance following a natural disaster, deterring a potential adversary, or responding to a rapidly unfolding conflict.

The versatility and availability of such a force coupled with its utility in a highly maritime region is motivating investments by a number of countries throughout the Asia-Pacific region to create or enhance their own amphibious forces. Japan and Australia are each working to establish a standing amphibious capability for the first time in decades; South Korea is investing to expand its amphibious ship-capacity; and India, the Philippines, and Singapore are working to build stronger amphibious capabilities for their countries.

Comprising ships, sea- and airborne connectors, and trained personnel, amphibious forces represent a joint capability. Sustaining such a force requires long-term commitment of resources (personnel, budgets, and equipment) and continued efforts by the participating services—most often navies and armies, though often including air forces as well—to regularly undertake and exercise truly joint operations.

Investments by countries across the Asia-Pacific region in increasingly capable amphibious forces presents an opportunity for more countries to contribute more effectively across a range of important missions, including bi- and multi-lateral trainings, humanitarian assistance and disaster relief, noncombatant evacuation operations, and potentially more stressing crisis-response activities such as raids or other kinetic operations. U.S. partnership with countries throughout the Asia Pacific is an important element in the development of amphibious capability in many of these countries.

In the long term, the United States may be able to share the amphibious burden with close allies in the region for training engagements and crisis response. However, in the near to mid-term, it is likely that U.S. Navy and Marine Corps engagements with these partners and allies will increase—in terms of frequency and complexity—in the Asia Pacific as partners and allies expand their amphibious capabilities. With our most capable allies, there appears to be a coming bow wave of interest in complex amphibious bi- and multi-lateral exercises as Australia, Japan, and South Korea all have initiatives under way to enhance or, in the case of Japan, develop a multi-domain amphibious capability.

The training needs of U.S. partners and allies in the Asia-Pacific region vary widely. Some partners, such as South Korea and Australia, maintain highly capable amphibious forces. Others, such as Japan, have highly professional uniformed services but are at the early stages of developing an amphibious capability. Still others, such as Singapore, maintain only a small amphibious force with a narrowly defined mission set. As a result, the mission packages needed to train with one ally or partner may significantly over- or under-represent the capability needed to train with another partner. U.S. amphibious forces must tailor their training deployments to the capability—and capacity—of the partner nation.

The need to tailor partnership or support packages to specific partners was also borne out when the study team assessed partner and allied capabilities in three operational scenarios: humanitarian assistance/disaster relief (HA/DR), noncombatant evacuation, and a raid. Despite the variation in capability and capacity of the amphibious capabilities assessed, the United States would be called on

consistently to provide medical support, logistics, Command and Control, and aerial maneuver across a range of scenarios.

While meeting requests for greater levels of engagement, the United States must also contend with its primary obligation: ensuring its forces are available and ready to engage in major combat operations should the need arise. As the numbers of hulls in the U.S. amphibious fleet has decreased, the size (tonnage) and capabilities of each ship class has increased. Compared with the amphibious fleet of 1991, there are currently only half as many vessels. However, the total tonnage of the amphibious fleet has fallen by only 8 percent in that same time period—on average, amphibious vessels are nearly twice as large today as they were 25 years ago. Each ship is more capable and more efficient than its predecessors, but ships can only be in one place at a time.

With a smaller number of more capable ships, the Navy and Marine Corps have increasingly moved to "split ship" and "disaggregated" operations. In these distributed deployments, the constituent ships of an amphibious ready group/marine expeditionary unit operate at great distance from one another—often undertaking distinct missions and even reporting to different combatant commanders. This approach reflects a recognition that the traditional three- (or four-) ship amphibious ready group may have more capability than is strictly necessary for most peacetime missions. It comes, however, with new strains on key enabling capabilities such as Command and Control, surface and aerial amphibious connectors, aviation maintenance, and medical facilities.

Over the past 30 years, U.S. forces have responded to a growing number of contingencies, in addition to a steady—and growing—number of partner trainings and exercises. For example, the amphibious force has responded to an average of 5.3 crises and contingencies per year since the end of the Cold War. This is compared to roughly 2.3 events per year during the Cold War.[1] Sustaining this pace of activity while preserving the amphibious force's necessary warfighting capability will be important for continued U.S. presence, reassurance, and deterrence in the Asia-Pacific region.

This report provides an assessment of current and future U.S. amphibious capabilities and those of a select group of allies and partners. It further explores options to allow U.S. amphibious forces to leverage partner and allied capabilities for combined operations without sacrificing warfighting capabilities. The options presented include cost estimates for acquisition and operations, relative to the existing amphibious force. ***Though no options explored by the study team offered greater capability at less cost, several options do provide a different mix of capabilities and capacity (and therefore risk to the force managers) with only modest increases in cost.***

Based on the unclassified analysis available for this report, we recommend the Navy and Marine Corps take seven specific actions, four in the short term and three in the mid- to long term:

1. Increase Pacific Command (PACOM) operations and maintenance (O&M) funding to ensure it can continue experimenting with alternative platforms in a variety of real-world and exercise scenarios.

2. To best leverage the capabilities and capacity of the E-class vessels, establish a Special Purpose MAGTF for Crisis Response (SPMAGTF-CR) for the Western Pacific, modeled on the SPMAGTF-CR for Africa Command (AFRICOM). This would serve as a small self-deploying

[1] Douglas M. King and John C. Berry, "National Policy and Reaching the Beach," *Proceedings Magazine*, November 2011, 23.

force to meet up with E-class vessels for small-scale crisis response and for small-unit amphibious force training.

3. Conduct a pilot program to test the viability of utilizing Army-owned logistics support vessels (LSV-class) as an alternative platform in the Pacific. These small (5,000 ton) vessels have great range and are more comparable to the equipment operated by most Asia-Pacific allies and partners.

4. Develop a low-cost modular mechanism to rapidly expand the Command and Control capabilities of all L-class ships in the fleet. Disaggregated Amphibious Ready Group (ARG) operations and partner-nation capability gaps will place a high premium on U.S. Command and Control capacity in increasingly complex tasks.

5. Explore the possibility of codeveloping with partners or allies—and even coproducing—a commercial-derivative auxiliary ship such as the Expeditionary Mobile Base (ESB), including designs based on larger hulls.

6. Change the home-porting of two Maritime Prepositioning Force (MPF) vessels currently stationed in Guam to ports in Southeast Asia. If the Navy were to move the home-port of a small number of MPF vessels to Southeast Asia, it would greatly reduce transit time, enhance responsiveness, and provide a consistent reason to engage with the host-country even outside of named exercises.

7. Urge the Marine Corps and the Navy to partner on an analysis of alternative amphibious forces to consider how force adaptability could be increased while preserving warfighting capabilities.

1 Demand for U.S. Amphibious Forces

The demand for U.S. amphibious warships arises from two sources. The first is the amphibious lift requirement derived from operational plans. Generally referred to as the warfighting requirement, it is the requirement cited by Navy and Marine Corps leaders during their annual posture and budget hearings before Congress. The second is day-to-day requirements from Combatant Commands (COCOMs) for presence, crisis response, and training engagements with allies and partners. Broadly speaking, these COCOM demands are numerous, geographically dispersed, and mostly occur in low-threat environments. Although not a driver of force size, this COCOM requirement is immediate and visible and therefore tends to put a floor on force size. The warfighting requirement does not include peacetime demands

The following section explores these two drivers of demand and examines historical examples of how they have affected the force. As we will see, some tension exists between the two demand sources, especially in a fiscally constrained environment where the costs of naval vessels are rising.

Warfighting Requirements

The foundational demand signal for the U.S. Navy and Marine Corps amphibious forces is the ability to lift 2.0 Marine Expeditionary Brigade Assault Echelons (MEB-AEs). In terms of personnel, this translates into roughly 21,000 Marines plus their associated equipment, vehicles, and aircraft. Analysis has shown that to meet this requirement fully requires 38 amphibious warships. Because of resource constraints, the Marine Corps agreed to accept risk with a fiscally constrained amphibious lift requirement of 34 ships: 11 Landing Helicopter Docks (LHDs), 12 Landing Platform Docks (LPDs), and 11 Landing Ship Docks (LSDs).[2]

The 38 ship unconstrained / 34 ship constrained requirement includes a 10 percent out-of-service rate for vessels in deep overhaul that would not be able to deploy even in a crisis. Thus, the actual availability would be 34 and 31 ships, respectively. As is discussed in a Chapter 2 , the amphibious lift requirement does not mean that all ships are deployed day-to-day. The 34/31 ships needed to meet the warfighting requirement would all be available only in case of national emergency.

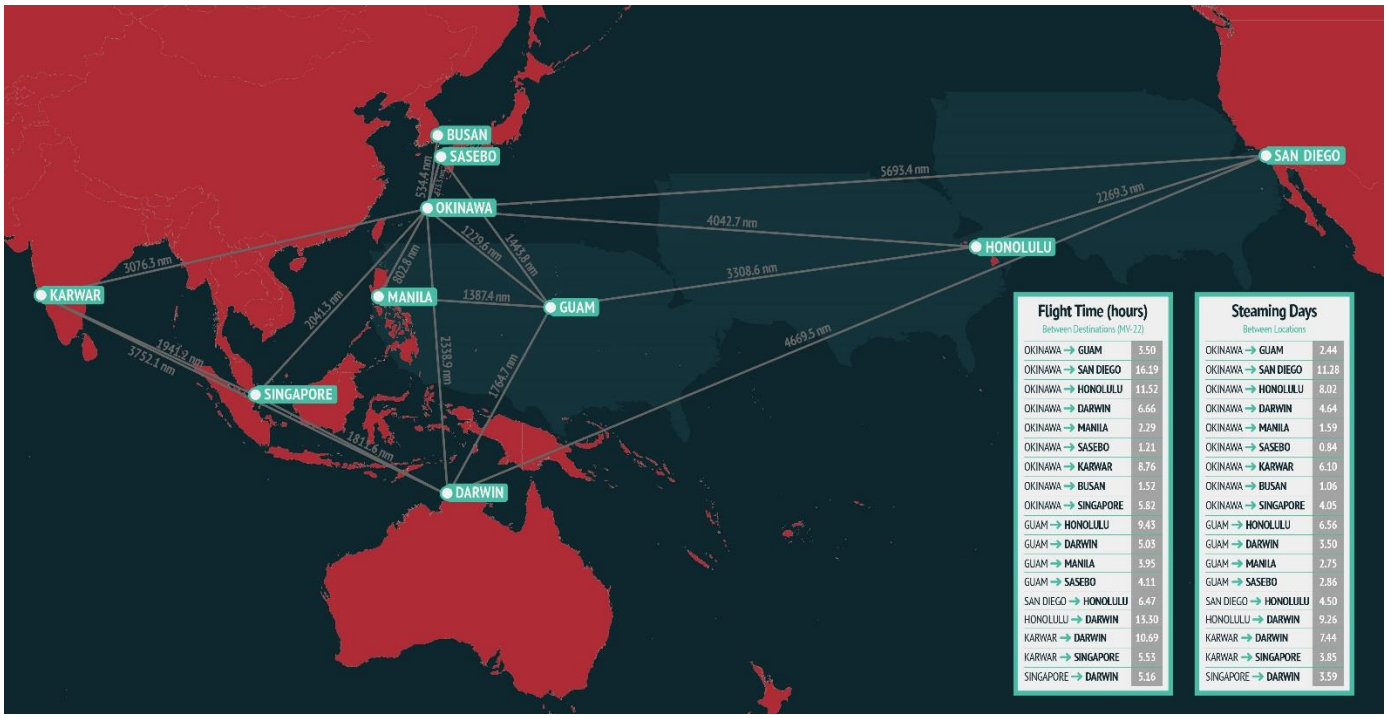
The wartime amphibious lift requirement has evolved over time. During the Cold War, the lift requirement was roughly one Marine Expeditionary Force (MEF) and one Marine Expeditionary Brigade (MEB) with some variation. The rationale behind this requirement was that the Corps needed to be able to conduct two simultaneous landings. The larger MEF force was intended to counter Soviet formations while the MEB dealt with other global contingencies. Similarly, the current 2.0 MEB-AE requirement is driven by warfighting demands; however, the exact justification is classified.

Due to its direct link to warfighting needs, the 34 ship goal is the requirement that Navy and Marine Corps leaders point to when discussing whether the requirement for amphibious ships is being met.

[2] Congress incrementally added funding for a 12th LPD starting in FY2013. As a result, the Navy increased the "resource constrained" requirement from 33 to 34 ships in 2015.

COCOM Presence and Crisis Response Requirements

Figure 1.1. Distances between Key Locations in the Asia Pacific



Amphibious forces are particularly valued in the Pacific Command because of the region's maritime character. To give some sense of scale, it is 3,300 miles from South Korea to the northern coast of Australia and over 4,000 miles from there to the west coast of India. These distances greatly increase the complexity faced by planners trying to meet allied and partner demands as they impose a significant transit tax. Figure 1.1 illustrates the geographic challenge facing PACOM planners. The organic ability to move robust forces by sea makes the Marine Corps an attractive choice for a variety of missions.

Across this vast domain, COCOMs employ amphibious forces for a wide range of tasks that span the range of military operations: deterrence and strategic signaling, crisis response, and exercises and partner engagement. COCOM demands on all forces are unconstrained; that is, they are not informed by the available supply of forces. This disconnect is discussed further in Chapter 2. Due to the inherent multi-mission nature of the Marine Corps, deployed force formations, generally either Marine Expeditionary Units (MEUs) or Special Purpose Marine Air-Ground Task Forces (SP-MAGTFs), may be used for several different tasks over the course of their deployment. This flexibility contributes to the high demand for Marine Air-Ground Task Forces (MAGTFs). The range of military operations serves as a useful framework for discussing how amphibious forces are used in PACOM.

- At the high end of the range, they can provide powerful deterrent effects and serve as powerful signals of U.S. intent. The use of amphibious forces for strategic signaling relies on the full spectrum of their warfighting capabilities. For PACOM, the deterrent and strategic signaling requirement has a pronounced geographic focus in Northeast Asia.

- In the mid-range, the Marine Corps serves as a crisis response force for the United States. The nation's 9/11 force requires a range of capabilities across the range of military operations as the contingency response role encompasses everything from kinetic entry operations to humanitarian assistance and disaster relief (HA/DR) missions.[3] While HA/DR operations have not traditionally been a planning factor for Marine Corps force sizing, they have been a source of growing demand for amphibious capabilities. This growth looks to continue into the foreseeable future driven by demographic and climatological factors.

- At the low end of the range, amphibious forces engage in a multitude of training engagements that aim to build partner capacity in amphibious warfare in particular and military operations more broadly. These operations represent the most numerous of the demands for amphibious force in PACOM and in most cases are the least stressing from a capabilities perspective when compared to the other requirements. While less stressing, they are vitally important for building long-term relationships and, potentially, interoperability in the region that can pay off in higher-end missions.

The following sections explore each of these requirements in greater detail.

Deterrence and Strategic Signaling

The Secretary of Defense and Chairman of the Joint Chiefs of Staff have identified two major threats to U.S. interests in PACOM—China and North Korea—although other challenges remain possible. These challenges may require the United States to use Amphibious Ready Groups and Marine Expeditionary Units for signaling or deterrence. This requires the full range of ARG/MEU military capabilities as the situation could potentially escalate to an active conflict. The United States often uses ARG/MEUs in this role in Northeast Asia when North Korea undertakes highly provocative actions. In 2014 and 2016, the United States dispatched two ARG/MEUs to participate in the Ssang Yong exercise on the Korean Peninsula.[4] This exercise not only improved interoperability and coordination between the U.S. and South Korean militaries, it also served as a powerful signal to the North Korean government in the wake of its highly provocative nuclear activities. Should the situation deteriorate, the Korean Peninsula is the most likely venue for a large-scale amphibious landing.

The United States may also choose to use ARG/MEUs to signal U.S. opposition to Chinese coercive actions in the East and South China Seas. U.S. amphibious deployments in support of exercises with the Philippines, primarily the Balikatan exercise, have a deterrent and signaling purpose that is, in part, aimed at China. The United States may make such messaging more explicit in the future by conducting transit operations in the South China Sea with a full ARG and supporting surface warfare assets.

Crisis Response

Contingency response is the core competency of the ARG/MEUs because these forces are regularly forward-deployed to places where instability or natural disasters are likely. Deterrence and strategic

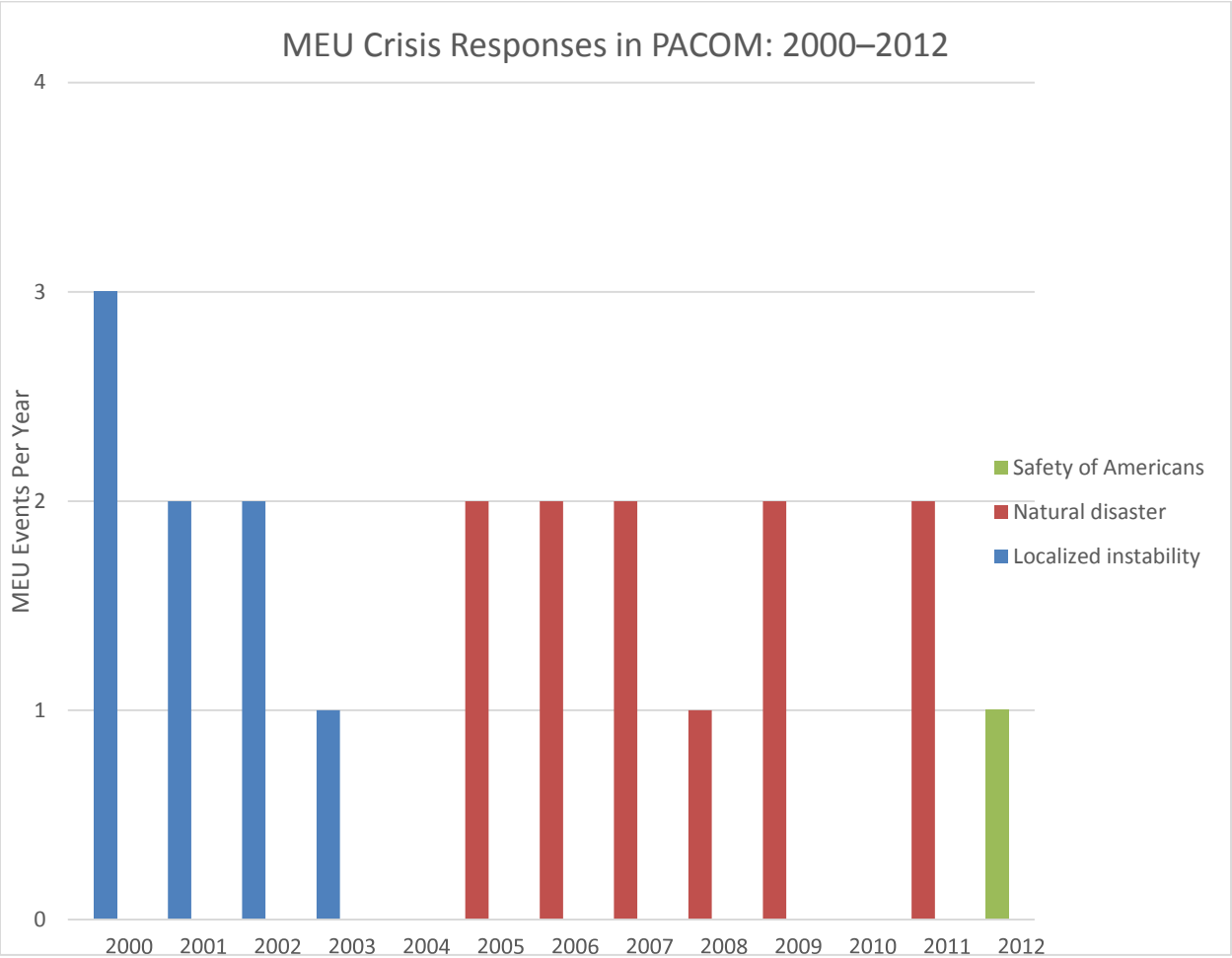
[3] Although humanitarian assistance and disaster relief are often expressed together as HA/DR, they are distinct missions. HA activities can cover an extremely broad range of missions beyond disaster relief to conflict intervention, such as those activities undertaken by the United States and the North Atlantic Treaty Organization (NATO) in the Balkans.

[4] Ashley Rowland, "Large U.S. contingent to take part in South Korean exercise," *Stars and Stripes*, March 11, 2014, http://www.stripes.com/news/large-us-contingent-to-take-part-in-south-korean-exercise-1.272265.

signaling activities can potentially turn into a contingency response mission. The best historical example is the Marine Corps response to the 1990 Iraqi invasion of Kuwait. There was an afloat Marine force in the Persian Gulf for most of Operations Desert Shield and Storm that threatened the Iraqi left flank with an amphibious landing. While this landing plan was never executed, elements of these Marine forces were, in very short order, called on to facilitate the evacuation of the U.S. Embassy in Somalia. Immediately after the war, these Marine/amphibious forces pivoted again to conduct HA/DR operations in Bangladesh after a deadly cyclone struck that country (Operation Sea Angel). This ability to pick up from one mission and quickly pivot to another is a hallmark of the Marine Corps and amphibious forces.

In the PACOM Area of Responsibility (AOR), there is a history of using ARG/MEUs for countering localized instability, as shown by Figure 1.2. These responses from the early 2000s were all related to the persistent instability in East Timor. The United States did not provide a ground force for the peacekeeping operation but did provide considerable mission support to the operation led by Australian forces. Figure 1.2 shows the ARG/MEU crisis responses in PACOM from 2000–2012. The “Safety of Americans” mission in 2012 was the U.S. Marine Corps (USMC) support to the president’s visit to the region.

Figure 1.2. MEU Crisis Responses in PACOM: 2000–2012[5]



While not as fragile as Central Africa or parts of the Middle East, Southeast Asia has several flash points that at some point in the future may require the United States to execute a noncombatant evacuation operation (NEO).[6] One of the largest NEOs undertaken by the United States, the evacuation of Clark Air Base and Subic Bay Naval Base after the explosion of Mount Pinatubo in 1991, took place in PACOM. Moreover, the threat of a major natural disaster including typhoons, earthquakes, volcanos, tsunamis, and monsoon flooding is high in the region. Sixty percent of the world's natural disasters occur in the PACOM AOR and there was a 400 percent increase in observed disasters from 2002 to 2011 when compared to the prior decade. [7] These disasters are often exacerbated by human factors including weak

[5] Jonathan D. Geithner, *The ARG/MEU: Is It Still Relevant?* (Arlington, VA: CNA, 2015).

[6] "Fragile States Index: 2015," *Fund for Peace*, June 17, 2015, http://fsi.fundforpeace.org/rankings-2015.

[7] Colin G. Chin, "Humanitarian Assistance and Disaster Relief in the Indo-Asia-Pacific," *Maritime Power and International Security: EMC Chair Symposium Working Papers*, March 26, 2015, https://www.usnwc.edu/Academics/Faculty/Derek-Reveron/Workshops/Maritime-Security,-Seapower,---Trade-(1)/papers/EMC-Working-Papers---FINAL.aspx.

governance and fragile infrastructure, demographic factors such as urbanization, geographic factors such as low lying flood plains, and climate change.[8]

Figure 1.2 shows how common HA/DR missions are in PACOM with the AOR averaging roughly 1.5 events per year over a seven-year period from 2005 to 2012. Although HA/DR is not the Marine Corps' core mission, it is an enduring reality, a compelling soft power tool, and one of the more frequent ways the USMC is employed.[9] As a result, the Navy and Marine Corps have built a strong proficiency in this mission globally and in the PACOM AOR particularly over the past decade. Over the past 10 years, these two services have responded successfully to major HA/DR events in Japan, the Philippines, and Nepal.

The examples of HA/DR responses in Japan and the Philippines demonstrate several of the challenges posed by HA/DR missions for the Navy and Marine Corps. These disasters required responses that were beyond the scope of the ARG/MEUs as they demanded immense logistics, lift, and medical capabilities. For both Operation Tomodachi (Japan) and Operation Damayan (the Philippines), the Navy and Marine Corps response quickly eclipsed the ARG/MEU level to include the activation of Maritime Prepositioning Squadron (MPSRON) assets.[10]

In addition to the challenges of scale, HA/DR missions are often lengthy in duration. Eventually, these missions are transitioned from military units to USAID and nongovernmental actors, but the Navy and Marine Corps provide vital support in the immediate aftermath. In this rapid response role, the scale with which the military can respond eclipses that provided by nonmilitary sources. HA/DR missions have the potential to further stress high-demand units, especially helicopters.

Operation Sahayogi Haat, the response to the Nepal earthquake in 2015, differs from previous HA/DR responses as the Marine Corps was still the first responder from the United States, but the nation in question has exactly zero miles of coastline. The USMC airborne response, enabled by the long-distance, self-deploying capability of the V-22, may signal a new paradigm for HA/DR response. If this response is replicated in other HA/DR events, it may further increase the demands for Marine forces, although not necessarily coupled to demand for amphibious ships.

Exercises and Building Partner Capacity

The last and most common way amphibious forces are used in PACOM is for partnership activities, notably in the form of bi- and multi-lateral exercises. Requests from allies and partners for U.S.

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[8] Y. E. Hijioka et al., "2014: Asia," in Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, ed. V. R. Barros et al. (Cambridge: Cambridge University Press), 1327–1370, http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap24_FINAL.pdf; "Climate Change, HADR, and Security in the Asia-Pacific," transcript, International Institute for Strategic Studies, May 31, 2014, https://www.iiss.org/en/events/shangri%20la%20dialogue/archive/2014-c20c/special-sessions-b0a1/session-3-18b0; "World Urbanization Prospects: The 2014 Revision File 11a: The 30 Largest Urban Agglomerations Ranked by Population Size at Each Point in Time, 1950–2050," data chart, United Nations Department of Economic and Social Affairs, June, 2014.

[9] U.S. Marine Corps, *Expeditionary Force: 21* (Washington DC: Department of the Navy, 2014), 9, http://www.mccdc.marines.mil/Portals/172/Docs/MCCDC/EF21/EF21_Marine_Corps_Capstone_Concept.pdf.

[10] Alvaro Genie et al, "CSIS Analysis of 2013 and 2014 U.S. Amphibious Engagements" (unpublished dataset, Center for Strategic and International Studies, Washington DC, 2015).

amphibious capabilities in this context is high. [11] The increase in amphibious capabilities across the AOR is in part responsible for demand, not only in terms of number of exercises and engagements but also in terms of complexity. For example, the types of capabilities the United States exercises with Australia is more complex than those exercised with the Philippines. There appears to be a coming bow wave of demands for complex amphibious bi- and multi-lateral exercises as Australia, Japan, and South Korea all have initiatives under way to enhance or, in the case of Japan, develop a multi-domain amphibious capability.

The study team conducted an open source analysis of U.S. exercises in the PACOM AOR in 2013 and 2014 to gain insight into the frequency and nature of U.S., allied, and partner interactions in the amphibious context. For 2013, the team identified 16 bi- and multi-lateral exercises with eight nations that either explicitly focused on building amphibious capability or involved amphibious assets. For 2014, the team identified 12 such exercises also with eight nations. In this data set, the average exercise lasts around two weeks and can involve forces ranging from a single warship (the Shatrujeet exercise in 2013) to a veritable armada (RIMPAC 2014).[12]

Analyzing this data by taking an average of low-end and high-end estimates of duration and U.S. commitments, coupled with an average of 14 engagements per year, translates into almost 450 ship/days of amphibious commitments throughout the AOR.[13] This does not factor in the aforementioned substantial transit times that any vessel faces in the Pacific.

It is possible that the number of exercises in this sample is lower than average. During this period, the Department of Defense (DOD) was contending with significant budgetary shortfalls caused by the Budget Control Act and FY2013 budget impasse. The resulting decrease to the Department's budget caused many training and engagement activities to be curtailed or canceled outright. However, this basic analysis helps show the current and potential scale of requests from allies and partners for amphibious engagements with U.S. forces.

The data reveals some instances where the platform to mission fit for certain exercises seems misaligned. For example, during Balikatan 2008, the U.S. force was approximately 93,500 tons while the entire Philippine Navy displaces no more than 50,000 tons.[14] There are likely reasons related to strategic signaling and/or transit efficiencies to explain why an entire ARG/MEU or some smaller yet still multi-ship formation is exercised with a given ally or partner whose exercise contingent is much smaller than that of the United States. This mismatch is also driven by Defense Department requirements that partnership activities have direct training value for participating U.S. forces. Given the relative scarcity of amphibious assets and their utility, forces need to be allocated in a manner that supports regional objectives while not overwhelming allies and partners. In Chapter 2, the study team will explore ways in which the Navy and Marine Corps might alter their platforms and processes to better support this growing but geographically dispersed demand.

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[11] Allied nations are those with which the United States has a formal security treaty. Partner nations are those with which the United States has a relationship but no formal treaty.

[12] "CSIS Analysis of 2013 and 2014 U.S. Amphibious Engagements."

[13] Ibid.

[14] 31st MEU Public Affairs, "31st MEU Reflects on '08," U.S. Marine Corps, December 19, 2008, http://www.31stmeu.marines.mil/News/NewsArticleView/tabid/7377/Article/532727/31st-meu-reflects-on-08.aspx.

2 Supply of U.S. Amphibious Forces

This chapter explores historical fleet trends, the force generation and allocation processes, the current state of the U.S. amphibious force, future force projections, and the effects of the fiscal climate on these projections. The analysis shows that the number of ships in the amphibious force has declined over time while the capabilities of individual ships have increased. In addition, there have been changes to the Navy's force generation process that translate into fewer, yet better maintained, available warships.

The Amphibious Fleet: Historical Trends

The amphibious fleet has the fewest number of hulls since the establishment of modern amphibious operations with the 1956 Hogaboom Board. [15] In 1975, the U.S. Navy (USN) had 64 amphibious vessels in the fleet.[16] Today, that number stands at 30 vessels.[17] Taken at face value, the U.S. Navy and Marine Corps have less ability to confront geographically dispersed global challenges than they did 45 years ago.

However, an analysis based solely on number of hulls fails to capture the entire story. First, the decline in numbers represents a change in mix. Two large classes in the 1975 force, amphibious cargo ships (LKAs) and landing ship tanks (LSTs), have been phased out as they are incompatible with the modern Marine Corps doctrine of ship-to-objective maneuver (STOM). These classes have been supplanted by larger and far more capable LPDs and LSDs. Second, the size of the average amphibious ship size has increased greatly.

In 1975, the amphibious force displaced a total of 880,000 tons with the average L-class vessel displacing 13,750 tons. Today, the amphibious fleet displaces 812,000 tons with the average vessel displacing 27,100 tons. To put this in perspective, the total number of hulls decreased 53 percent while the total displacement of the amphibious fleet decreased only 7 percent.[18] Figure 2.1 shows the changes in tonnage and number of hulls from 1975 to present in five-year increments. It illuminates the tradeoff the USN made over time in shaping the amphibious force; the Navy is buying fewer amphibious warships, but the total tonnage does not change much.

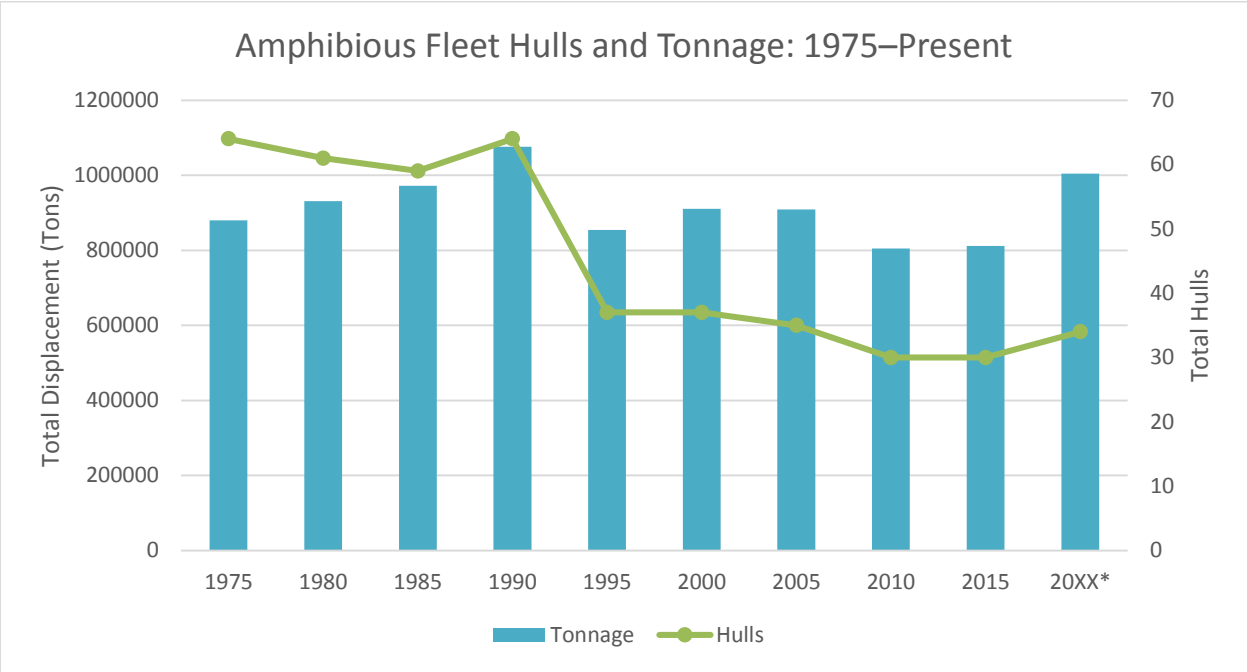
[15] The Hogaboom Board represents a break point in amphibious thinking as it offered recommendations to restructure Marine forces to integrate aviation assets, principally helicopters, into Marine Corps amphibious operations. For more, see Eugene W. Rawlins, *Marines and Helicopters 1946–1962,* ed. William J. Sambito (Washington, DC: Department of the Navy, 1976), 73–78, http://www.marines.mil/Portals/59/Publications/Marines%20and%20Helicopters%201946-1962%20%20PCN%2019000306900_3.pdf; Mathew T. Robinson, *Integrated Amphibious Operations Update Study (DON Lift 2+): A Short History of the Amphibious Lift Requirement* (Alexandria, VA: Center for Naval Analyses, July 2002), 42–43.

[16] Naval History and Heritage Command, "U.S. Ship Force Levels," *Naval History and Heritage Command*, http://www.history.navy.mil/research/histories/ship-histories/us-ship-force-levels.html.

[17] NAVSEA Shipbuilding Support Office, "Ship Battle Forces—272," *Naval Vessel Register*, accessed April 4, 2016, http://www.nvr.navy.mil/nvrships/sbf/fleet.htm.

[18] Andrew Metrick and Christine Wilkes, "CSIS Analysis of Historical Ship Data" (unpublished analysis, Center for Strategic and International Studies, Washington DC, 2015).

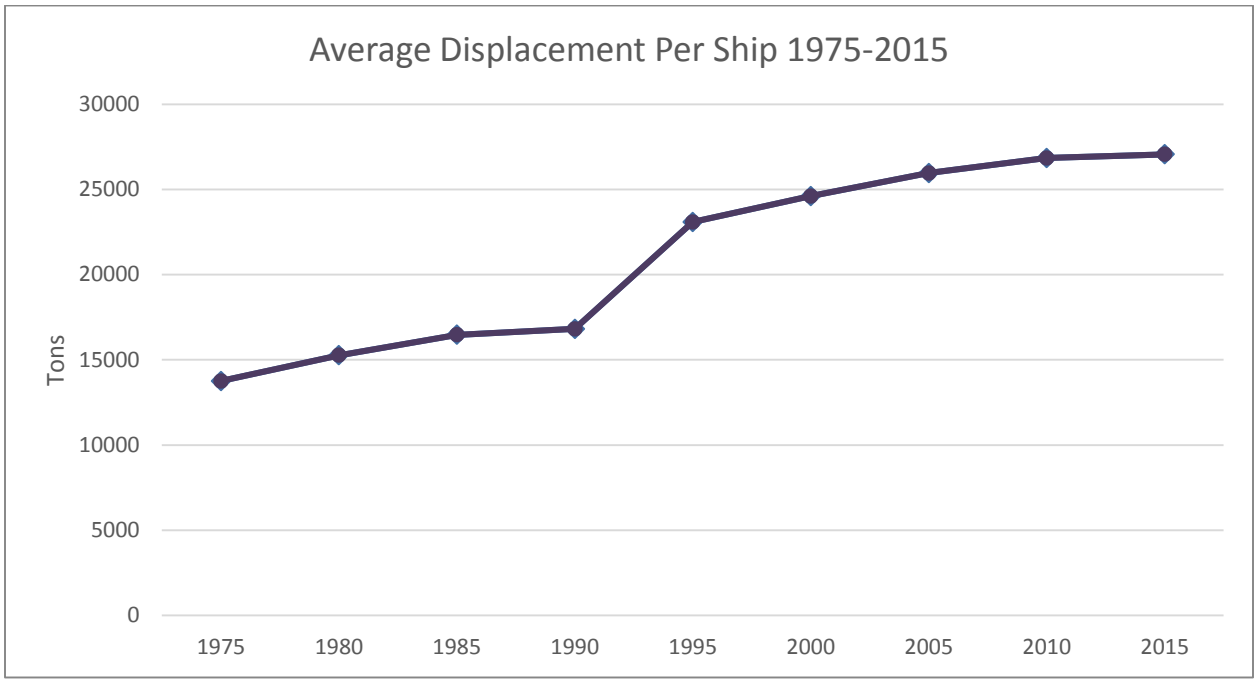
Figure 2.1. Amphibious Fleet Hulls and Tonnage: 1975–Present



Source: CSIS Analysis of Historical Ship Data. Note that the 20XX entry denotes a 34 ship objective force with 3 Landing Helicopter Assault ships (LHAs), 8 LHDs, 12 LPDs, 3 LSD-49s, and 8 Landing Ship Dock, Replacement (LXRs) of 22,000 tons.

Figure 2.2 shows the growth in size of the average amphibious ship since 1975. Over time the vessels are becoming much larger and hence more capable than their predecessors. The jump in average ship size between 1999 and 1995 is a result of the Navy divesting legacy ships from the Cold War, primarily the smaller *Newport*-class LSTs.

Figure 2.2. Average Displacement per Ship: 1975–2015

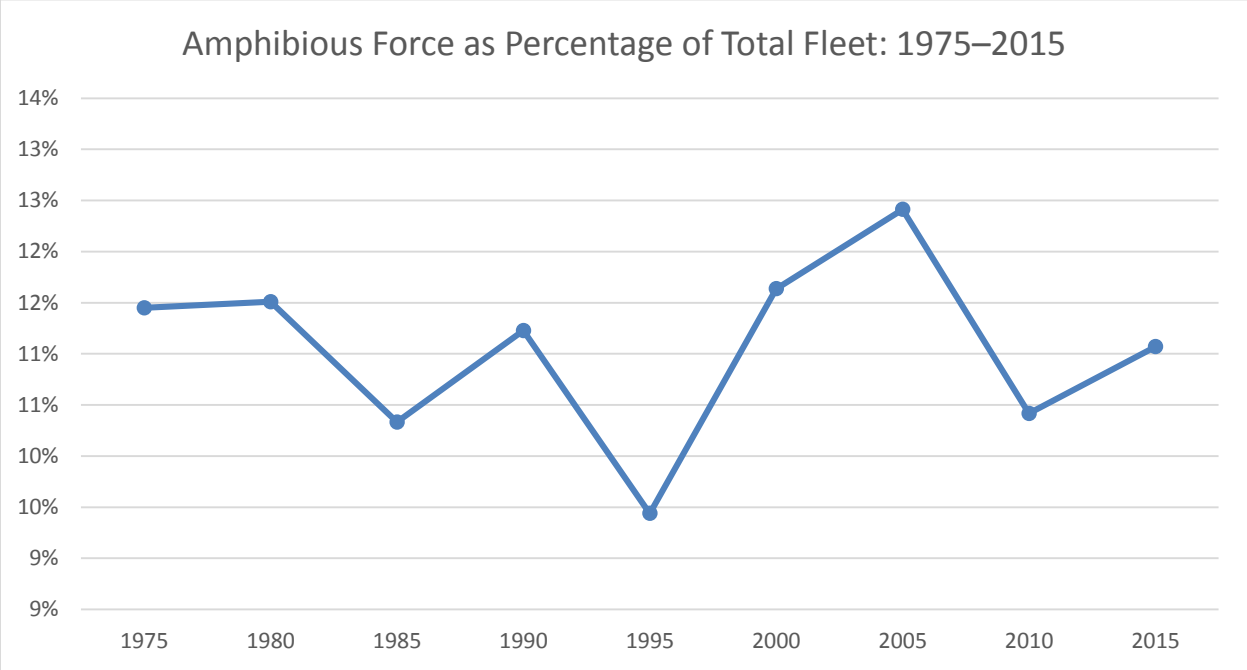


Growth in the weight and footprint (square and cubic footage) of Marine Corps equipment has, in part, driven the growth in average displacement, as numerous analyses of amphibious lift have noted.[19] The result of this trend is that the ships of the amphibious force, while exceedingly capable individually, are too few to meet all global demands. Ships, however capable, can only be in one place at a time.

Despite the reduction in numbers of amphibious ships, as a percentage of the total fleet the amphibious fleet has remained largely constant at 11 percent since 1975, with a variance of only one to two percent.[20] This suggests that the relative priority of amphibious forces in comparison to the rest of the Navy's force structure has not changed in 45 years. This is striking considering the great changes in the threat environment, such as the fall of the Soviet Union, the growth of China as a military force, the emergence of global terrorist networks, and the rise of peacekeeping operations. The latter two demands would seem to drive an increase in amphibious ships.

[19] Maren Leed, *Amphibious Shipping Shortfalls: Risks and Opportunities to Bridge the Gap* (Washington, DC: Center for Strategic and International Studies, 2014); Robinson, *Integrated Amphibious Operations Update Study (DON Lift 2+)*.
[20] "CSIS Analysis of Historical Ship Data."

Figure 2.3. Amphibious Force as a Percentage of Total Fleet: 1975–2015



This historical analysis provides some useful guideposts for discussing the hypothetical future supply of U.S. amphibious ships. Using the 11 percent historical average as a benchmark, the 34 ship resource-constrained amphibious lift objective would suggest a total naval force of 309 vessels. This is close to the Navy's stated goal of 308 battle force ships.[21] The full requirement of 38 ships suggests a total battle force of 345 ships. Although the 2014 National Defense Panel and some commentators have recommended such a fleet size, this level is unachievable under currently forecasted Department of the Navy funding levels.[22] The requirement of 50 or more amphibious ships, sufficient to meet all COCOM demands, suggests a battle force of 450 or more warships. This would return the Navy to its pre-1993 Bottom-Up Review size.[23] However, because current ship designs are so large, the total displacement of such an amphibious fleet would be much larger than the post–World War II historical levels.

Force Generation

The current 34 ship amphibious force provides day-to-day availability through the Navy's force generation mechanism. Under the current force generation concept, the Optimized Fleet Response Plan (OFR-P), it takes roughly five vessels in the inventory to forward-deploy one. (The exact number varies depending on the theater and the home-port.) As of this writing, the OFR-P has only been implemented

[21] Ronald O'Rourke, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, CRS Report No. RL32665 (Washington, DC: Congressional Research Service, 2016), 5, https://www.fas.org/sgp/crs/weapons/RL32665.pdf.

[22] William J. Perry and John P. Abizaid, *Ensuring a Strong U.S. Defense for the Future: The National Defense Panel Review of the 2014 Quadrennial defense Review* (Washington, DC: U.S. Institute of Peace, 2014), http://www.usip.org/sites/default/files/Ensuring-a-Strong-U.S.-Defense-for-the-Future-NDP-Review-of-the-QDR_0.pdf.

[23] Naval History and Heritage Command, "U.S. Ship Force Levels."

for carrier strike groups.[24] However, the Navy intends to move the entire fleet, including the amphibious force, to the OFR-P cycle in the near future.[25] When the plan was unveiled in 2013, its architect, Admiral William Gortney, then Commander, U.S. Fleet Forces Command, indicated that the five-to-one ratio was the result of limited resources. More robust resourcing could lower the ratio to three to one.[26] When the amphibious force transitions to the OFR-P, the experience with the carrier fleet suggests that somewhere between 6 to 11 amphibious warships will be available at any given time depending on funding level and size of the amphibious fleet.

At current funding levels, it is reasonable to assume that the Navy is able to provide available forces at the low end of this range. The Navy's FY2015 Posture Statement, as given by then Chief of Naval Operations (CNO) Admiral Jonathan Greenert, is consistent with this analysis. Admiral Greenert indicated that the Navy could make roughly two ARGs worth of amphibious ships available on a regular basis and three ARGs available for "surge" by 2020.[27]

With the new OFR-P cycle, the Navy is pulling back from its earlier all-out efforts to meet the exceptionally high global demands for its forces. Ships were not getting the maintenance they needed for long-term readiness. The OFR-P is a conscious effort to ensure that Navy ships are properly maintained and not "sailed into the ground" trying to meet Combatant Commander (CCDR) demands that are not supply constrained. To date, the Navy has been unwilling to change the planned cycle for its carrier fleet even when facing considerable political pressure.[28]

If the Marine Corps is able to align its force generation to the Navy's ship availability, this suggests that the combined blue-green team is able to support roughly two MEUs of available presence. This does not factor in the effects of the transit tax (which decreases availability), the forward-deployed amphibious forces in Japan (which slightly increases availability), or persistent issues with the readiness of Marine Corps aviation units (decreases availability).[29]

In peacetime, the Marine Corps works to generate deployable forces at the level of a Marine Expeditionary Unit (MEU), a force of roughly 2,200 Marines and sailors. They also work to provide a deployable command element certified to lead a joint task force (JTF). The Marine Corps may be unable to generate forces at the scale of two MEUs needed to meet Navy ship availability if it is required to provide a sizable number of forces for other contingency operations. This disconnect has a recent

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[24] William Gortney, "Optimizing the Fleet Response Plan" (presentation, Surface Navy Association, Crystal City, VA, January 15, 2014), https://shipbuilders.org/sites/default/files/ADM%20Gortney%20SNA%202014%20Optimizing%20The%20Fleet%20Response%20Plan%20(Public%20Version).pdf.

[25] Megan Eckstein, "Admirals: Fleet Readiness Plan Could Leave Carrier Gaps, Overwhelm Shipyards," *USNI News*, September 9, 2015, https://news.usni.org/2015/09/09/admirals-fleet-readiness-plan-could-leave-carrier-gaps-overwhelm-shipyards.

[26] Gortney, "Optimizing the Fleet Response Plan."

[27] *Hearings on FY2016 Department of the Navy Posture before the Senate Comm. on Appropriations, Subcommittee on Defense,* 114th Congress (2015) (statement of Admiral Jonathan Greenert, U.S. Navy Chief of Naval Operations), http://www.navy.mil/cno/docs/CNO_SACD.pdf.

[28] Valeria Insinna, "Low Inventory, Low Readiness Plague Amphibious Ship Fleet," *National Defense Magazine*, August 2014, http://www.nationaldefensemagazine.org/archive/2014/August/Pages/LowInventoryLowReadinessPlagueAmphibiousShipFleet.aspx.

[29] John Grady, "Department of Navy: Aviation Safety, Readiness Are Major Concerns," *USNI News*, March 3, 2016, https://news.usni.org/2016/03/03/department-of-navy-aviation-safety-readiness-are-major-concerns.

historical antecedent. The Marine Corps' ability to operate "from the sea" was directly impacted by the ground mission in Iraq and Afghanistan over the past 15+ years. The past two Commandants of the Marine Corps (CMC) and the current CMC, General Robert Neller, have made the return to the sea and expeditionary operations a cornerstone of the Corps' reset. However, it is clear that a major contingency operation of any significant duration would decrease the Marine Corps ability to source steady-state, amphibious demands within acceptable personnel tempo levels.

At present, the Marine Corps is working toward achieving an acceptable yet shorter than preferred force generation cycle that provides Marines at a 1:2 deploy-to-dwell ratio. In an ideal world, the Marine Corps' would have a 1:3 deploy to dwell ratio.[30] At the current ratio, Marines can expect seven months of deployment and 14 months of "dwell" at home.[31] The major concern within the Marine Corps is that its aviation units are expecting exceptionally high demand and are being run inside of the 1:2 ratio, much close to 1:1. Not only is this highly taxing on personnel, it degrades long-term readiness as it impedes equipment maintenance and the completion of full training cycles.[32]

Force Allocation

The Secretary of Defense allocates service-provided forces across all COCOMs through the Global Force Management (GFM) process, including the GFM annual allocation plan (GFMAP). This allocation takes place in response to COCOM demands, termed requirements in DOD parlance. The GFMAP is continually adjusted to account for global events through the Secretary of Defense Operations Book (SDOB) process.

The fact that COCOM requirements are not supply-informed means that they often have unmet requirements in the GFM process. This is especially true as requirements for ongoing combat operations in U.S. Central Command (CENTCOM) and rising tensions in PACOM and EUCOM pull from the same pool of scarce resources. At congressional hearings, COCOM commanders, service chiefs, and service secretaries have all testified to the mismatch between supply and demand. Amphibious warships and the Marines that they transport are one such group where demand exceeds supply.

Based on then Commandant Joseph Dunford's testimony at the FY2016 Marine Corps posture hearing, the two services can meet "less than half of the GCC [Geographic Combatant Commander] ARG/MEU crisis response force demand."[33] The Marine Corps is attempting to meet some of this unmet demand

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[30] Bryan Clark and Jesse Sloman, *Deploying Beyond Their Means: America's Navy and Marine Corps at a Tipping Point* (Washington, DC: Center for Strategic and Budgetary Assessments, 2015, http://csbaonline.org/publications/2015/11/deploying-beyond-their-means-americas-navy-and-marine-corps-at-a-tipping-point/.

[31] Bryan Clark, "Deploying Beyond Their Means: The U.S. Navy and Marine Corps at a Tipping Point," *National Interest*, November 18, 2015, http://nationalinterest.org/feature/deploying-beyond-their-means-the-us-navy-marine-corps-14378.

[32] Megan Eckstein, "Gen. Paxton: Some Marine Units Operating at Less Than 1:2 Deployment-to-Dwell Ratio," *USNI News*, March 27, 2015, https://news.usni.org/2015/03/27/gen-paxton-some-marine-units-operating-at-less-than-12-deployment-to-dwell-ratio.

[33] *FY2016 Department of the Navy Budget: Hearings on USMC Posture before the House Appropriations Comm., Subcommittee on Defense*, 114th Cong. (2015) (statement of General Joseph Dunford, Commandant of the U.S. Marine Corps), http://www.hqmc.marines.mil/Portals/142/Docs/CMC%20Testimony%202015/USMC%20FY16%20Written%20Posture%20Statement_FINAL.pdf.

with forces not tied to amphibious vessels, including air mobile SP-MAGTFs and use of so-called alternative platforms. In addition, ARG/MEUs are operating more and more frequently in a split or disaggregated manner. Split operations means that the ARG's component vessels are operating separately but still within a roughly 200-mile radius. [34] A recent development is the rise of disaggregated operations wherein ARG/MEU components are functioning independently, potentially in different COCOM AORs.[35] This operational model places new strains on the ships and units as capabilities that were once present in aggregate must be distributed to the component parts, which can create situations where ships must provide capabilities such as medical and Command and Control (C2) that they were not designed to provide.[36]

This persistent, heightened demand is referred to by Marine Corps and other leaders as the "new normal." Navy and Marine Corps leadership have indicated that meeting the unconstrained new normal demand would require an amphibious force in excess of 50 ships.[37] Figure 2.4 demonstrates the disconnect between COCOM requests and the ability of the Navy and Marine Corps to meet those requests. For these reasons, it is clear that some judgment is needed when using COCOM requests for force sizing, especially in a cost-constrained environment.

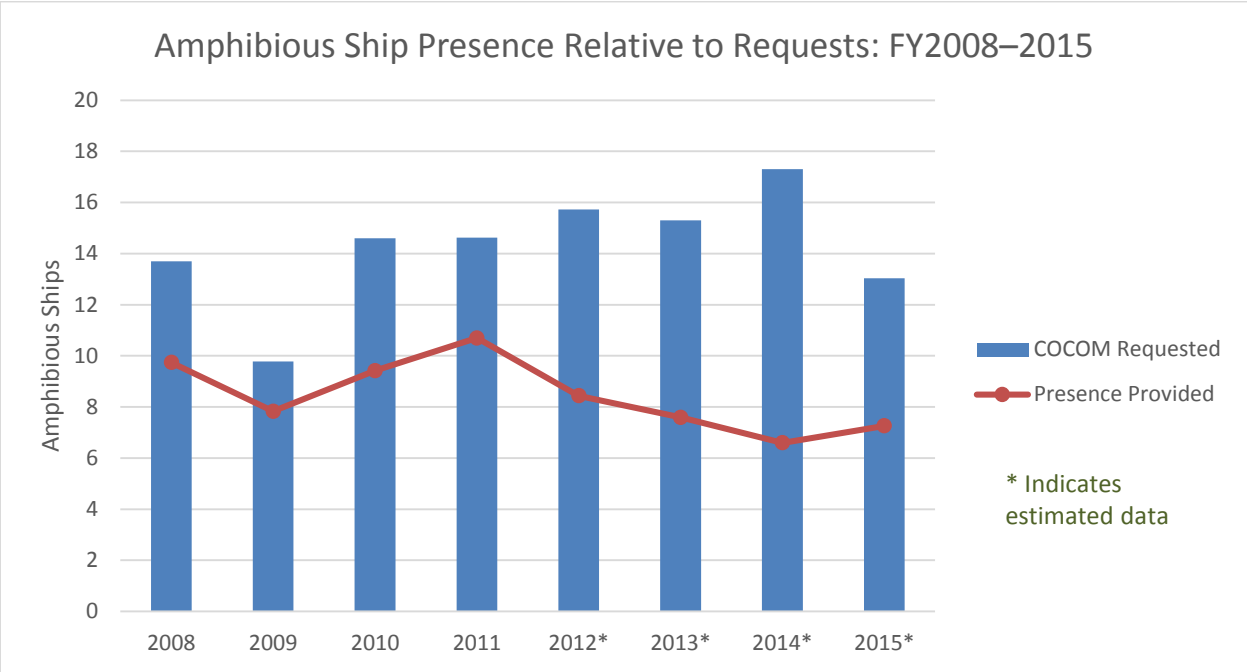
[34] Derrick Perkins, "Disaggregated MEUs likely to become more common," *Marine Corps Times*, December 28, 2014, http://www.marinecorpstimes.com/story/military/pentagon/2014/12/28/disaggregated-meus-become-commonplace/20852001/.

[35] *Expeditionary Force 21, Forward and Ready: Now and in the Future* (Washington, DC: Department of the Navy, 2014), http://www.mccdc.marines.mil/Portals/172/Docs/MCCDC/EF21/EF21_Capstone_Concept.pdf.

[36] *Annual Report for Program Objective Memorandum 2017: Seabasing* (Quantico, VA: U.S. Marine Corps Combat Development & Integration, 2016), https://marinecorpsconceptsandprograms.com/sites/default/files/files/Seabasing%20Annual%20Report.pdf.

[37] *Annual Report for Program Objective Memorandum 2017: Seabasing*; Insinna, "Low Inventory, Low Readiness Plague Amphibious Ship Fleet."

Figure 2.4. Amphibious Ship Presence relative to COCOM Request: FY2008–2015



Source: Leed, *Amphibious Shipping Shortfalls*, 11.

Amphibious presence in PACOM is bolstered by Forward Deployed Naval Forces (FDNF) in Sasebo, Japan and the forward stationing of the majority of III MEF to include 31st MEU in Okinawa, Japan. These forward forces greatly increase the available amphibious presence in PACOM as their transit tax is far less than forces based on the West Coast of the United States. In addition, these forward forces operate on a different force generation cycle than their U.S.-based counterparts. This different cycle provides a much higher level of availability 66 percent of the time.[38] Non-FDNF naval forces are available between 20 percent and 30 percent of the time.

For a more detailed exploration of warfighting requirements, force generation, and allocation issues, see the CSIS study, *Amphibious Shipping Shortfalls*. That study describes the myriad of demands faced by the amphibious force, and the challenges associated with meeting these demands, and offers a framework for assessing the risk associated with increased use of alternative platforms. It concludes that the Navy and Marine Corps lack a "comprehensive, common, affordable, and systems-based strategy guiding the amphibious capability portfolio."[39]

The Amphibious Fleet of Today and Tomorrow

Today's amphibious force stands at 30 amphibious warships, defined as those vessels that are designated with the L- hull classification prefix (but excluding the two *Blue Ridge*–class amphibious command vessels (LCCs) because they have been diverted to other missions).[40] L-class ships are

[38] Bryan Clark and Jesse Sloman, *Deploying Beyond Their Means: America's Navy and Marine Corps At a Tipping Point*.

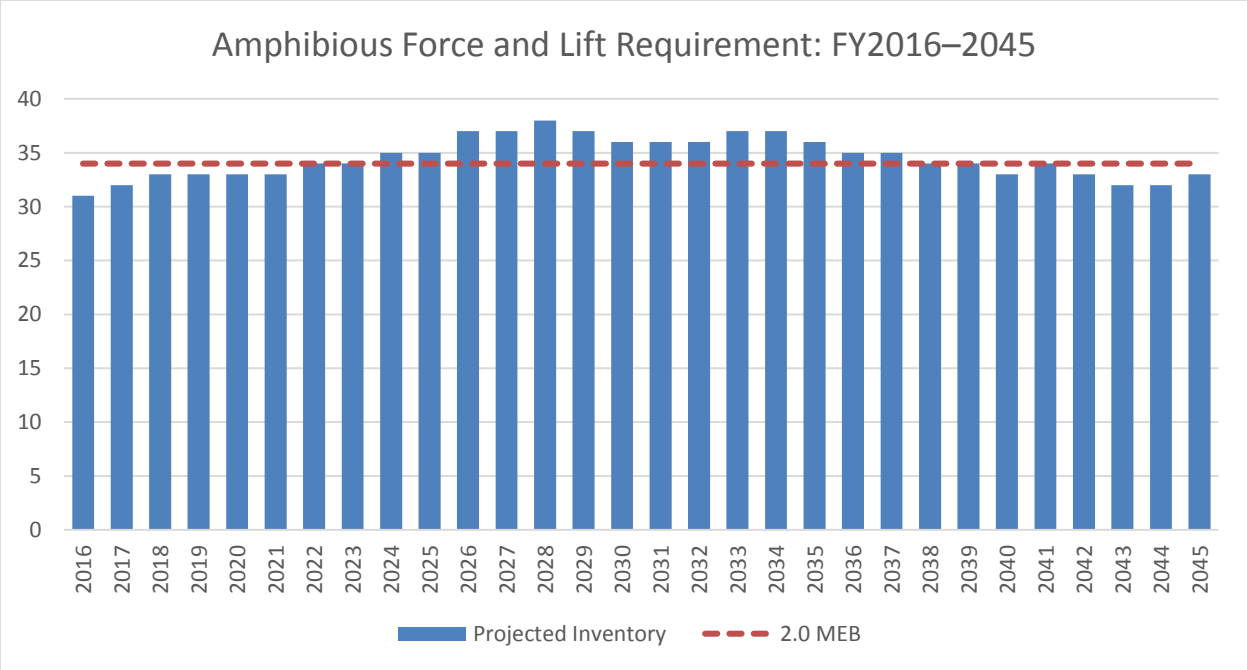
[39] Leed, *Amphibious Shipping Shortfalls,* 56–57.

[40] "Naval Vessel Register," NAVSEA Shipbuilding Support Office,accessed April 13, 2016, http://www.nvr.navy.mil/.

purpose-built to deliver substantial USMC forces over the beach and directly to their objectives by both air and sea. They are designed to achieve this mission even in a contested environment. The 30 ships of the Gator Navy, the colloquial name for the amphibious fleet, include two classes of "big deck" amphibious assault ships—8 *Wasp*-class LHD ships and 1 *America*-class LHA ship—and three classes of amphibious transports—9 *San Antonio*-class LPD ships, 8 *Whidbey Island*–class LSDs, and 4 *Harpers Ferry*–class LSDs.[41]

This inventory is four below the 34 ship resource-constrained requirement for amphibious warships. Figure 2.5 shows the projected amphibious force out to 2045, based on the Navy's FY2016 30-year shipbuilding plan.[42] The dotted line reflects the 34 ship / 2.0 MEB lift requirement. It shows that the amphibious force will not reach minimum required levels until the early-2020s. From the mid-2020s until the late-2030s, the amphibious force hovers between the minimum (34) and full (38) required levels before dipping below the minimum requirement again in the 2040s.

Figure 2.5. Amphibious Force and Lift Requirement: FY2016–2045



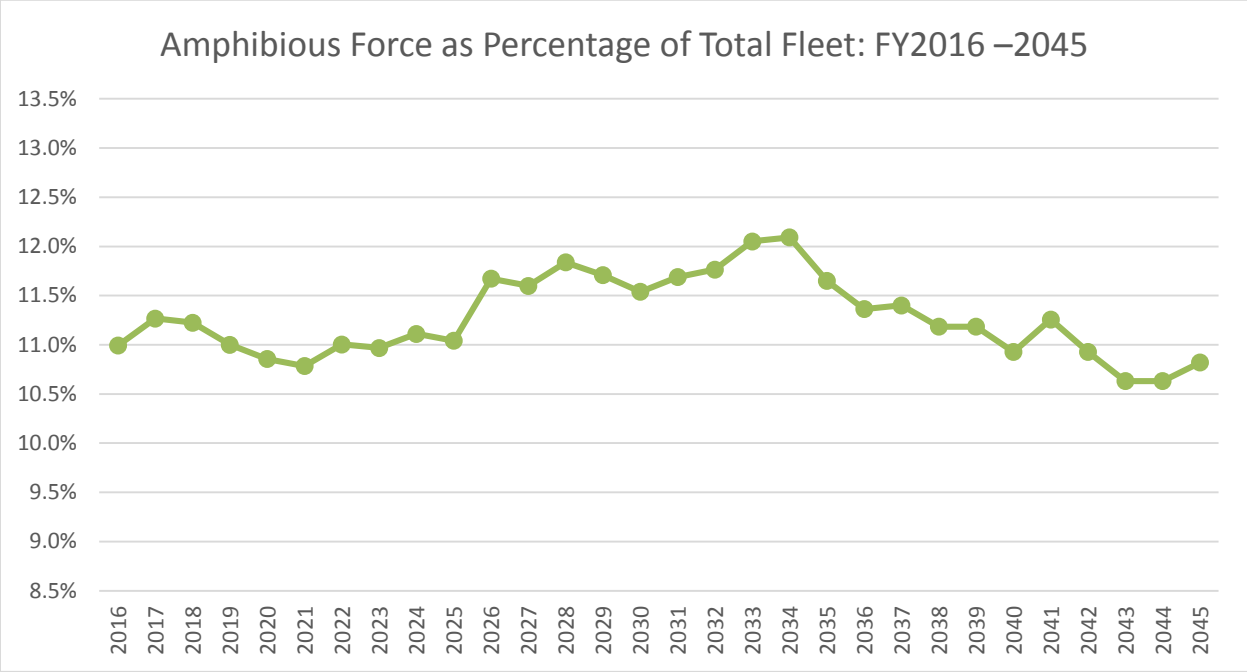
Source: Department of Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2016*.

[41] "Naval Vessel Register."

[42] Department of Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2016,* (Washington, DC: Office of the Chief of Naval Operations, 2015), http://news.usni.org/wp-content/uploads/2015/04/FY16-30-Year-Shipbuilding-Plan.pdf.

As shown in Figure 2.6, the amphibious force as projected in the Navy's 30-year plan holds near its historical average of 11 percent of the total fleet.

Figure 2.6. Amphibious Force as a Percentage of Total Fleet: FY2016–2045



Source: Department of Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2016*.

Two major procurement programs will unfold over the coming decades that, while not greatly increasing the number of hulls in the amphibious force, will modernize its constituent parts. First, the Navy is purchasing a new class of big deck amphibious assault ships, the *America* LHAs, which will replace the older LHDs when they reach the end of their service lives. The first of the *America*-class (Flight 0 subclass) was delivered in 2014 and the second will be delivered in 2017. There will be a seven year gap between the delivery of the second *America*-class (*Tripoli*) and the resumption of deliveries in 2024.[43] Starting in 2024, the Navy plans to fund one LHA every four years.

The Flight 1 subclass scheduled for delivery beginning in 2024 will reintroduce the well deck for launching surface connectors. The initial two vessels lack this capability and are aviation-centric platforms. The well deck was eliminated to increase the ship's aviation capability. However, loss of the well deck was controversial within the Marine Corps because it shifted the logistics load onto aerial connectors that inherently can carry less and are susceptible to a range of increasing advanced man-portable weapons, which decreases operational flexibility and makes the maneuver options for

[43] *An Analysis of the Navy's Fiscal Year 2016 Shipbuilding Plan* (Washington, DC: Congressional Budget Office, 2015), https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/50926-Shipbuilding_OneCol-2.pdf.

commanders more weather dependent. The decision also shifted the force away from the traditional amphibious landing "over the beach." This design decision was reversed in the Flight 1 ships.[44]

The second major amphibious procurement will be the LPD-replacement next-generation amphibious ship (LXR) program to replace the Navy's aging force of LSD-41s and LSD-49s. LSDs are the pickup trucks of the amphibious fleet. Less capable than either the big decks or LPDs for carrying personnel and aircraft or conducting C2 or medical activities, LSDs are instead optimized for cargo and seaborne connectors.

The Navy plans to build the LXRs on the LPD-17 hull, which is much larger than its predecessor, the LSD-41/49.[45] A notional 20,000+ ton LXR provides substantially increased lift capacity in comparison to the 16,000-ton LSD it replaces, albeit at a higher cost. Some have criticized buying such a robust platform to meet the LSD requirement. These concerns reflect the tension between warfighting and presence demands. The critics' argument is that a smaller, cheaper LXR would allow the Navy to purchase more vessels and help meet the rising day-to-day demand for amphibious warships. The Navy and Marine Corps concluded that the efficiencies gained both during construction and over the vessels' life spans by using a common hull and many common components would give them the most ship for their dollar and better meet the warfighting requirement.[46] In addition, an LXR needs to be larger than the LSD-41/49s to accommodate the growth in size and weight of Marine Corps equipment.[47] For example, the Joint Light Tactical Vehicle is much larger than the vehicles it replaces: roughly triple the weight of the soft-skin High Mobility Multipurpose Wheeled Vehicle (HMMWV) and roughly 1,000 pounds heavier than the up-armored HMMWV.[48]

Despite these new vessels, the standard amphibious formation of the mid-2020s, the ARG, will look very much like it does today. The biggest changes will instead be related to the amphibious connectors: the boats, hovercraft, and rotorcraft that link ship to shore. These changes are discussed in a subsequent section of this chapter.

Alternative Platforms

The Navy and Marine Corps recognize that the traditional amphibious fleet does not have the capacity to meet all global demands. This recognition has led the Marine Corps to explore a broader array of U.S. vessels that could be used to meet some of these demands.[49] Such ships have become known as alternative platforms.

Vessels in the Maritime Prepositioning Force (MPF) comprise one group of alternative platforms. Historically, the MPF was conceived as responding to a full-scale forcible entry scenario. Each MPSRON,

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[44] *An Analysis of the Navy's Fiscal Year 2016 Shipbuilding Plan*.

[45] Ronald O'Rourke, *Navy LX(R) Amphibious Ship Program: Background and Issues for Congress* (Washington, DC: Congressional Research Service, 2016), 6–7.

[46] O'Rourke, *Navy LX(R) Amphibious Ship Program*, 7–10.

[47] Leed, *Amphibious Shipping Shortfalls*.

[48] Jordan Golson "This Scaled-Down Armored Truck Could Be the Next Humvee," *Wired*, October 27, 2014, http://www.wired.com/2014/10/the-next-humvee/all/1; *M1151A1w/B1 HMMWV*, specs sheet, AM General, accessed April 14, 2016, http://www.amgeneral.com/files/specs-sheet-m1151-domestic-04-10.pdf.

[49] Megan Eckstein, "Simcock: Marines in Pacific Need Alternative Platforms to Ensure Mission Availability," *USNI News*, November 24, 2015, http://news.usni.org/2015/11/24/simcock-marines-tn-pacific-need-alternative-platforms-to-ensure-mission-availability.

consisting of four to seven vessels, would provide the follow-on support for a MEB-sized operation. Today, there are two MPSRONs operated by civilian mariners and forward-deployed at two locations: Diego Garcia and Guam.[50]

In response to global demands, the Navy and Marine Corps have moved to make these formations more useful in a broad spectrum of operations—not just amphibious assaults—and for smaller-scale operations, not just MEB-sized. There are now deployment packages for less than the full MPSRON that are designed to support HA/DR, NEO, and other lower-intensity missions.[51]

Efforts have focused on operationalizing the most recent addition to the MPSRONs, the *Lewis and Clark*–class Dry Cargo/Ammunition Ship (T-AKE). These vessels are also used by the Combat Logistics Force (CLF) for underway replenishment of Navy ships. In their Marine Corps role, they serve as utility logistics vessels without the roll-on, roll-off vehicle spaces of the T-AKRs. They also have the largest flight deck of any vessel in the MPSRON, which makes them attractive as an alternative platform. The Navy and Marine Corps are already using T-AKEs to enhance presence, and modifications are being considered that would improve the ability of the T-AKEs to operate in this role.[52]

Another MPSRON vessel, the Large, Medium-Speed, Roll-on/Roll-off ship (T-AKR/LMSR) will likely see increased operational use. These roll-on, roll-off cargo ships can be paired with a Mobile Landing Platform (MLP) to create a sea-based logistics hub. The LMSRs may also be upgraded to allow more selective offload. This means that not only is equipment loaded in such a manner that the most likely equipment sets are easiest to access, but also cargo can be rearranged at sea, dramatically improving the logistics flexibility.

In the middle 2000s, the Marine Corps developed an ambitious plan to greatly increase the size and capability of a MPSRON through the Maritime Prepositioning Force (Future) program, known as MPF(F). This 14 ship force would have been based out of either Guam or Diego Garcia and included two LHAs, one modified LHD, three T-AKEs, three modified LMSRs, three MLPs with six Landing Craft Air Cushions (LCACs) each, and two conventional MPF vessels.[53] The MPF(F) was designed to provide robust follow-on logistics support from the sea to two MEBs without the need for access to port facilities. The MPF(F) would have provided the Navy and Marine Corps with a large and flexible forward-deployed capability that could be used to support a host of other activities in the Asia-Pacific region.[54]

When this ambitious program was canceled in 2010, the MLP platform lived on as an enabler for sea-based logistics as it permits many cargo ships to offload at sea. However, the MLPs that entered service in 2012 and 2014 are scaled-back versions of the MLP that was originally envisioned as part of the MPF(F) effort. Crucially, they lack the capability to carry their own LCACs, requiring the presence of an amphibious warship with surface connectors to make the sea-based logistics concept a full reality.

In recent years, the Navy has recognized the importance of alternative platforms by giving new ship designations to three classes. Called expeditionary support or E-class ships, they include the Joint High

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[50] *Annual Report for Program Objective Memorandum 2017: Seabasing*.

[51] Leed, *Amphibious Shipping Shortfalls.*

[52] Eckstein, "Simcock: Marines in Pacific Need Alternative Platforms to Ensure Mission Availability"; *Annual Report for Program Objective Memorandum 2017: Seabasing*.

[53] Robert Button et. al., *Maritime Prepositioning Force (Future) Capability Assessment* (Arlington, VA: RAND Corporation, 2010), http://www.rand.org/content/dam/rand/pubs/monographs/2010/RAND_MG943.pdf.

[54] Button, *Maritime Prepositioning Force (Future) Capability Assessment.*

Speed Vessel (JHSV), now Expeditionary Fast Transport (EPF); the MLP, now Expeditionary Transfer Dock (ESD); and the Afloat Forward Staging Base (AFSB), now Expeditionary Base Mobile (ESB).[55] These ships are all commercial derivative designs.

The EPF is a high-water-speed theater transport built on a catamaran hull. In addition to its 600-ton cargo capacity, it can transport over 100 personnel and have substantial aviation capabilities for its small size.[56] The decision to build 10 EPFs was a direct result of U.S. experience with a series of leased, commercially derived ferries in the 2000s.[57] These vessels were used as multi-mission vessels in support of a wide range of theater security, capacity building, and high-speed transport missions. The EPFs will likely be used for similar missions and will thereby relieve some of the burden currently on larger vessels.

The ESB is based on the same hull as the previously described ESD and can support a range of missions including mine warfare, special operations, theater security, and partner engagement.[58] This vessel is based on a long-standing requirement from CENTCOM, and the operational concept was tested on an interim basis in the Persian Gulf by the *USS Ponce*, a modified *Austin*-class LPD. The new ESBs will be able to embark CH-53 helicopters, a range of small boats, and up to 250 personnel.[59]

In addition to these naval vessels, the U.S. Army also operates a large fleet of transport vessels with many amphibious characteristics. While the Army's small- and medium-sized vessels are generally intended for riverine or port operations, the Army fleet does include eight of the seagoing *Frank S. Besson*–class logistics support vessels (LSVs). Displacing between 5,000 and 6,000 tons, these vessels resemble traditional LSTs with bow ramps to beach and disembark cargo and vehicles directly over the shore. Several of these vessels are forward-based in Hawaii and could be used as alternative amphibious platforms. However, they have not been used in this role to date.

Alternative platforms can help meet certain demands traditionally met by amphibious ships, but there are several policy and capability limitations that must be recognized. First, because these ships are not built to military specifications with robust compartmentalization, system redundancy, and highly capable damage control systems, they have less survivability than L-class ships.

Second, the civilian or civilian/military makeup of their crews may limit their employment in a high threat environment. Third, increased use of these vessels will need to be accompanied by requisite funding increases to modify alternative platforms to better reflect their increased use.[60]

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[55] Megan Eckstein, "Navy Renames Three Ship Classes, Creates 'Expeditionary' Designator in Naming System," *USNI News*, September 4, 2015, https://news.usni.org/2015/09/04/navy-renames-three-ship-classes-creates-expeditionary-designator-in-naming-system.

[56] Kris Osborn, "Navy Sees Broader Role for Joint High Speed Vessel," *DOD Buzz*, June 29, 2015, http://www.dodbuzz.com/2015/06/29/navy-sees-broader-role-for-joint-high-speed-vessel/.

[57] O'Rourke, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, 6.

[58] Sam Lagrone, "Afloat Forward Staging Base Lewis B. Puller Delivers to Navy," *USNI News*, June 12, 2015, https://news.usni.org/2015/06/12/afloat-forward-staging-base-lewis-b-puller-delivers-to-navy.

[59] Lagrone, "Afloat Forward Staging Base Lewis B. Puller Delivers to Navy"; Otto Kreisher, "Navy, Marines Eye Alternatives to Traditional Amphibious Platforms," *Seapower Magazine*, April 14, 2015, http://www.seapowermagazine.org/stories/20150414-seabasing.html.

[60] *Annual Report for Program Objective Memorandum 2017: Seabasing*.

Connectors

The amphibious warships or alternative platforms in the U.S. inventory cannot directly land troops and matériel over the beach. To get troops and equipment ashore, the Navy and Marine Corps operate two types of connectors: sea-based and aerial. At present, sea-based connectors include the Amphibious Assault Vehicle (AAV), the Landing Craft Utility (LCU), and LCAC. Aerial connectors include the MV-22 and CH-53E. Several of these connectors are aging and in varying stages of upgrade/replacement. Over the next decade, the Navy and Marine Corps will acquire one wholly new sea-based connector (the Amphibious Combat Vehicle or ACV) and three evolutionary connectors; namely, one aerial (CH-53K) and two sea-based vehicles—the Surface Connector (X) Replacement, or SC(X)R, and the Ship-to-Shore Connector (SSC). Descriptions of these connectors follow.

The most common connector in use today is the AAV, originally acquired in the 1970s and 1980s and upgraded many times. [61] The Marine Corps currently maintains 1,046 AAVs, each capable of carrying 21 Marines from ship to shore and then inland.[62] Long-standing experience and the wars of the past decade have revealed weaknesses with this aging design with regard to "water and land mobility performance, lethality, protection, and network capability."[63] For these reasons, the Marine Corps has been trying to replace the AAV since the 1980s. The current effort is the ACV program, which aims to produce a more capable vehicle, albeit without the high water speed of previous concepts.[64]

The LCAC, a large hovercraft, is one of two workhorse connectors operated by the Navy. The LCAC can carry 60 tons ashore at a high speed and from a relatively long range.[65] In the near and mid-term the Navy is undertaking a service life extension program (SLEP) for the existing LCAC fleet and, in the long term, is pursuing the acquisition of a new build, modified LCAC design, which is the SSC.

The second Navy connector is the Landing Craft Utility, which, like the AAV, is showing its age, having been in the fleet an average of 43 years, far past its designed 25 year lifetime. [66] The Navy is planning to replace the LCU fleet on a one-for-one basis using the same strategy it is pursuing with the LCAC replacement: a new build, modified version of the existing design. The Surface Connector XR, or SC(X)R program, is slated to begin procurement in 2018 and become operational in 2022.[67]

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[61] Kris Osborn, "Corps Eyes New Amphibious Assault Vehicles," *Defense Tech,* September 25, 2014, http://defensetech.org/2014/09/25/corps-eyes-new-amphibious-assault-vehicles/; Sydney Freedberg, "Marines 2014: Year of Decision for Amphibious Combat Vehicle," *Breaking Defense*, January 9, 2014, http://breakingdefense.com/2014/01/marines-2014-year-of-decision-for-amphibious-combat-vehicle/.

[62] "AAV-7 Features," Marines, accessed December 2, 2015, http://www.marines.com/operating-forces/equipment/vehicles/aav-7#features.

[63] Andrew Feickert, *Marine Corps Amphibious Combat Vehicle (ACV) and Marine Personnel Carrier (MPC): Background and Issues for Congress*, CRS Report No. R42723 (Washington, DC: Congressional Research Service, 2015), https://www.fas.org/sgp/crs/weapons/R42723.pdf.

[64] James Sanborn, "CMC's plan for ship-to-shore connectors soothes critics," *Marine Corps Times*, February 2, 2015, http://www.marinecorpstimes.com/story/military/tech/2015/02/02/commandants-planning-guidance-soothes-amphib-procurement-critics/22545379/.

[65] "U.S. Navy Fact File: Landing Craft, Air Cushion—LCAC," U.S. Navy, updated November 15, 2013, http://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=1500&ct=4.

[66] Megan Eckstein, "LCU Replacement in Preliminary Design, Anticipating 2022 Fleet Debut," *USNI News*, April 21, 2015, http://news.usni.org/2015/04/21/lcu-replacement-in-preliminary-design-anticipating-2022-fleet-debut.

[67] Eckstein, "LCU Replacement."

In the air domain, the V-22 Osprey is the newest platform in the inventory. This tilt-rotor aircraft provides the U.S. Marine Corps with unique capabilities for speed, payload, and range. The exceptionally short response time demonstrated by the Marine Corps in several operations in the Asia-Pacific region would not have been possible without this aircraft. The platform does have several limitations. It is expensive to maintain and procure, resulting in limited numbers available; it is large, thereby limiting the ships it can embark on; and its hot, downward-pointing exhaust requires special ship modifications. The Marine Corps plans to acquire 360 Ospreys and has 220 in inventory as of FY2015.[68]

The CH-53E Super Stallion is the heavy-lift helicopter used by the Marine Corps. The 151 CH-53Es currently in operation were developed in the 1970s with the first aircraft delivered in 1981.[69] They are slated to be replaced with the CH-53K King Stallion, a visually similar yet substantially more capable aircraft. This new heavy-lift helicopter will triple the payload of its predecessor.[70]

Budget Constraints: Effects on Amphibious Capacity

Questions remain about the ability of the Navy to meet these inventory levels, given the overall fiscal environment, budgetary pressures on the shipbuilding accounts, and historical cost overruns. Similarly, there are concerns that the Marine Corps may be unable to successful execute its modernization efforts. The previous CSIS study on amphibious shipping concluded that near-term pressure on the amphibious force has been increasing, and increases in the force have been deferred to the mid-term.

Recently, both CSIS and the Congressional Budget Office (CBO) have issued reports on the sufficiency of funding for shipbuilding, including amphibious vessels. The FY2016 CBO assessment of the Navy's 30-year shipbuilding plan questions the sufficiency of the Navy's shipbuilding accounts to fund its planned acquisitions. It also questions the cost estimates used by the Navy. CBO believes that the Navy underestimates the needed funding level by roughly 11 percent. The CBO argues that the necessary annual funding level is 28 percent more than the Navy has received, on average, over the past 30 years.[71]

The CSIS report, *Defense Modernization Plans through the 2020s*, considers the effects of the looming "modernization bow wave." This phenomenon is defined as long-term plans that depend on funding increases often just beyond the Department of Defense's five-year planning horizon.[72] For the Navy and Marine Corps, this study concluded that a bow wave did not exist and that modernization funding begins to fall off for both ships and aircraft in the mid-2020s.[73] However, it is important to note that this

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[68] U.S. Marine Corps, "Marine Aviation Plan: 2015," PowerPoint presentation, slide 2.57, accessed April 13, 2016, https://marinecorpsconceptsandprograms.com/sites/default/files/files/2015%20Marine%20Aviation%20Plan.pdf.

[69] "CH-53E Super Stallion," Marines, accessed December 3, 2015, http://www.marines.com/operating-forces/equipment/aircraft/ch-53e-super-stallion; "CH-53E Super Stallion," Naval Air Systems Command, updated April 2014, http://www.navair.navy.mil/index.cfm?fuseaction=home.displayPlatform&key=25A327F8-4E42-4FB9-AB34-8609E6657215.

[70] Jen Judson, "Marine Corps CH-53K King Stallion Heavy-Lift Helicopter Finishes First Flight," *Defense News*, October 27, 2015, http://www.defensenews.com/story/defense/air-space/support/2015/10/27/marine-corps-ch-53k-king-stallion-heavy-lift-helicopter-finishes-first-flight/74691932/.

[71] *An Analysis of the Navy's Fiscal Year 2016 Shipbuilding Plan*, 9.

[72] Todd Harrison, *Defense Modernization Plans through the 2020s: Addressing the Bow Wave* (Washington, DC: Center for Strategic and International Studies, 2016), http://csis.org/files/publication/160126_Harrison_DefenseModernization_Web.pdf.

[73] Harrison, *Defense Modernization Plans through the 2020s*, 9–11.

analysis considers the *Ohio*-class Replacement Program (ORP) under nuclear forces, where there is a large bow wave. The ORP may therefore have significant impacts on the Navy's budget.[74]

Other studies of the Navy's shipbuilding plans have concluded that the ORP may have significant impacts on the shipbuilding budget. Ronald O'Rourke, the Congressional Research Service's longtime naval analyst, has pointed out that the Navy's plan will require shipbuilding budgets that are significantly greater than recently authorized and that the ORP will place pressure on this budget during the middle period of the 30-year plan.[75]

To make the amphibious portion of the shipbuilding plan more affordable, the Navy is attempting to control costs of the upcoming LXR acquisition by seeking block-buy or multi-year procurement authorities rather than buying ships individually.[76] Such block buys have allowed the Navy to drive down costs by purchasing materials in bulk and have been used for programs such as the *Arleigh Burke*–class destroyer and *Virginia*-class submarine. Generally, however, block buys are only executed for mature programs, which LXR will not be for several years.

There are also questions as to whether the Navy and Marine Corps can successfully modernize their fleets of surface and aerial connectors. The Navy's aforementioned efforts to acquire the SCC and SC(X)R carry relatively low risk as they are upgraded versions of existing, proven platforms.

The Marine Corps' replacement of its aging AAV-7 and CH-53E fleets bring greater risk. The Marine Corps spent several billion dollars and almost two decades developing the high-water-speed Expeditionary Fighting Vehicle (EFV) before it was canceled in 2011. The follow-on effort, ACV, is taking a low-risk approach by using an existing foreign design as the baseline. It discards the EFV's most exquisite requirement, high water speed for ship-to-shore movement, but the ACV should enhance mobility and force protection ashore. While the CH-53E's replacement, the CH-53K, looks visually similar to its predecessor, the similarity is only skin deep. This program is already several years behind schedule and 25 percent over budget.[77] Current plans indicate that the CH-53K should enter full-rate production by 2020.[78]

The partisan gridlock between the White House and Congress on how to address the cost caps present in the Budget Control Act of 2011 and the subsequent Bipartisan Budget Acts of 2013 and 2015 exacerbates these funding challenges. Some of these issues, especially those pertaining to modernization, may be solved, or at least mitigated, if political differences over the budget can be resolved in a sustainable, long-term manner.

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[74] *An Analysis of the Navy's Fiscal Year 2016 Shipbuilding Plan*, 17.

[75] Ronald O'Rourke, *Navy Force Structure and Shipbuilding Plans*, 26.

[76] O'Rourke, *Navy Force Structure and Shipbuilding Plans*, 24.

[77] Harrison, *Defense Modernization Plans through the 2020s*, 19.

[78] James Drew, "Sikorsky's CH-53K lifts off after troubled start," *Flight Global*, October 27, 2015, https://www.flightglobal.com/news/articles/sikorskys-ch-53k-lifts-off-after-troubled-start-418268/.

3 Pacific Allies and Partners: Amphibious Capabilities and Development

The previous two chapters have considered U.S. forces and the demand for their capabilities in PACOM. Now we will analyze the amphibious forces of four allied and two partner nations. Their forces are in various stages of development and have different goals. Although none of these nations are working toward an amphibious capability that is a one-to-one match of the USMC model, they are all trying to develop some amphibious capabilities. Each country analysis also includes an assessment of the future trajectory of the country's amphibious capabilities.

Australia

The Australian Defence Forces (ADF) has demonstrated the most capable and joint air-sea-ground amphibious force of any of the ally- and partner-nations considered in this study. In 2000 Australia reestablished a requirement for the ADF to have an amphibious capability. This reestablishment was announced in the 2000 *Defence White Paper* and the 2001 *Defence Capability Plan 2001–2010,* which called for the replacement of the ADF's aging fleet of amphibious warships by 2015. Since that time, Australia has been able to enhance its amphibious capability by reviving its historical experience with amphibious operations, learning from its recent experience with expeditionary operations in Fiji and Timor-Leste, and building on its close operational relationship with U.S. forces, including the USMC in Iraq and Afghanistan. Based on the current timeline, the ADF will certify an amphibious capability roughly equivalent to a U.S. ARG/MEU during the biennial combined joint military exercise TALISMAN SABRE in 2017. This certification will also mark a major milestone in the ADF's Joint Project 2048 (JP2048) effort to recapitalize its amphibious capabilities.

Over the past 20 years, the ADF has used amphibious and expeditionary capabilities to respond to contingency situations in Fiji and Timor-Leste. However, shortcomings in the force during those operations have helped focus senior leaders within the ADF as well as Australia's political leadership on reinvigorating amphibious capability in the ADF. The Timor-Leste intervention in 1999 demonstrated the ADF's need for amphibious capabilities and simultaneously its "stark lack of capability."[79] This shortcoming was so great that the ADF had to lease a commercial catamaran to give it needed sealift capability on an emergency basis.[80] The chronic lack of availability of its legacy amphibious fleet, highlighted during the 2011 landfall of Typhoon Yasi in Queensland, when all the ADF's major amphibious vessels were laid up for major maintenance, further reinforced the need for a modern amphibious force.

The ADF intends to regularly deploy a reinforced company, termed an Amphibious Ready Element (ARE), to support an HA/DR or stabilization mission in the immediate region. The *2013 Defence White Paper* suggests that it may deploy amphibious capabilities for other contingencies in the future as the ADF's proficiency in amphibious operations increases.[81] Specifically, the white paper identified two tasks for

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[79] Aldo Borgu, *Capability of First Report? Australia's Future Amphibious Requirement* (Canberra: Australian Strategic Policy Institute, 2004), 2, https://www.aspi.org.au/publications/strategic-insights-8-capability-of-first-resort-australias-future-amphibious-requirement/SI_amphibious_capability.pdf.

[80] Borgu, *Capability of First Resort? Australia's Future Amphibious Requirement*, 2.

[81] Australia Department of Defence, *Defence White Paper 2013*, Commonwealth of Australia, 2013, 77, http://www.defence.gov.au/whitepaper/2013/docs/WP_2013_web.pdf.

which an amphibious capability can substantially contribute: the stability and security in the South Pacific and Timor-Leste, and military contingencies in the Pacific region with a focus on Southeast Asia.

The ADF is likely to undertake larger, more complex operations using the ADF's larger ARG structure that is roughly the same size as its U.S. counterpart. The ADF's ARG shares more than size with its USMC counterpart. It is based on the USMC's MAGTF construct with aviation, command, ground combat, and logistics support elements. It differs from a U.S. MAGTF, however, in that it has a less robust aviation element and is generated from a smaller pool of forces. Structural similarities with the U.S. ARG/MEU notwithstanding, the ADF's ARG is likely to be fully deployed only in major contingencies, not for day-to-day operations.

Australian defense commentators have indicated that the most likely missions for the ADF amphibious capability are HA/DR, partnership, or peacekeeping activities. While these missions may represent most frequent force employment, the ADF does not discount the possibility of warfighting operations. This concept is very much in line with how Australia has historically employed its expeditionary forces. Australia's most recent experiences in Timor-Leste unequivocally demonstrate the need to train and sustain high-end amphibious capabilities.

The ADF has benefited tremendously from deep engagement with the USMC, an engagement that is likely to grow further as USMC rotational forces in Darwin reach their target of 2,500 Marines. The ADF has also looked to its Commonwealth partner, the United Kingdom, for assistance in the development of its amphibious capability by embedding soldiers from the Australian Army in the Royal Marines. This exchange has included having a former Royal Marine colonel run the amphibious force generation effort of the Royal Australian Navy (RAN).[82]

Amphibious Capabilities

The two *Canberra*-class LHD are the most visible outcomes of Australia's modernization initiatives. The new ships are slightly modified versions of the Spanish *Juan-Carlos* LHD/light carrier (CVL). These 27,500-ton LHDs are capable of embarking 1,000 troops, 100 vehicles, and 8 helicopters. Her Majesty's Australian Ship (HMAS) *Canberra* was commissioned in 2014 and her sister ship, the HMAS *Adelaide*, in December 2015.[83]

In 2011 the RAN also acquired the LSD HMAS *Choules,* a British *Bay*-class logistics ship that the United Kingdom retired after only five years of service. The *Choules* can embark 350 troops, 200 tons of cargo, 24 tanks or 150 light trucks, 6 landing craft, and 24 large armored vehicles. While the *Choules* lacks permanent aviation facilities, its helicopter deck can accommodate large, Chinook-sized helicopters as well as V-22 Ospreys.

[82] Helen Frank, "Former Royal Marine helps implement amphibious capability," *Navy Daily*, June 21, 2015, http://news.navy.gov.au/en/Jun2015/People/2116/Former-Royal-Marine-helps-implement-amphibious-capability.htm#.VwaxCPkrJmB.

[83] "Developing the Australian Amphibious Force," Australian Army, last modified June 3, 2015, http://www.army.gov.au/Our-people/Units/1st-Division/Developing-the-Australian-Amphibious-Force.

Table 3.1. Australian Amphibious Platforms

Class	Class Name	Commissioned	Shipbuilder	Full-load Displacement (tons)	Length (feet)
LHD	*Canberra* (x2)	2014/2015	Navantia; BAE Systems-Maritime	27,500	757
LSD	*Choules* (Ex-U.K. *Largs Bay*)	2006 (transfer 2011)	Swan Hunter (U.K.)	16,160	579

The ADF is also acquiring new classes of air and sea connectors. Chief among these are the new Landing Craft Mechanized (LCM) 1E landing craft for use with the two *Canberra*-class vessels. These landing craft share the Spanish heritage of their motherships and can carry up to one modern main battle tank from ship to shore. Australia's main battle tank, the Abrams, is nearing the maximum carrying weight of these LCM-1E connectors. Current and future upgrades to the Abrams, particularly to its armor, will need to take into consideration the trade-off of greater capability and survivability with the potential constraints to mobility.[84] Later phases of the JP2048 plan to remedy this shortcoming by replacing the ADF's self-deploying *Balikpapan*-class Landing Craft Heavy (LCH) ships with a new platform that interfaces with existing vessels' well decks and/or lighterage.

The ADF relies on the NH-90 medium helicopter and potentially the CH-47 Chinook for aerial connectors. However, neither of these platforms are designed to operate from ships.[85] The ADF can generate aerial fires through its variant of the Tiger attack helicopter.

Future Developments

The ADF plans to acquire six self-deploying LCHs to replace the *Balikpapan*-class LCH.[86] The initial plans indicate that these replacement vessels will be significantly larger than the vessels they replace.[87] In its 2016 *Defence White Paper*, Australia also committed to acquiring additional naval support ships for the purpose of better supporting and supplying expeditionary forces. Further, Australia may be considering acquiring the Vertical takeoff and short landing (VTOSL) F-35B to operate from the *Canberra*-class

[84] Euan Graham, "HMAS Canberra: A progress report on the RAN's new flagship," *Interpreter*, October 20, 2015, http://www.lowyinterpreter.org/post/2015/10/20/HMAS-Canberra-A-progress-report-on-the-RANs-new-flagship.aspx.
[85] Maren Leed, J. D. McCreary, and George Flynn, *Advancing U.S.-Australian Combined Amphibious Capabilities,* (Washington, DC: Center for Strategic and International Studies, 2015), 16–17.
[86] "Landing Craft Heavy," *Global Security*, accessed April 13, 2016, http://www.globalsecurity.org/military/world/australia/hmas-lch.htm.
[87] Simon Cullen, "NDIA Expeditionary Warfare Conference JP2048 Update," Royal Australian Navy, March 24, 2010, http://www.dtic.mil/ndia/2010expedition/Cullen.pdf.

vessels. F-35Bs would provide a powerful enhancement to Australia's seaborne capabilities, but operating them from the LHDs would require significant and costly upgrades to LHD flight facilities.

Over the near and mid-term, Australia will continue to work through how it will generate and sustain its amphibious force, and in particular how the maintenance and deployment cycle for the *Canberra*-class ships will align with training and readiness of the supporting Australian Army units. Australia can maintain the reinforced company-sized ARE on a standing basis within its existing force. The Australian Army has identified the 2nd Royal Australian Regiment (2RAR) as, at present, the core of its amphibious force. The Australian Army has committed to fully staffing this battalion-sized formation to support the ground combat element (GCE) of the ARE. As it grows its amphibious capability, Australia expects to consider carefully the benefits of various force generation options before determining a final approach.

However, questions remain about how the Australian Army will generate the necessary forces under its Plan Beersheba force generation concept, which calls for a 36-month readiness cycle for infantry brigades within which there is a 12-month ready phase. A battalion of the ready brigade, the ready battle group, would be at the highest level of readiness for crisis response. This plan also accepts that the Army's aviation and combat support brigades cannot match the 36-month cycle due to a lack of capacity. As the designated amphibious unit, 2RAR can meet the GCE requirements of the ARE construct. However, the support and aviation brigades will likely find it difficult to provide the necessary forces to support ARE training requirements and the needs of the ready brigade at current force levels.

Implications for the United States

Close cooperation between the United States and Australian armed forces over the past 15 years has resulted in a high degree of operational interoperability. Australia's revitalized amphibious capability, when certified in 2017, will provide an additional means of continuing to deepen interoperability. When the more capable supply and replenishment ships that Australia intends to acquire are incorporated into the fleet, the RAN will be able to conduct cooperative activities farther from Australia and over longer time periods. Should political leaders in Canberra and Washington view it as appropriate, Australia's enhanced supply capability would provide a mechanism for the United States and Australia to experiment with resupplying each other's ships while under way.

While deployed, the *Canberra*-class ships also provide Australia a capability to lead operations—particularly HA/DR operations—in a way that has been difficult previously. These new amphibious ships potentially enable a more robust and immediate HA/DR capability than the current U.S.-only force provides. It would also offer the U.S.-Australia alliance the potential to cooperate and coordinate operations across a larger geographic area should a disaster like the 2004 tsunami in Indonesia strike again.

Achieving such a high level of interoperability will require time and effort from both Washington and Canberra; this effort would include heavily leveraging the on-land opportunities, provided by the Marine Rotational Force-Darwin, and additional at-sea opportunities. Sustaining the combined capability will require continued engagement. In the end, however, a highly interoperable U.S.-Australia amphibious force would provide important benefits for promoting stability throughout the region.

India

Historically, the primary mission of the Indian Armed Forces (IAF) has been to maintain the country's territorial integrity in light of threats from its neighbors, primarily Pakistan but also China. Over the years, this focus has expanded to include internal security challenges posed by a variety of terrorist organizations. Amphibious warfare has not historically been a large part of Indian defense planning, but over the past decade, India has begun to think more deeply about the need for expeditionary capabilities for operations both in the Indian Ocean Region (IOR) and beyond.

In 2008, the IAF announced the completion of a Joint Amphibious Warfare Doctrine that was informed by exercises in 2005 and 2007.[88] The IAF recognized that its amphibious warfare capabilities were relatively basic.

The 2008 Mumbai terror attacks amplified the drivers for India to increase its amphibious capability. It is difficult to overstate how potently the attacks demonstrated to the Indian Armed Forces the need for greater maritime capability. Unsurprisingly, the subsequent release of the *2009 Indian Maritime Doctrine* signaled a commitment to ensuring regional security in the Indian Ocean.[89] To this end, India began a series of ambitious modernization initiatives. While many of these initiatives sought to correct the counterterrorism deficiencies exposed by the Mumbai attack, they also included efforts to improve power projection capabilities in order to secure access to major sea lines of communications.

Several of India's strategy documents, primarily those issued by the Navy, have increasingly warmed to the idea of amphibious/expeditionary operations for HA/DR, NEO, peacekeeping, and possibly combat missions. The use of amphibious forces in a crisis with Pakistan has long been a possibility recognized in India; their utility in an unsettled region to safeguard sea-lanes and promote Indian interests is beginning to be recognized.[90]

Amphibious Capabilities

The amphibious warships operated by the Indian Navy have the ability to lift roughly a 5,000-soldier brigade.[91] However, this force would lack aviation support and sea-based logistics. The Indian Army has identified the 91st Infantry Brigade as the Army's dedicated amphibious brigade. This 3,000-person force may be used as the primary building block for a larger amphibious force. In addition to this amphibiously aligned Army brigade, the Indian Navy operates the Marine Commandos (MARCOS), an amphibious special forces group. However, the MARCOS are more akin to the U.S. Navy SEALs or the USMC's MARSOC than a conventional amphibious force.

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[88] Rajat Pandit, "Forces Ready with Joint Amphibious Warfare Doctrine," *Times of India,* September 7, 2008, http://timesofindia.indiatimes.com/india/Forces-ready-with-joint-amphibious-warfare-doctrine/articleshow/3453589.cms.

[89] Abhijit Singh, *The Indian Navy's New 'Expeditionary' Outlook* (Mumbai: Observer Research Foundation, 2012), http://www.orfonline.org/wp-content/uploads/2012/10/OccasionalPaper_37.pdf.

[90] Gurmeet Kanwal, "India's Military Modernization: Plans and Strategic Underpinnings," National Bureau of Asian Research, September 24, 2012, http://www.nbr.org/research/activity.aspx?id=275.

[91] Uday Pinninti, "Blue Print to India's Amphibious Forces" (master's thesis, United States Marine Corps Command and Staff College, 2009), http://www.dtic.mil/dtic/tr/fulltext/u2/a517791.pdf.

The IAF's initial desire to expand amphibious capability led to the acquisition of the Indian Naval Ship (INS) *Jalashwa* from the United States in 2007.[92] The *Jalashwa*, formerly the USS *Trenton,* is an *Austin*-class landing platform dock and the largest amphibious vessel in the Indian Navy. With a total displacement of 16,590 tons, the *Jalashwa* can accommodate 930 troops and six medium helicopters on deck, although it lacks the hangar facilities to maintain them.[93] The *Jalashwa* is a departure for the Indian Navy because it offloads using ship-to-shore connectors rather than beaching the ship and opening a bow ramp. All of the previous amphibious warships acquired or produced by India have been traditional beaching landing ship tanks (LSTs). Indian commentators have remarked that the acquisition of the *Jalashwa,* despite its age, allows India to gain experience with this style of amphibious operation.

The bulk of India's amphibious fleet consists of nine older tank landing ships of various sizes, capabilities, and ages. The newest of these are the three ships of the *Shardul* class. With a displacement of 5,650 tons, these vessels are a hybrid LST/LSD design, given their ability to beach and disembark forces via bow doors or utilize four LCMs carried on davits. The *Sharduls* are an upgraded version of the earlier *Magar*-class LST, of which India operates two. Both classes can carry 10 large armored vehicles, 11 armored personnel carriers, and 500 troops. The Indian Navy also operates a smaller class of Landing Craft Tank (LCT), the *Kumbhir*-class. These Polish/Soviet-designed vessels were built for India in Gdańsk, Poland. They displace 1,190 tons and can carry 160 troops or five large armored vehicles.

Table 3.2. Indian Amphibious Platforms

Class	**Class Name**	**Commissioned**	**Shipbuilder**	**Full-load Displacement (tons)**	**Length (feet)**
LPD	*Jalashwa* (ex-U.S. *Austin*)	2007	Lockheed Shipbuilding (United States)	16,590	586
LCT	*Kumbhir* (x4)	1985/1985/1985/1986	Gdańsk Shipyard (Poland)	1,150	275
LST	*Shardul* (x3)	2007/2008/2008	Garden Reach Shipbuilders and Engineers Ltd. & Hindustan Shipyard	5,655	409

[92] "INS Jalashwa," *Bharat Rakshak*, accessed April 14, 2016, http://www.bharat-rakshak.com/NAVY/Ships/Active/167-ins-jalashwa.html.
[93] "AMPHIBIOUS FORCES, India," *Jane's Fighting Ships* (London: IHS Global Limited, 2015).

LST	*Magar* (x2)	1987/1997	Garden Reach Shipbuilders and Engineers Ltd. & Hindustan Shipyard	5,665	409

Future Developments

The ability of the IAF to achieve these ambitions will depend on how rapidly India's Navy and Army are able to settle on the requirements for future vessels to meet India's needs and on how quickly India's procurement process is able to convert the requirements into a completed acquisition. In addition, increasing amphibious capability will require sustained support from India's political leadership. The clearest sign of interest in a robust amphibious capability is the Indian Ministry of Defence reissue of a request for proposal (RFP) for four 40,000-ton LHDs. These LHDs would be the largest vessels in the Indian Navy, other than India's aircraft carriers.[94]

The ability of India to successfully implement these plans remains uncertain given the consistent cost and schedule problems that India has had in the past with large procurement programs. Delivery dates for several of its indigenous shipbuilding programs have already slipped. Thus, it is unlikely that India will acquire this new generation of amphibious warships before the mid-2020s, despite regular expressions of interest in such vessels by parts of India's military community.

Implications for the United States

Ties between the United States and India are growing across a range of security-related issues. The release of the U.S.-India Joint Strategic Vision for the Asia-Pacific and Indian Ocean Region highlights a number of mission-areas where closer cooperation between amphibious forces could benefit both countries. Notable examples include counterpiracy, counterproliferation, and counterterrorism. Further, should India successfully acquire some number of the proposed LHDs, opportunities for additional cooperation could include enhancing interoperability in cross-deck helicopter landings and important HA/DR and NEO missions.

The United States will likely need to moderate its ambitions for closer cooperation with India, however, as India will want to preserve its strategic flexibility and maintain a range of diplomatic and security relationships, including with Russia and with Iran, and will not want to be perceived as growing too close to the United States. The United States will also need to be sensitive to India's political and policy limits on foreign militaries conducting exercises on Indian territory and work through any related issues with both military and civilian leadership well in advance of conducting exercises.

[94] Ajay Banerjee, "India to ramp up amphibious capabilities with four warships," *Tribune*, January 12, 2015, http://www.tribuneindia.com/news/nation/india-to-ramp-up-amphibious-capabilities-with-four-warships/29035.html.

Japan

Japan's political and military leaders have explicitly expressed the desire and intention to develop an amphibious capability for the Japan Self-Defense Forces (JSDF). Increasing tensions with China have led to significant changes in the SDF's priorities in the last five years, emphasizing the importance of rapid deployment of troops to contested islands. The Mid-Term Defense Plan (MTDP) for FY2014–2018 defines the main mission of the Ground Self-Defense Force (JGSDF) as being to "respond swiftly and deal effectively and nimbly with an attack on offshore islands."[95] The document also emphasizes decreasing response time to both humanitarian disasters and threats to Japanese territory. In the case of a disaster, the MTDP states that "Japan will swiftly transport and deploy requisite units," again requiring a rapid amphibious response.[96] Although HA/DR missions are briefly mentioned in the MTDP, security is clearly its main priority for increasing amphibious capabilities.[97]

Despite the impressive amphibious hardware operated by the Japan Maritime Self-Defense Force (JMSDF), the actual amphibious capability of Japan does not intend to develop a separate marine service, but rather work toward improved jointness and the development of amphibious skills in an assigned JGSDF formation. As part of this joint strategy, Japan identified a dedicated Amphibious Rapid Deployment Brigade assigned to its Western Army District.[98] This is an important first step; however, Japan's current amphibious capability remains nascent. To accomplish the missions outlined, the MTDP committed the JGSDF to develop an amphibious brigade, modeled after the ground combat element (GCE) of the USMC.[99]

The designation of an amphibious brigade is one part of the MTDP's plan to "newly develop sufficient amphibious operations capability, which enables the JSDF to land, recapture and secure without delay in the case of an invasion of any remote islands."[100] The JSDF's Joint Staff Office is spearheading the development of increased amphibious capability. Japan has a major advantage compared to most nations in its quest for improved capability: it hosts a sizable contingent of U.S. Marines who are willing to work closely with Japan as it develops an amphibious force. Since 2006, the JGSDF has trained with U.S. Marines as part of the Iron Fist series of exercises.[101] However, these exercises have not mated JGSDF forces with JMSDF vessels. In the wake of stepped-up Chinese activities around the Senkaku

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[95] Japan Ministry of Defense, *National Defense Program Guidelines for FY2014 and Beyond*, December 17, 2013, 21, http://www.mod.go.jp/j/approach/agenda/guideline/2014/pdf/20131217_e2.pdf.

[96] Japan Ministry of Defense, *National Defense Program Guidelines*, 15.

[97] Japan Ministry of Defense, *National Defense Program Guidelines*; HA/DR is mentioned twice in reference to international cooperation (8) and bilateral relations with the United States (9).

[98] Paul Kallender-Umezu, "Amphibious Focus, Joint Strategy Drive Japan," *Defense News*, June 9, 2015, http://www.defensenews.com/story/defense/policy-budget/budget/2015/05/27/japan-defense-buildup-technology-procurement-helicopter-amphibious-patrol-f35-uav/26922409/.

[99] Japan Ministry of Defense, *National Defense Program Guidelines,* 31; Kyle Mizokami, "Japan's Amphibious Buildup," *USNI News*, October 9, 2013, http://news.usni.org/2013/10/09/japans-amphibious-buildup.

[100] Japan Ministry of Defense, *National Defense Program Guidelines*, 19.

[101] Gidget Fuentes, "U.S. Marines Teach Japanese Forces How to Fight from the Sea in Expanded Iron Fist Exercise," *USNI News*, January 25, 2016, https://news.usni.org/2016/01/25/u-s-marines-teach-japanese-forces-how-to-fight-from-the-sea-in-expanded-iron-fist-exercise.

Islands, Dawn Blitz 2013 marked the first time that the three branches of the JSDF worked together to achieve a unified amphibious force.[102]

The United States and Japan have agreed to a fundamental overhaul of the alliance with substantial implications for increased amphibious cooperation. The Guidelines of Japan-U.S. Defense Cooperation now permit the JSDF to defend U.S. forces should they come under fire during a joint operation. Under the previous interpretation of Article 9 of Japan's Constitution, the JSDF could not engage in kinetic support to an allied unit it was operating alongside of.[103] In addition, the new guidelines transform the alliance from one focused on Japan's territory to one with a global scope.[104]

These changes are not without political tension as they represent to some members of the Japanese public an offensive military capability. These segments of Japan's population believe that Japan's current leadership is dangerously close to or actually breaking the prohibition in Japan's constitution against using force or the threat of force to resolve international disputes. While currently a small minority within Japan express reservations about Japan's emerging amphibious capability, the domestic political dynamic will be important to watch in coming years as Japan attempts to manage its relationship and territorial disputes with an increasingly assertive China.

Amphibious Capabilities

Today, the JMSDF operates one class of amphibious vessel and two classes of helicopter carriers that could, if required, serve in an amphibious role with aerial connectors. The *Osumi*-class amphibious ships—classed as LSTs but actually LPDs—first entered service with the JMSDF in 1998. Based on an Italian light aircraft carrier (CVL) design, these vessels raised concerns among Japan's neighbors when the plan was first introduced. Japan redesigned the vessels, with the final design resulting in a ship that is 584 feet long and 14,700 tons fully loaded. These vessels have a large stern well deck with the ability to embark two LCACs, similar to U.S. LPDs. They are able to transport 330 troops, 10 armored vehicles of 50 tons each, or 1,400 tons of cargo. In an emergency, the *Osumis* can carry over 1,000 civilians. They have greater aviation capacity than U.S. LPDs as the flight deck is the nearly the full length of the ship vice roughly one-fourth the length of a U.S. *San Antonio*–class LPD. The *Osumi* and her two sisters, the *Shimokita* and the *Kunisaki*, can store two CH-47s and two SH-60Js on deck; however, they do not have hangar facilities.[105] These vessels are being modernized to support V-22 operations, which will greatly increase the reach of the *Osumi*'s aviation component. During the 2013 Dawn Blitz exercise, a U.S. MV-

[102] "The Significance of Japan's Inclusion in Dawn Blitz 2013," *Stratfor,* June 14, 2013, https://www.stratfor.com/sample/analysis/significance-japans-inclusion-dawn-blitz-2013.

[103] Article 9 of Japan's Constitution codifies the nation's post–World War II pacifism. In particular, it prohibits Japan from maintaining "war potential" and "land, sea, and air forces." Under the current interpretation of Article 9, Japan maintains military forces only for its self-defense, not offensive purposes. For more, see Sayuri Umeda, "Japan: Article 9 of the Constitution," Library of Congress, Law Library of Congress, February 2006, https://www.loc.gov/law/help/japan-constitution/article9.php.

[104] Kyle Mizokami, "Inside the New U.S.-Japan Defense Guidelines," *USNI News*, April 29, 2015, http://news.usni.org/2015/04/29/inside-the-new-u-s-japan-defense-guidelines.

[105] Mitsui Engineering and Shipbuilding, "Creating a Dramatic Future," products catalog, 4, accessed April 13, 2016, http://www.mes.co.jp/english/company/pdf/products2013e.pdf; "LST Osumi Class: General Page," *Global Security*, updated November 7, 2011, http://www.globalsecurity.org/military/world/japan/osumi.htm.

22 Osprey landed for the first time on an *Osumi*-class ship.[106] In 2014, the *Kunisaki*, the last ship in the class, became the first JMSDF ship to serve as the primary mission platform for the annual Pacific Partnership deployment that focuses on HA/DR.[107]

Beyond these amphibious ships, the JMSDF possesses two classes of helicopter destroyers (DDHs)—arguably helicopter carriers—the *Hyuga*-class DDH and the *Izumo*-class DDH. The *Hyuga*-class ships are 646 feet long with a fully loaded displacement of 19,000 tons.[108] The JMSDF has indicated that their primary mission is anti-submarine warfare (ASW). With their embarked helicopter air wing, they can be used in support of amphibious operations.

The *Izumo*-class is a similar, but larger, class of DDH. The *Izumo*-class is 813 feet long and displaces 24,000 tons. Another *Izumo*-class ship is expected to be commissioned in 2017.[109] Both vessels may embark the V-22. Japan has recently purchased the first five V-22 aircraft out of a possible 17 aircraft acquisition.[110]

The SDF operates a number of connectors. The JMSDF operates six sea-based SSCs: two LCUs and six LCACs. As aerial connectors, the JMSDF has two AW-101s (a variant of an Augusta-Westland medium-lift helicopter); 31 UH-60J Black Hawks; and 15 CH-47 Chinook heavy-lift helicopters. The Japanese Air Self-Defense Force (JASDF) also operates 31 UH-60J Black Hawks and 15 CH-47 Chinook helicopters, which could, if exercised, serve as ship-to-shore connectors (SSCs).

Table 3.3. Japanese Amphibious Platforms[111]

Class	**Class Name**	**Commissioned**	**Shipbuilder**	**Full-load Displacement (tons)**	**Length (feet)**
LST (LPD)	*Osumi* (x3)	1998/2002/2004	Mitsui Manufacturing	14,700	584
DDH (CVH/LPH)	*Hyuga* (x2)	2009/2011	IHI Marine United	19,000	646

[106] Paul McLeary, "U.S. Marine Corps and Japanese Forces Storm Ashore," *Defense News*, June 24, 2013, http://archive.defensenews.com/article/20130624/DEFREG02/306240023/US-Marine-Corps-Japanese-Forces-Storm-Ashore.
[107] "LST Osumi Class: General Page"; Pacific Partnership Public Affairs, "JS Kunisaki Arrives in Yokosuka for PP14 On-Load," United States Navy, March 26, 2014, http://www.public.navy.mil/surfor/cds21/Pages/JSKunisakiarrivesinYokosukaforPP14onload.aspx#.VZ6OmvlVhHw.
[108] "JMSDF Hyuga Class Destroyer, Japan," *Naval Technology*, accessed April 13, 2016, http://www.naval-technology.com/projects/hyuga-class/.
[109] James Hardy, "Japan Commissions Helicopter Carrier Izumo," *IHS Jane's 360*, March 25, 2015, http://www.janes.com/article/50196/japan-commissions-helicopter-carrier-izumo.
[110] Megan Eckstein, "Japan Finalizes Purchase of 5 MV-22s in First International Osprey Sale," *USNI News*, July 14, 2015, https://news.usni.org/2015/07/14/japan-finalizes-purchase-of-5-mv-22s-in-first-international-osprey-sale.
[111] Carrier, Helicopter (CVH) and Landing Platform, Helicopter (LPH)

DDH (CVH/LPH)	JDS *Izumo* (x2)	2015/2017	IHI Marine United	24,000	813

Future Developments

In line with the priorities stated in the MTDP, Japan's 2014 fiscal year budget included funding for an "Amphibious Rapid Deployment Preparatory Unit" and $3 million to enhance the amphibious capabilities of the *Osumi*-class and *Izumo*-class vessels. Then Defense Minister Itsunori Onodera said the goal is to have an amphibious force of 3,000 personnel.[112] This objective, along with several new equipment acquisitions, will significantly increase amphibious capabilities in the next decade.

These expected upcoming acquisitions include one *Izumo*-class DDH, 52 AAV-7 amphibious assault vehicles, up to 17 MV-22 Ospreys, and potentially before 2019 a new amphibious ship.[113] The second *Izumo*-class ship will be commissioned in March 2017.[114] The AAV-7 vehicles are the same kind the USMC uses and will be purchased in small quantities, with the goal to acquire 52 in total.[115] The procurement process for the 17 V-22 Osprey aircraft began in April 2014 and should last five years.[116] In August 2014, the Defense Ministry announced it had requested funding to study the acquisition of additional amphibious vessels. The acquisition of U.S. systems is unsurprising due to the long-standing and close ties between the U.S. military and Japan's SDF. [117]

Implications for the United States

Japan's amphibious capability represents an increasingly capable force. However, it currently has a relatively small number of sea-based connectors; has not fully established or exercised C2 of this composite "blue-green" force of maritime and ground self-defense; and needs to integrate amphibious operations with the broader JMSDF C2 structure.

Like Australia, Japan will need to be involved in increasingly complex combined exercises with the U.S. Navy and Marine Corps on land and at sea. These operations will be important factors in Japan's continued development of amphibious capability for the JSDF.

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[112] Seth Robson and Chiyomi Sumida, "With eye on China, Japan slowly building amphibious force with help of U.S. Marines," *Stars and Stripes,* August 7, 2014, http://www.stripes.com/news/pacific/with-eye-on-china-japan-slowly-building-amphibious-force-with-help-of-us-marines-1.297115.

[113] Hardy, "Japan Commissions Helicopter Carrier Izumo"; Kyle Mizokami, "Inside Japan's New Defense Plan," *USNI News*, December 20, 2013, http://news.usni.org/2013/12/20/inside-japans-new-defense-plan; "Defense Ministry to Seek Funds for Amphibious Assault Ship Study," *The Japan Times*, August 4, 2014, http://www.japantimes.co.jp/news/2014/08/04/national/defense-ministry-to-seek-funds-for-amphibious-assault-ship-study/#.VZ6oQ_lVhHw.

[114] Hardy, "Japan Commissions Helicopter Carrier Izumo."

[115] Robson and Sumida, "With eye on China."

[116] Mizokami, "Inside Japan's New Defense Plan."

[117] "Defense Ministry to Seek Funds for Amphibious Assault Ship Study."

The Philippines

The Philippines has primarily used its amphibious capability for counterinsurgency missions and internal disaster response. With over 7,000 islands, the Armed Forces of the Philippines (AFP) needs the ability to move forces by water. The Philippine Marine Corps has trained extensively with the USMC as part of the annual Balikatan exercise; the most recent of these exercises included a full U.S. three-ship ARG and MEU of over 3,500 U.S. Marines.[118]

The Philippine Marine Corps is a roughly 8,000-man light infantry force that is nested under the larger Philippine Navy (PN) structure. It is not a combined arms formation like the USMC; rather it more closely resembles the Royal Marine Corps of the United Kingdom. While the AFP has acquitted itself well overall in domestic counterinsurgency activities, it faces budget challenges in modernizing the amphibious force, training consistently, and maintaining sufficient personnel.

The AFP Modernization Act, introduced in 1995, aimed to upgrade the AFP by modernizing existing infrastructure and acquiring new systems. However, the financial crisis of the late 1990s, and associated budget shortfalls, resulted in the plan being delayed. Enduring budget instability has impeded these efforts, resulting in delays or cancellations of amphibious programs. Systematic defense reform and upgrade efforts restarted in the early 2000s under the Philippine Defense Reform (PDR) and Capability Upgrade Program (CUP).[119] The government of Benigno Aquino, in office since 2010, has committed to achieving the goals outlined in these plans and accelerated the CUP efforts. Most recently, the legislature passed the AFP Modernization Act of 2012. The most important amphibious policy codified in this document is a commitment to developing the AFP "capability to uphold the territorial integrity and sovereignty of the Philippines and to secure the national territory from all forms of intrusion and encroachment."[120]

Moving forward, there is a recognition by leaders in the Philippines that amphibious capabilities are important for territorial defense in light of regional encroachments. The PN currently does not have the ability to project force on a large scale or over long distances. For all its tactical training, the Philippine Marine Corps is unable to deploy or project force in sustained ways beyond their internal seas.

Amphibious Capabilities

The bulk of the PNs amphibious fleet consists of vessels acquired through excess defense article transactions with other nations and, as such, its amphibious forces are quite old. The largest and most modern amphibious vessels in the PN are the two *Bacolod City*–class LSTs that entered service in 1993 and 1994. These 4,265-ton vessels are modified versions of the U.S. Army's *General Frank S. Besson, Jr.*–class of LSTs. The primary difference between the PN and U.S. variants is the addition of a small helicopter deck and davits for two LCM crafts. Both modifications expanded the Philippine ships' capability in comparison to the U.S. baseline. The *Bacolod City*–class can transport approximately 850 tons over the shore and 1,780 tons from port to port.

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[118] Gina Harkins, "The new look for U.S.-Philippine military relations," *Marine Corps Times,* April 26, 2015, http://www.marinecorpstimes.com/story/military/2015/04/26/philippines-military-exercise-balikatan-marines/26293261/.

[119] Peter Chalk, *Rebuilding While Performing: Military Modernization in the Philippines* (Canberra: Australian Strategic Policy Institute, 2014), 3.

[120] Chalk, *Rebuilding While Performing*, 4.

The three vessels of *South Cotabato*–class (*LST 512*–class) are the oldest ships within the PN. Originally constructed for the U.S. Navy during the Second World War, these ships were commissioned into the PN during the mid-1970s. Both vessels have a full displacement of 4,080 tons and are capable of carrying over 2,100 tons of cargo and up to 115 troops. The availability and condition of these LSTs is questionable given their extreme age.

The PN also operates two *Balikpapan*-class LCHs acquired from Australia in early 2015. The ships have a full displacement of 570 tons, are 146 feet in length, and can carry up to 180 tons of cargo.

The Philippines operates several classes of smaller LCUs. These vessels are often not included in broad conversations of a nation's amphibious capability as they, generally speaking, operate as a connector for larger amphibious vessels. In the case of the PN, this is not necessarily true given the archipelagic nature of the nation. They are useful for internal defense and HA/DR operations, but have extremely limited utility in more stressing or far-ranging military operations. They are not a credible deterrent force in the context of China's current island-building actions in the South China Sea.

Table 3.4. Philippine Amphibious Platforms

Class	Class Name	Commissioned	Shipbuilder	Full-load Displacement (tons)	Length (meters)
LST	*Bacolod City* (x2) (Ex-U.S. *Besson*)	1993/1994	Trinity Marine-Moss Marine	4,265	273
LST	*South Cotabato* (x3)	1940–1944 (1975–1978)	Various U.S. shipbuilders	4,080	328

Future Developments

In light of its perception of threat from China's activities in the South China Sea, the Philippines has reprioritized its military modernization efforts. The restarted AFP Modernization Act will build, slowly, the amphibious capabilities of the PN. The act calls for nearly US$22.1 billion for this purpose by 2028 and divides the modernization process into three five-year phases. The first of these phases calls for establishing a "minimum credible deterrence."

In a 2012 Department of National Defense white paper, the Philippine government indicated that it would seek to improve amphibious capabilities "not only for sea denial and patrol, but also to ensure the sovereignty of the archipelago and the country's Exclusive Economic Zone (EEZ)." In an effort to achieve this goal, the PN has published the Philippine Fleet Desired Force Mix, which calls for the acquisition of four LPDs and 18 LCUs over a 15-year period.

In early 2014, the PN signed a contract with the Indonesian shipbuilder PT PAL for the construction of two Strategic Sealift Vessels (LPDs). The vessels, the *Tarlac*-class LPD, are based on the Indonesian

Makassar-class LPD. They displace 11,583 tons, are 403 feet long, and can carry up to 500 troops. The first of the two was launched in January 2016 and, when commissioned, will be three times larger than any vessel previously operated by the PN.

These LPDs represent a massive increase in both amphibious capability and capacity. Capable of conducting the full range of amphibious operations, these vessels will also provide robust C2 capabilities for the AFP. However, it is unclear whether the acquisition funding commitment will be matched with the appropriate funding for equipping, manning, training, and sustaining the vessels that would enable the AFP to actualize their potential.

Implications for the United States

The United States has long partnered with the Philippines across a range of military activities. Challenges within the Philippines to invest in, and sustain, military capabilities have limited progress toward more complex cooperation. Growing concern within the Philippines about its ability to preserve its claimed sovereignty against increasingly active foreign countries appears to be galvanizing support among political leaders in the Philippines to sustain investments in military modernization.

The receipt of the two *Tarlac*-class LPDs will provide a large increase to the naval—not just amphibious—capabilities of the AFP. These vessels will provide the AFP a means of moving reinforced company-sized units around the Philippines, including equipment and stores, particularly important for HA/DR missions, which the Philippines has had an unfortunately high need for in recent years. It will provide a much-needed regional amphibious capability that was previously absent. Finally, it will provide the Philippines modern platforms with which it can engage the United States in more complex exercises. The *Tarlac*-class LPDs represent a significant advancement for the Filipino capabilities, but will likely require additional support in the form of aerial connectors, due to limited rotary wing aviation assets, and possibly C2, due to equipment limitations, to operate in geographically dispersed environments, as would exist during an HA/DR scenario. These capabilities could come from land-based AFP units or from vessels from the United States or other nations.

Republic of Singapore

Minister of Defense, Dr. Ng Eng Hen, has repeatedly expressed Singapore's interest in increasing its amphibious capabilities to better respond to nontraditional missions like HA/DR and counterpiracy operations. Singapore has recently used its LPDs in counterpiracy operations in the Gulf of Aden; HA/DR missions in response to regional typhoons, earthquakes, and tsunamis; and international search operations in the wake of the Malaysia Airlines Flight 370 (MH370) tragedy.[121] Another of the key interests of the Singapore Navy (RSN) is protecting maritime trade routes, particularly the Strait of

[121] Ong Hong Tat, "Dr. Ng: SAF and NS well poised to tackle future challenges," Singapore Ministry of Defense, July 1, 2014, http://www.mindef.gov.sg/imindef/resourcelibrary/cyberpioneer/topics/articles/news/2014/jul/01jul14_news.html#.Va_bpPlVhHx; Singapore Ministry of Defense, "Helicopter Landing Ships Return as Singapore's Relief Efforts Transition from Emergency Relief to Recovery Phase," news release, January 24, 2005, http://www.mindef.gov.sg/imindef/press_room/official_releases/nr/2005/jan/24jan05_nr.html; Lam Shushan, "Singapore's Navy's RSS Persistence set to join in QZ8501 search operations," *Channel News Asia* (Singapore), December 30, 2014, http://www.channelnewsasia.com/news/specialreports/qz8501/news/singapore-navy-s-rss/1557770.html.

Malacca, as the total amount of trade flowing through the city-state amounts to more than 200 percent of its GDP.

Singapore is interested in further increasing its capacity for these missions by expanding its amphibious fleet. Heightened tensions in the South China Sea are of increasing concern for Singapore, particularly as such tensions could affect Singapore's role as a trade hub. At present, the country is responding to these tensions by expanding joint patrols in the Malacca Strait with Malaysia and Indonesia.[122]

The Singapore Armed Forces (SAF) have approximately 71,000 active-duty personnel, across the army, navy, and air force. The majority of personnel are conscripted as part of Singapore's compulsory military service, lasting approximately two years. Singapore's regular acquisition of modern equipment, and the fairly high level of training provided to its units, produces a high-quality force. However, the turnover resulting from a conscription-based force and the size limitations of the city-state's military require a narrow mission focus for the SAF.

Amphibious Capabilities

Currently, the RSN has four *Endurance*-class LPDs. These locally designed and built vessels replaced the *County*-class LSTs that Singapore acquired in the late 1970s from the United States.[123] These four amphibious assault ships entered service between 2000 and 2001 and significantly enhanced Singapore's amphibious capabilities.[124] *Endurance*-class vessels, with a standard displacement of 6,000 tons, can embark 350 troops and carry up to 18 large armored vehicles, 20 unarmored vehicles, and bulk cargo. [125] This is twice as much cargo as the previous class of amphibious vessels operated by the RSN and moving at nearly twice the speed.[126] These LPDs also have flight facilities, including a large flight deck and an integrated hangar large enough to carry two medium or one large helicopter.

Table 3.5. Singaporean Amphibious Platforms

Class	Class Name	Commissioned	Shipbuilder	Full-load Displacement (tons)	Length (feet)
LST (LPD)	*RSS Endurance* (x4)	2000/2000/ 2001/2001	Singapore Technologies Marine	8,400	462

[122] Xue Jianyue, "Singapore, Malaysia and Indonesia could extend joint patrols in South China Sea," *Today,* May 11, 2015, http://www.channelnewsasia.com/news/singapore/singapore-malaysia-and/1838338.html.
[123] Singapore Ministry of Defense, "County Class Landing Ship Tanks Retire from Service," news release, November 23, 2000, http://www.mindef.gov.sg/imindef/press_room/official_releases/nr/2000/nov/23nov00_nr.print.img.html.
[124] "Endurance Class Landing Ship Tank (LST), Singapore," *Naval Technology*, accessed April 13, 2016, http://www.naval-technology.com/projects/endurance-class-landing-ship-tank-lst/.
[125] "Endurance Class Landing Ship Tank (LST), Singapore."
[126] Singapore Ministry of Defense, "Commissioning of RSS Persistence and RSS Endeavor," news release, April 7, 2001, http://www.mindef.gov.sg/imindef/press_room/official_releases/nr/2001/apr/07apr01_nr.print.img.html.

Future Developments

In March 2014, Defense Minister Ng outlined the *Singapore Armed Forces (SAF) 2030 Plan*. Ng stated that the *Endurance*-class vessels do not have sufficient capacity for air operations or cargo, given the RSNs projected operational needs, including more robust HA/DR response capabilities.[127] In light of these comments, there have been persistent reports that Singapore is planning to acquire some form of air-capable ship in the future. At the 2014 Singapore Air Show, Singapore Technologies Marine displayed a model of an *Endurance*-class ship configured as an LHD, deepening such speculation. In addition, some have speculated that Singapore's acknowledged interest in the STOVL F-35 variant and an LHD/CVL is a response to the inherent vulnerabilities of Singapore's military posture as a small island nation.[128]

Implications for the United States

Singapore remains an extremely capable partner for the United States. Acquisitions of amphibious hardware over the past 15 years have resulted in Singapore's navy and army possessing some of the most up-to-date equipment in Southeast Asia. Singapore remains focused on ensuring open sea lines of communication and the free flow of trade. Given personnel constraints and Singapore's own limited interests in offensive engagement, its amphibious capability is likely to remain focused on HA/DR missions. The United States can expect Singapore to maintain a highly capable amphibious force, and opportunities to partner with Singapore will likely continue at the current pace.

South Korea

The Republic of Korea Navy (ROKN) has been modernizing and upgrading its amphibious fleet over the past several years. These efforts are part of a larger program to reduce the size of the Republic of Korea (ROK) military while increasing its overall capability. In addition, the maritime nature of recent North Korean provocations has underscored the importance of the ROK Marine Corps. At present, the ROK Marine Corps is a 29,000-man, mechanized amphibious force. It is not a multi-domain, air-ground task force like the USMC. The ROKN and ROK Marine Corps intend to develop a dedicated aviation group and more closely follow the U.S. MAGTF model.[129]

In the *2014 Defense White Paper*, the ROK confirmed its intention to increase amphibious capabilities.[130] North Korean aggression, especially in the maritime domain, remains the primary driver for these planned increases.[131] North Korea may possess in excess of 260 amphibious ships (many of them of dubious quality) that pose a direct threat to South Korea's territorial integrity.[132] Given the

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[127] Ong Hong Tat, "Dr. Ng showcases SAF 2030 at budget debate," Singapore Ministry of Defense, March 7, 2014, http://www.mindef.gov.sg/imindef/resourcelibrary/cyberpioneer/topics/articles/news/2014/mar/07mar14_news.html#.VwKdGfkrKUk.

[128] Wendell Minnick, "Is a Light Carrier in Singapore's Future?," *Defense News*, March 1, 2014, http://archive.defensenews.com/article/20140301/DEFREG03/303010020/Is-Light-Carrier-Singapore-s-Future-.

[129] Republic of Korea Ministry of National Defense, *2014 Defense White Paper*, http://www.mnd.go.kr/user/mnd_eng/upload/pblictn/PBLICTNEBOOK_201506161156164570.pdf.

[130] Republic of Korea Ministry of National Defense, *2104 Defense White Paper,* 176.

[131] Ibid., 176.

[132] Ibid., 28–30.

circumstances, the *Defense White Paper* indicates that the ROK Marine Corps must be able to defend "strategic islands" and conduct modern, multi-domain amphibious operations on short notice.[133]

As envisioned, the ROKN's goal is to respond to "local provocations" and also to be capable of "deploying forces for overseas missions and providing disaster relief."[134] South Korea provided humanitarian assistance following more than a dozen regional disasters in the last decade but has only sent amphibious ships once, during the 2004 Indian Ocean tsunami.[135] It remains unclear whether the ROK would be willing to dispatch amphibious vessels to respond to a regional crisis in light of the persistent threat posed by North Korea.

Through major military exercises, Marine exchange programs, and equipment acquisitions, the ROK Marine Corps and the USMC are able to work fairly well together. However, there are still major impediments to interoperability, including C2, information sharing, and aviation facilities. The 2015 Foal Eagle bilateral exercise demonstrated the ability of the two nations to conduct a combined amphibious landing. At this exercise, a U.S. MV-22B Osprey landed on the *Dokdo*, an important step given South Korea's interest in this aircraft.[136] As with Japan, the close bilateral relationship with South Korea is cemented by a permanent U.S. presence as a result of the United States' alliance commitment to the ROK.

Amphibious Capabilities

The biggest upgrade to the ROK amphibious fleet has come with the commissioning of the first *Dokdo*-class Landing Platform Helicopter (LPH)/LHD in 2007. The *Dokdo* is the lead ship of a class of potentially three vessels, with the second ship ordered in 2014.[137] These LHDs, which are 653 feet long with a full displacement of 19,000 tons, are the largest ships in the ROKN.[138] Due to its large size, the *Dokdo* can carry 700 troops along with 10 large armored vehicles and two landing craft air cushions (LCACs).[139] Like Japan, South Korea uses an indigenously produced variant of the U.S. LCAC, the LSF-II, as its connector. The ROKN envisions using these LHDs to conduct "over the horizon assaults," although the ships also have the capability for peacekeeping and HA/DR missions. The ships are the key component of a future amphibious task force.[140]

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[133] Ibid., 42–49.

[134] Republic of Korea Ministry of National Defense, *2012 Defense White Paper*, 151, http://www.mnd.go.kr/user/mnd_eng/upload/pblictn/PBLICTNEBOOK_201308141005219260.pdf.

[135] Republic of Korea Ministry of National Defense, *2014 Defense White Paper*, 231.

[136] Joseph Digirolamo, "U.S., ROK Marines Strengthen Alliance through Annual Exercise," *Defense Media Activity*, April 3, 2015, http://www.marines.mil/News/NewsDisplay/tabid/3258/Article/583520/us-rok-marines-strengthen-alliance-through-annual-exercise.aspx.

[137] "Dokdo Class Landing Platform Helicopter (LPH)," *Naval Technology*, http://www.naval-technology.com/projects/dodko-class/; "LP-X Dodko (Landing Platform Experimental) Amphibious Ship: Ship List," *Global Security*, accessed October 30, 2014, http://www.globalsecurity.org/military/world/rok/lp-x-list.htm.

[138] "Dokdo Class Landing Platform Helicopter (LPH)"; "LP-X Dodko (Landing Platform Experimental) Amphibious Ship: General Page," *Global Security*, accessed October 30, 2014, http://www.globalsecurity.org/military/world/rok/lpx.

[139] "LP-X Dodko (Landing Platform Experimental) Amphibious Ship: General Page"; Kyle Mizokami, "Asian Carriers by the Numbers," *USNI News*, August 29, 2013, http://news.usni.org/2013/08/29/asian-carriers-by-the-numbers.

[140] "LP-X Dokdo: General Page."

The ROK amphibious fleet also includes two classes of LST: the older LST-I *Go Jun Bong*–class and the new LST-II *Cheon Wang Bong*–class. The LST-I dates to the early 1990s and uses a conventional LST design whereby the ship beaches itself and disembarks vehicles through large bow doors. The LST-I landing ship, which is 369 feet long and displaces 4,200 tons when fully loaded, can carry 200 troops, 15 large armored vehicles, six medium-sized trucks, and four small landing craft on davits.

The first of the new LST-II *Cheon Wang Bong*–class ships was commissioned at the end of 2014. These vessels represent a measurable upgrade from LST-I in terms of overall lift and aviation capability with a large, two spot helicopter deck. The LST-II landing ships do not have bow ramps; instead, they carry two medium landing craft on the foredeck and use a stern gate for loading and offloading. These LSTs (more accurately LPDs, according to the categories of amphibious vessels in Appendix 1) are 416 feet long and 7,140 tons fully loaded.

Table 3.6. South Korean Amphibious Platforms

Class	**Class Name**	**Commissioned**	**Shipbuilder**	**Full-load Displacement (tons)**	**Length (feet)**
LST (LPD)	*Cheon Wang Bong* (x2)	2014/2016	Hanjin Heavy Industries & Construction	7,140	416
LPH (LHD)	*Dokdo* (x1)	2007	Hanjin Heavy Industries & Construction	18,000	653
LST	*Go Jun Bong* (x4)	1993/1997/1999/1999	Hanjin Heavy Industries and Construction	4,300	369

The ROKN has a limited number of connectors available for its amphibious force. It has purchased several indigenously produced LCACs to pair with the *Dokdo*-class LHDs. South Korea does not have a medium- or heavy-lift helicopter for its amphibious force. At present, the ROKN operates Blackhawk derivatives. The ROK Marine Corps uses the U.S.-made AAV-7 amphibious assault vehicle for ship-to-shore movement and ground maneuver.

Future Developments

Over the past decade, the ROKN has embarked on a series of modernization projects that have rapidly expanded the fleet, including the amphibious component.[141] This effort is expected to continue with the

[141] Kyle Mizokami, "South Korea's New Navy Is Impressive . . . and Pointless," *Medium*, October 19, 2013, https://medium.com/war-is-boring/south-koreas-new-navy-is-impressive-and-pointless-513b93e52b84#.r89ihyyhh.

acquisition of at least one more *Dokdo*-class ships (which is funded as of 2016).[142] In addition, the ROKN plans to acquire three more *Cheon Wang Bong*–class LSDs by 2018.

There are possible modifications to future *Dokdo*-class LHDs that remain unconfirmed. The most persistent and intriguing is that follow-on LHDs will be equipped with a ski-jump ramp on the bow. This would enable Short takeoff and vertical landing (STOVL) flight operations with an aircraft such as the F-35B. Another report is that the ROKN will acquire a newly designed amphibious assault ship before 2019 based on the Spanish *Juan Carlos* design, a vessel with a 27,500-ton full displacement.[143] If true, these rumors point to a desire by the ROKN to improve, dramatically, its capability for naval aviation through the addition of fixed wing flight operations.

The ROK Marine Corps plans to establish an aviation component by 2017. Additionally, the ground component of the Corps is expected to add another brigade headquarters and small detachment. The Ninth Brigade stationed on Jeju Island off the Eastern coast of South Korea is in the process of standing up and should eventually total 500 Marines. [144]

The ROK Marine Corps has indicated interest in acquiring a sea-based utility helicopter and light attack helicopter. It is unclear at present whether the ROK would acquire those capabilities through domestic production or international purchase. The ROK has also discussed acquiring the V-22 Osprey, though whether for the Marine Corps or Special Forces is not clear.[145]

Implications for the United States

As seen in the 2016 iteration of the Ssang Yong exercise, amphibious operations remain a large part of combined planning between the United States and South Korea. The United States brought elements of two ARGs—the *Bonhomme Richard* and *Boxer*—with the 31st and 13th MEUs, five MPF ships, and additional assets and personnel to deploy as the Third MEB, in the largest U.S. amphibious exercise in many years.

South Korea's amphibious forces are highly trained and well equipped. There are no other allies or partners with whom the United States could conduct a MEB-sized exercise at present. The cooperation and interoperability are important to facilitate effective and efficient operations in the event that hostilities resume on the Korean peninsula. With delivery of additional *Dokdo*-class vessels to the ROKN, South Korea will have the capacity to develop greater amphibious capability in C2 and the air combat element. Over the near and mid-term, however, U.S. amphibious forces will likely need to continue to provide these critical enablers to the ROK.

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[142] "Dokdo Class Landing Platform Helicopter (LPH)"; "LP-X Dodko (Landing Platform Experimental) Amphibious Ship: Ship List."

[143] Jung Sung-Ki, "S. Korea Envisions Light Aircraft Carrier," *Defense News*, October 26, 2013, http://archive.defensenews.com/article/20131026/DEFREG03/310260005/S-Korea-Envisions-Light-Aircraft-Carrier.

[144] Republic of Korea Ministry of National Defense, *2014 Defense White Paper*, 92.

[145] Bradley Perret, "South Korea Chooses Boeing AH-64E Apache for Army," *Aviation Week*, April 18, 2013, http://aviationweek.com/defense/south-korea-chooses-boeing-ah-64e-apache-army.

4 Assessment of U.S., Ally, and Partner Amphibious Capabilities

The first three chapters of this report have been largely descriptive, explaining the demand for and supply of U.S., allied, and partner amphibious forces in PACOM. This analytic chapter assesses the types of capabilities that allied and partner amphibious forces may require from the United States using a scenario-based approach. We present 1) three scenarios that are used to assess how U.S., allied, and partner forces would perform; 2) the factors and methodology used for the assessment; and 3) a country-by-country assessment in each scenario. This methodology allows us to identify regional shortfalls by capability area. This, in turn, illuminates where the U.S. amphibious force may need to augment the contributions of ally and partner forces.

The three scenarios considered are humanitarian assistance/disaster relief, a noncombatant evacuation operation, and an amphibious raid. These scenarios were chosen because they stress different amphibious capabilities and represent key points in the range of military operations. The HA/DR scenario stresses the logistics and maneuver capabilities of an amphibious force, as such a mission requires a large volume of supplies to move from ship to various points inland. The NEO stresses C2, medical capability, and the ability to operate at a greater threat level than the HA/DR scenario. The amphibious raid stresses maneuver and kinetic capabilities, including significant force protection.

The team did not include a scenario for a high-end forcible entry operation. In our judgment, such an operation is beyond the means of almost all allied and partner amphibious forces in the Asia Pacific. Further, few countries have, or at least acknowledge, the intent to conduct such an operation. At present, only the Republic of Korea has a forcible entry capability, but this is only applicable for an operation on the Korean Peninsula and would most likely be conducted in close cooperation with U.S. forces. The amphibious raid scenario allows the team to explore a kinetic operation and the capabilities associated with such an operation without resorting to an unrealistic scenario that would quickly eclipse the capabilities of the allied/partner force.

Each scenario description includes a brief vignette along with key mission objectives, impediments, and level of violence involved. All of these scenarios assume that the ability to move forces and matériel by strategic airlift into the area of operations is limited because of time and circumstances (e.g., level of violence, damage to infrastructure). The team took this approach because, historically, that is often the situation and because it stresses the amphibious force capabilities in logistics and maneuver.

The team used historical events to inform our thinking. For the HA/DR scenario, we used the responses to the Nepal earthquake, Typhoon Haiyan, and the 2004 Boxing Day earthquake and tsunami. For the NEO scenario, the team used the evacuations from Yemen, Lebanon, and Somalia. For the amphibious raid scenario, the historical record was more limited. The team used some of the amphibious feints from the 1991 Gulf War along with Malaysia's experience in Lahad Datu; however, the scenario is more speculative than either the HA/DR or NEO.

Humanitarian Assistance and Disaster Relief (HA/DR) Scenario

A magnitude 8.1 earthquake hits a maritime Asian country causing significant damage to all civilian and military infrastructure in the affected area. In addition, the earthquake triggers a minor tsunami causing additional damage to low-lying coastal areas and several port facilities. The infrastructure damage is severe enough to preclude humanitarian assistance from reaching the nation until the runways are repaired, air traffic control capabilities are restored, and the country's main port is brought back on line.

In addition, the host-country government has few rotary wing aviation assets, so its ability to reconnoiter and deliver aid to outlying areas is limited. There is a low likelihood of violence. Any violence that does occur is likely to take the form of looting and general civil unrest.

The affected nation requests humanitarian assistance from the international community. In addition, the embassy has knowledge of approximately 35,000 citizens in country. It is anticipated that many of them will be able to be evacuated on commercial aircraft / passenger ships once air and surface port operations are restored. However, some may need more immediate evacuation for medical purposes.

This scenario therefore requires an amphibious force to accomplish the following tasks in order to successfully complete the HA/DR response mission:

1. Deploy units to assess the extent of damage and coordinate with the affected country's government.

2. Develop a plan of action in concert with the nation's government and other international actors.

3. Dispense critical aid to hardest hit and/or cutoff areas.

4. Provide medical care to hardest hit and/or cutoff areas with ship-based medical facilities.

5. Restore operating capability of airports and ports to facilitate the flow of aid.

6. Transition relief mission to international organizations and agencies of the affected country.

Noncombatant Evacuation (NEO) Scenario

A long-standing, low-level insurgency in a maritime Asian nation escalates to more widespread instability after the assassination of the current president. The situation further escalates and engulfs the nation's capital, a city of roughly five million people, with widespread civil unrest. According to the embassy, 1,500 citizens remain in the country, with two missionary groups thought to be in the directly affected region.

The embassy is unable to safely evacuate remaining citizens and personnel on commercial charters because the main national airport has been closed due to ground fire from insurgents and their rudimentary shoulder-fired anti-air missiles. The embassy has requested military support to facilitate the evacuation of the embassy staff and nationals in the country. The embassy has secured access to a waterfront, gated compound with a 400-meter-wide beach as the primary route for evacuation.

The embassy has made contact with the two groups of foreign missionaries who are being sheltered in two villages approximately 20 miles inside of insurgent-held territory. These missionaries will need to be evacuated via helicopter in a far riskier environment than the rest of the operation. The likelihood of violence for the entire mission is medium; however, the force is under restrictive rules of engagement (ROEs) when operating in the capital city. For the rescue mission, the force may engage with a full range of capabilities but using lethal force only if fired on first.

This scenario requires an amphibious force to accomplish the following:

1. Deploy a team to establish a C2 link with embassy staff.[146]

2. Develop a plan of action in concert with the embassy staff to evacuate nationals from the beachfront compound.

3. Secure the beachfront compound and create a processing facility on-site to manage the evacuation.

4. Transport 1,500 persons to amphibious warships offshore.

5. Help close the embassy, ensuring the safety of embassy personnel and destruction of classified matériels.

6. Conduct a helicopter-based rescue mission of missionary groups including protective overwatch of transport aircraft by armed aircraft (fixed or rotary wing).

Amphibious Raid Scenario

An offshoot of the Islamic State takes root in a maritime Asian nation. Due to the region's difficult geography, the group is able to secure a remote area as a base of operations. The so-called Islamic State of Southeast Asia (ISSA) leverages an existing local insurgent group and substantial international financing. In a sudden outburst of violence, ISSA carries out attacks against foreign nationals and the local government.

Because of the difficult terrain, the affected nation's military is unable to respond effectively. Therefore, the affected nation's government calls on the UN to form an intervention force to attack and destroy the ISSA base of operations. Unfortunately, ISSA has managed to buy or capture some sophisticated military equipment to include Man-Portable Air-Defense Systems (MANPADS), mortars, and anti-armor weapons. This is in addition to numerous crew-served automatic weapons and unconfirmed reports of prepared improvised explosive devices (IEDs).

The mission is an amphibious raid to cripple the ISSA base of operations and destroy as much of its heavy weaponry as possible. Total duration for the kinetic phase of the operation is not likely to exceed 36 hours. Because the operation takes place in a remote region, no evacuation of friendly or neutral noncombatants is needed.

This scenario requires an amphibious force to accomplish the following tasks:

1. Conduct intelligence activities to understand enemy capabilities, focusing on the location of heavy weapons, ammunition and weapon storage facilities, IEDs, and major enemy force concentrations.

2. Develop a plan of action to maximize kinetic effects while minimizing risk to the landing force.

[146] Nations in this study may have specific capabilities that can deploy rapidly to enhance embassy security or support a NEO before the arrival of the larger amphibious force. In the U.S. Marine Corps, these capabilities include Marine Security Augmentation Units (MSAUs) and the Fleet Antiterrorism Security Teams (FASTs).

3. Execute preparatory strikes to degrade enemy capabilities, with a focus on securing landing zones.

4. Deploy forces ashore and destroy weapons caches and communications infrastructure.

5. Conduct armed overwatch and casualty evacuation operations, where applicable.

6. Recover landing force.

Assessing Amphibious Capability

The study team assessed each ally/partner amphibious force in the three scenarios using six assessment categories: C2, maneuver, fires, intelligence, logistics, and force protection. The assessment categories are based on the Marine Corps' six warfighting functions with some elaborations to highlight important amphibious capabilities that may not be explicitly surfaced in the top-level functions.

The assessment scale has four levels—red, orange, yellow, and green—representing an increasing level of capability. The capabilities of a U.S. ARG/MEU are set as the benchmark (GREEN) against which allied and partner capabilities are compared. Allied and partner capabilities are assessed based on how they compare with ARG/MEU capabilities. Although using an absolute rather than relative assessment methodology is theoretically more attractive, it is difficult to execute, requiring extensive modeling to determine flows and capacity. This is an analytically challenging assessment regarding U.S. capabilities and extremely difficult to assess for allied and partner forces. Thus, the study team used this relative assessment methodology.

The four levels are defined as follows.

- GREEN—By definition, green is the level of capability that a U.S. ARG/MEU has for a given mission requirement. Allied and partner forces are rated green when they are judged to reach a similar level of proficiency.

- YELLOW—A function is rated as yellow if the considered force still meets the mission requirements in that scenario but has shortcomings in speed or scale when compared to the U.S. baseline. The considered force may also lack some component of the capability that, while not preventing mission success, does impede the ability to meet mission requirements.

- ORANGE—A function is rated as orange if the considered force can meet certain mission requirements in that scenario, but not all of them, when compared to the U.S. baseline. The mission requirements are met in a limited manner that will affect overall mission success. To meet the same number of objectives as previous levels, high levels of risk will be incurred.

- RED — A function is rated as red if the considered force is unable to meet the mission requirements at an acceptable level of risk.

The following sections provide the doctrinal definitions for each function, an explanation for how the function was applied in assessing amphibious capabilities, and further definitions for where the warfighting functions have been expanded in order to illuminate important components of amphibious operations that are not adequately captured by the six warfighting functions.

Command and Control

> COMMAND AND CONTROL IS THE EXERCISE OF AUTHORITY AND DIRECTION OVER ASSIGNED OR ATTACHED FORCES IN THE ACCOMPLISHMENT OF A MISSION. IT IS HOW THE COMMANDER TRANSMITS HIS INTENT AND DECISIONS TO THE FORCE AND RECEIVES FEEDBACK. COMMAND AND CONTROL INVOLVES ARRANGING PERSONNEL, EQUIPMENT, AND FACILITIES TO ALLOW THE COMMANDER TO EXTEND HIS INFLUENCE OVER THE FORCE DURING THE PLANNING AND CONDUCT OF MILITARY OPERATIONS. GOOD PLANNING FACILITATES COMMAND AND CONTROL.[147]

C2 in this assessment captures the ability of a commander to control the command's dispersed forces in a timely fashion from a central, afloat location. The main determinants are whether the commander has adequate planning spaces aboard ship and whether the amphibious command vessel has the necessary C2 equipment, both line-of-sight and beyond line-of-sight, to control the full range of amphibious operations.

The team has broken out doctrine as a subset of C2. Doctrine is vital in integrated amphibious operations as it allows a unified commander to effectively control his disparate and distinct assets. This doctrinal component is the key in achieving effectively integrated amphibious operations.

> *Doctrine* is defined as the set of fundamental principles by which an amphibious force guides its actions to achieve some predetermined objective.[148] In this context, doctrine also includes capstone amphibious operational concepts and underlying force structure and generation guidelines.

Maneuver

> DOD DEFINES MANEUVER AS THE EMPLOYMENT OF FORCES IN THE OPERATIONAL AREA THROUGH MOVEMENT IN COMBINATION WITH FIRES TO ACHIEVE A POSITION OF ADVANTAGE IN RESPECT TO THE ENEMY IN ORDER TO ACCOMPLISH THE MISSION. MANEUVER ALLOWS FOR THE DISTRIBUTION OR CONCENTRATION OF CAPABILITIES IN SUPPORT OF A COMMANDER'S CONCEPT OF OPERATIONS [CONOPS]. THE MARINE CORPS MANEUVER WARFARE PHILOSOPHY EXPANDS THE CONCEPT OF MANEUVER TO INCLUDE TAKING ACTION IN ANY DIMENSION, WHETHER TEMPORAL, PSYCHOLOGICAL, OR TECHNOLOGICAL, TO GAIN AN ADVANTAGE. IN COIN OPERATIONS, FOR EXAMPLE, FORCES MAY ACHIEVE ADVANTAGES THROUGH KEY LEADER ENGAGEMENTS, PROVISION OF SECURITY, GOVERNANCE, ECONOMICS, AND THE RULE OF LAW.[149]

For the purposes of this study, maneuver is the ability of the force to move through space to meet some objective. The assessment for maneuver has three components: maritime maneuver, aerial maneuver, and ground maneuver. These aspects reflect the inherently multi-domain nature of amphibious operations.

> *Maritime maneuver* is defined as the ability to move troops and matériel from a ship to the beach without using port facilities. One way to do this is by beaching a purpose-built amphibious warship that then disembarks troops and equipment through a large set of bow doors. Another

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[147] *Marine Corps Operations* (Washington, DC: Department of the Navy, 2011), B-1 – B-2. http://www.usna.edu/Training/_files/documents/References/2C%20MQS%20References/2015-2016%20MQS/MCDP%201-0%20Marine%20Corps%20Operations.pdf.

[148] *DOD Dictionary of Military Terms*, s.v. "doctrine," accessed on: April 11, 2016, http://www.dtic.mil/doctrine/dod_dictionary/data/d/3840.html.

[149] *Marine Corps Operations,* B-2.

way is to use landing craft to bring troops and equipment ashore while the amphibious ship remains some distance from the coast. Those nations with the capability for the latter are assessed higher because this method places amphibious warships in less danger.

Aerial maneuver is defined as the ability to move troops and matériel from a ship by air to some point at or near the objective, regardless of its proximity to shore. Those nations with full deck amphibious assault ships will rate higher in this area. Larger helicopters also rate higher.

Ground maneuver is defined as the ability to move troops and matériel from a landing point, whether beach head or helicopter landing zone, to some other location. This capability greatly increases tactical flexibility as landings can be offset from objectives. This category is assessed by examining the number of embarked ground vehicles and, if the force has them, armored vehicles.

Fires

> In JP 1-02, the DOD defines fires as the use of weapon systems to create a specific lethal or nonlethal effect on a target. Fires harass, suppress, neutralize, or destroy in order to accomplish the targeting objective, which may be to disrupt, delay, limit, persuade, or influence. Fires include the collective and coordinated use of target acquisition systems, direct and indirect fire weapons, armed aircraft of all types, and other lethal and nonlethal means. Fires are normally used in concert with maneuver, which helps shape the battlespace, setting conditions for decisive action.[150]

Fires are directly relevant in the raid scenario and as a deterrent in the NEO scenario. They are not rated in the HA/DR scenario. The study team assessed fires in two ways. The first is whether a force can provide sea-based aerial fire support, both fixed and rotary wing, to prepare the battlespace and to support forces ashore. The second is whether the ground element of the amphibious force has a robust organic fires capability. To receive the highest assessment, nations need to provide both forms. At present, only the United States has the ability to deliver aerial fires; however, the Australian Army's end state for its full amphibious ready group includes attack helicopters. Partner countries might be able to offset some of this deficiency by using naval gunfire, which was not rated.

Intelligence

> Intelligence provides the commander with an understanding of the adversary and the operational environment and it identifies the adversary's centers of gravity [COGs] and critical vulnerabilities. It assists the commander in understanding the situation, alerts him to new opportunities, and helps him assess the effects of actions within the battlespace. This warfighting function supports and is integrated with the overall operational effort and must be focused on the commander's intelligence requirements.[151]

The assessment of intelligence in these scenarios has three components. The first is the ability to connect to national intelligence sources. This requires remotely accessible and queried national databases, secure communications for linking data sources to afloat facilities, and secure compartments aboard ship for analysis and storage. The second is the ability to gather data organically, whether using

[150] Ibid, B-2 – B-3.
[151] Ibid, B-3.

shipboard, aerial, or ground-based sensors. The last and arguably most critical component is the ability to process data into usable intelligence. This requires a dedicated staff and analysis tools using the secure facilities. The dissemination component of the intelligence process is captured in the C2 rating.

Logistics

> LOGISTICS ENCOMPASSES ALL ACTIVITIES REQUIRED TO MOVE AND SUSTAIN MILITARY FORCES. AT THE TACTICAL LEVEL, LOGISTICS IS COMBAT SERVICE SUPPORT (CSS) THAT DEALS WITH FEEDING, FUELING, ARMING, AND MAINTAINING TROOPS AND EQUIPMENT. TACTICAL LOGISTICS INVOLVES THE ACTUAL PERFORMANCE OF THE LOGISTIC FUNCTIONS OF SUPPLY, MAINTENANCE, TRANSPORTATION, HEALTH SERVICES, GENERAL ENGINEERING, AND OTHER SERVICES.[152]

Because the team considered the ability to physically move consumables and people under maneuver, logistics captures the extent of the ship-based stores and the capability of the embarked logistics detachment to process them.

The team also chose to break out medical support as its own category because of feedback from subject matter experts who identified its importance in these scenarios and its lack of assessment elsewhere.

> *Medical support* is defined as the ability to receive, diagnose, and treat a diverse range of causalities using sea-based medical facilities. This was assessed by the extent of shipboard medical facilities and having a large, enclosed space to use as a triage area. Many nations maintain a full-scale, air-deployable field hospital; although an important capability, such a hospital was not usable in the scenarios considered.

Force Protection

> FORCE PROTECTION IS THE MEASURES TAKEN TO PRESERVE THE FORCE'S POTENTIAL SO THAT IT CAN BE APPLIED AT THE APPROPRIATE TIME AND PLACE. IT INCLUDES THOSE MEASURES THE FORCE TAKES TO REMAIN VIABLE BY PROTECTING ITSELF FROM THE EFFECTS OF ADVERSARY ACTIVITIES AND NATURAL OCCURRENCES. FORCE PROTECTION SAFEGUARDS FRIENDLY COGS AND PROTECTS, CONCEALS, REDUCES, OR ELIMINATES FRIENDLY CRITICAL VULNERABILITIES.[153]

In the amphibious context, force protection is largely concerned with the ability of amphibious warships to defend themselves from enemy attack. In extremely stressing scenarios, amphibious warships are part of a larger naval force and thus reliant on more capable naval vessels for defense from enemy missiles, small craft, and aircraft. However, amphibious warships need some level of self-defense capability in case they deploy independently or become engaged in a high-intensity situation.

Force protection also considers the ability of connectors to successful reach shore in the face of enemy opposition. Connectors with active countermeasures or high-speed water/air speeds will rate higher in this area.

Country Assessments

Using the framework described, this section provides the study team's assessment of different amphibious forces. For several nations, these force requirements represent maximum efforts; that is,

[152] Ibid, B-3.
[153] Ibid, B-3.

100 percent of amphibious forces in their inventory. That could happen in situations that are particularly operationally challenging.

These assessments identify the areas where these forces require additional support. These gaps are places where the United States could provide support and potentially add to its own capabilities to allow allies and partners to fully realize the potential of combined amphibious operations.

It is sometimes assumed that improving allied and partner amphibious capabilities will replace U.S. forces on a one-for-one basis, therefore decreasing the pressure on U.S. amphibious forces. While this may happen in the long term in some scenarios with the United States' closest and most reliable allies, non-U.S. amphibious forces will require varying degrees of U.S. support depending on the nation and scenario. The closest parallel to this situation is the North Atlantic Treaty Organization. NATO allies, while highly capable, are still heavily reliant on U.S. enabling capabilities and very rarely does NATO undertake missions without the United States playing a major role.[154] This should be the assumed paradigm for allied and partner amphibious operations.

The study team found that the amphibious forces in some regional nations were not highly developed, despite their long-standing relationship with the United States and/or the United Kingdom. Other nations have made major leaps forward over the past decade and yet others have begun more systematic efforts to improve their cross-service amphibious capability. Effective amphibious forces require not just the right equipment or even a well-trained landing force; they require an integrated doctrine that knits together air, sea, and land in a cohesive manner. This is arguably the most important amphibious competency to master.

[154] "A troubling victory," *The Economist*, September 3, 2011, http://www.economist.com/node/21528248.

U.S. Marine Corps and U.S. Navy—ARG/MEU

Table 4.1. Assessment of USMC ARG/MEU

USMC – ARG/MEU			
	HA/DR	NEO	Raid
Command and Control			
Doctrine			
Maneuver			
Maritime Maneuver			
Aerial Maneuver			
Ground Maneuver			
Fires			
Intelligence			
Logistics			
Medical Support			
Force Protection			

The traditional Navy/Marine Corps ARG MEU consists of three amphibious warships, one LHD, one LPD, and one LSD, with a landing force of roughly 2,200 Marines and sailors and rates highest across the board of any of the forces considered in this study.[155] This is to be expected of the world's preeminent amphibious fighting force. As noted earlier, the study team used the ARG/MEU as the benchmark and therefore rated it green across the board. The other amphibious formations are assessed against this baseline.

These assessments should not be interpreted as the ARG/MEU being without shortfalls. In the HA/DR scenario, for example, the ARG/MEU has excellent first response capabilities but lacks capacity needed to deal with long-term effects. It would need to be reinforced by follow-on forces delivered by air or sea. In the cases analyzed in this study, the CSIS team found that Marine Corps responses to major HA/DR events included* the activation of MPSRON assets and deployment of at least an MEB headquarters element.

[155] Leed, *Amphibious Shipping Shortfalls.*

U.S. Marine Corps—Special Purpose MAGTF—Crisis Response (SP-MAGTF-CR)

Table 4.2. Assessment of USMC SP-MAGTF-CR

USMC – SP-MAGTF-CR			
	HA/DR	NEO	Raid
Command and Control			
Doctrine			
Maneuver			
Maritime Maneuver			
Aerial Maneuver			
Ground Maneuver			
Fires			
Intelligence			
Logistics			
Medical Support			
Force Protection			

The Special Purpose Marine Air-Ground Task Force Crisis Response (SP-MAGTF-CR) was born in the wake of the attack on the U.S. Embassy in Benghazi, Libya in 2012. The current SP-MAGTF-CR-AF is roughly a battalion of Marine infantry plus V-22 and KC-130J support. Its mission is to deploy Marines on short notice to counter threats to U.S. interests in Africa and to support theater security engagements across the continent.[156] It is included here because it has become another tool in the amphibious toolbox.

This air mobile rapid reaction force uses the long range of V-22 to help mitigate the tyranny of distance. As SP-MAGTF's are inherently task-oriented, a Pacific-focused SP-MAGTF would look different from an Africa-focused unit. These assessments show how any Pacific SP-MAGTF would need to be augmented to meet mission needs for HA/DR, NEO, and raid missions in the PACOM AOR.

The aforementioned assessment reflects the limitation of an air mobile rapid reaction force for HA/DR and NEO missions where capacity is key. In addition, the SP-MAGTF does not have the ability to rapidly

[156] Megan Eckstein, "280 Special Purpose MAGTF Marines Set to Return Home from Europe, Africa Deployments," *USNI News*, January 26, 2016, https://news.usni.org/2016/01/26/280-special-purpose-magtf-marines-set-to-return-home-from-europe-africa-deployments.

move a logistics support or combat engineering unit without U.S. Air Force (USAF) support. An SP-MAGTF still has utility in these scenarios; however, it is less capable of independent action than a traditional MEU. The Nepal earthquake HA/DR response by USMC units demonstrates how SP-MAGTF concepts and in-theater aggregation may be used to enable a larger joint force response to these contingences.[157]

While the HA/DR and NEO missions reflect the inherent lack of capacity in an air mobile unit, the shortcomings in the raid missions are more capability focused. The intelligence shortcoming could be mitigated by using joint capabilities and planned enhancements to en route C2 systems. Fires could be augmented by utilizing KC-130Js in the Harvest Hawk configuration or by adding a light weapons payload to the V-22. Other capability limitations are inherent to the air mobile force and solutions may adversely affect the formation's chief asset—speed. Although the assessment shows significant shortcomings, a SP-MAGTF still has an important strength: ease of deployment in support of training activities with regional allies and partners.

[157] U.S. Department of Defense, "Nepal Earthquake Response Task Force Deactivates," U.S. Department of Defense, May 21, 2015, http://www.defense.gov/News-Article-View/Article/604720/nepal-earthquake-response-task-force-deactivates.

Australia

Table 4.3. Assessment of Australian Amphibious Capability

AUS			
	HA/DR	NEO	Raid
Command and Control			
Doctrine			
Maneuver			
Maritime Maneuver			
Aerial Maneuver			
Ground Maneuver			
Fires			
Intelligence			
Logistics			
Medical Support			
Force Protection			
Interoperability w/ United States			

Of the foreign amphibious forces considered, Australia's is consistently rated the most capable. This is unsurprising given Australia's long history of amphibious and expeditionary operations, its recent and substantial investments in amphibious capabilities, and its close working relationship with the U.S. military and Marine Corps in particular. The ADF amphibious force considered in these scenarios is its full, "brigade scale" ARG structure that is similar to the U.S. ARG structure. Broadly speaking, many of the yellow assessments are a reflection of the ADF's lack of experience operating a new amphibious construct with its joint nature. As the Australians gain experience in these areas and complete their acquisition of enabling capabilities, these assessments will likely transition from yellow to green.

- C2: We assess Australia to be capable, though stressed, for the HA/DR and NEO scenarios due to the complexities of these scenarios and the ADF's inexperience with its new amphibious construct. Over time, these would likely be rated all green as Australia becomes more experienced. Raid is rated green as C2 for this scenario does not include the need to coordinate with civil authorities.

    - Doctrine: We assess doctrine as green because Australia has a clear and cogent amphibious doctrine that covers this capability from generation through to employment.

- Maneuver:

    - Maritime Maneuver: We assess Australia to have reasonable maneuver capability, though it is limited by surface connectors that provide less overall throughput.

    - Aerial Maneuver: We assess aerial maneuver as very robust, including rotary wing aircraft with a significant external payload capability. However, the ADF is rated below the United States in HA/DR and NEO as its heavy-lift capabilities are not quite at the level of the United States.

    - Ground Maneuver: We assess Australia to be capable of ground maneuver in all scenarios.

- Fires: Australia is the one nation considered in the study that has organic aerial fire support. Its fires are sufficient for a NEO scenario, though the lack of organic fixed wing aviation support results in a lower assessment for the raid scenario.

- Intelligence: We assess that Australia has integrated intelligence collection and analysis functions in a way that would support mission requirements.

- Logistics: We assess logistics as able to meet the requirements of the HA/DR and NEO scenarios, though with some risk due to lack of capacity resulting from Australia's smaller vessels and therefore less available cube and square for supplies. This is not an issue in the raid scenario because its logistics requirements are far less stressing.

    - Medical Support: We assess medical support to be sufficient, though lacking is an onboard medical facility as robust as a U.S. LHD or LHA.

- Force Protection: We assess Australia's force protection would be stressed in the raid scenario due to the lack of high-capacity, high-water-speed surface connectors.

- Interoperability with the United States: We assess Australia and the United States as strongly interoperable in the HA/DR and NEO scenarios, especially if the forces are integrated vertically rather than horizontally. In a vertically integrated force, the two nations would operate in a combined fashion with missions being assigned to one nation or the other. In a horizontally integrated force, the two nations would operate jointly with missions being assigned to composite units. Interoperability is a minor concern in the raid scenario due to the relative complexity and stresses of the operation. However, a previous CSIS report on this topic concluded that datalinks and associated technologies were a promising area for combined experimentation.[158]

[158] Leed, McCreary, and Flynn, *Advancing U.S.-Australian Combined Amphibious Capabilities*, 39–40.

India

Table 4.4. Assessment of Indian Amphibious Capability

India			
	HA/DR	NEO	Raid
Command and Control			
Doctrine			
Maneuver			
Maritime Maneuver			
Aerial Maneuver			
Ground Maneuver			
Fires			
Intelligence			
Logistics			
Medical Support			
Force Protection			
Interoperability w/ United States			

We assess India's amphibious force to be very capable for the missions it is designed for: contributing one element to a larger ground campaign against an adversary in South Asia. However, the scenarios used in this report highlight situations where India's capabilities would be highly stressed. India is currently seeking to enhance its amphibious fleet with a request for proposal for 40,000-ton LHDs, which would provide far more capability than India's current amphibious fleet. At present, like much of the equipment of the IAF, India's amphibious vessels reflect a range of suppliers, including LCTs acquired from Polish shipyards during the Cold War, domestically produced LSTs, and an LPD acquired from the United States. Conducting effective C2 as well as managing logistical operations, ship-to-ship connections by sea or aerial connectors, and underway repairs will be more challenging because of the diversity of equipment India operates.

- C2: We assess India's C2 as able to meet some, but likely not all, mission-critical elements of the HA/DR and NEO scenarios and unable to meet mission requirements in the raid scenario. This is largely due to the relative lack of dedicated, afloat C2 facilities. Additionally, India's amphibious

forces have limited experience with distributed C2 necessary in both the HA/DR and NEO scenarios.

    - Doctrine: We assess doctrine as orange because India does not appear to have an integrated amphibious doctrine or fully developed force generation process. Although India appears to be moving in this direction, it has not progressed far down this path.

- Maneuver:

    - Maritime Maneuver: We assess that India's amphibious force would be capable of undertaking HA/DR and NEO missions with a high probability of success. However, India's limited SSCs result in greater risk to the raid scenario.

    - Aerial Maneuver: We assess that India's aerial maneuver would be unlikely to provide necessary capabilities in any of the scenarios because the amphibious force does not operate organic medium or heavy-lift rotary aircraft. The aircraft embarked on most Indian ships are best suited for intelligence, surveillance, and reconnaissance, but are not well suited for maneuver.

    - Ground Maneuver: We assess India's ground maneuver to be capable of meeting the mission requirements of each scenario. The capacity of India's amphibious force to self-deploy a fairly large number of ground vehicles directly onto an unprepared beach provides it a good ground-maneuver capability.

- Fires: We assess India's fires capability as very limited. Because the country lacks aerial fires support organic to the amphibious force, its fires would be limited to those provided by ground vehicles or ships themselves.

- Intelligence: We assess India as possessing adequate intelligence capabilities for the HA/DR and NEO scenarios. However, organic intelligence capability would fall short of the needs of a raid scenario because of a lack of dedicated collection and analysis functions.

- Logistics: We assess that India's logistics capabilities are sufficient for all scenarios, though limited by small-displacement ships and unclear capability to manage distribution of offloaded materiel.

    - Medical Support: We assess that India lacks both capability and capacity for medical support in its amphibious force. In the HA/DR and raid scenarios it would likely not be able to keep pace with expected casualties. In NEO, we assess it would be able to meet some needs, though not all.

- Force Protection: We assess India's force protection as sufficient for the HA/DR scenario. India's use of beaching landing ships is responsible for its poor rating in the raid scenario. Bringing such vessels ashore makes them potential targets even for a minimally equipped opposing force.

- Interoperability with the United States: India has extremely limited interoperability with the United States. It has developed much of its amphibious capability indigenously or with the support of Russian (and before that Soviet) forces, without regard to interoperability with the United States relative to most other countries examined in this study.

Japan

Table 4.5. Assessment of Japanese Amphibious Capability

JSDF			
	HA/DR	NEO	Raid
Command and Control			
Doctrine			
Maneuver			
Maritime Maneuver			
Aerial Maneuver			
Ground Maneuver			
Fires			
Intelligence			
Logistics			
Medical Support			
Force Protection			
Interoperability w/ United States			

As discussed in Chapter 3, Japan's impressive amphibious vessels belie an overall amphibious capability that is still being developed. The JSDF is able to put together an ad hoc amphibious group of roughly brigade strength, but this formation lacks joint amphibious doctrine and the specialized training of a designated amphibious unit. Furthermore, Japan's constitution places limits on the use of military force in scenarios other than the self-defense of Japan or an ally.

The Japanese government has clarified its position regarding the use of military units to support territorial integrity activities and expanded its cooperation with the United States; however, the JSDF still could not undertake the amphibious raid scenario. The lack of assessment is therefore a reflection of these constitutional restrictions, not a reflection of the JSDF's actual capability. Because of the political restrictions, the JSDF may not develop the tactics, techniques, and procedures for an out-of-area offensive mission. In the less stressing, permissive settings, the JSDF does relatively well in a material sense.

- C2: We assess C2 as a significant area of weakness for Japan. Both the ground and maritime self-defense forces, JGSDF and JMSDF, are working out service-specific issues relating to conducting the range of amphibious operations. Japan is still developing a fully joint operational and C2 structure for its amphibious operations.

    - Doctrine: Japan is in the early stages of its amphibious concept development. It is working closely with the United States on the development of its doctrine, but a final product is still some years away.

- Maneuver:

    - Maritime Maneuver: We assess Japan to be proficient in maritime maneuver because Japan operates modern U.S. equipment, in particular LCACs and AAV-7s, as their SSCs.

    - Aerial Maneuver: We assess aerial maneuver as good because Japan's amphibious fleet has the potential to support a sizable complement of aerial connectors. The capability is somewhat limited, however, because outside of mine-countermeasure and anti-submarine warfare helicopters, rotary wing aircraft are operated by the JASDF and JGSDF, and are not marinized.

    - Ground Maneuver: We assess ground maneuver capable of meeting most mission requirements. We expect Japan to be assessed as more capable in the future because Japan has only recently begun to take receipt of the AAV-7 amphibious assault vehicles. Once the full order is received, and as JGSDF and JMSDF familiarity with operating these vehicles grows, the study team expects this proficiency to increase.

- Fires: Japan's fires capability is adequate, though it will need to further demonstrate the capability of integrating JGSDF rotary wing aircraft into joint operations on JMSDF ships.

- Intelligence: We assess that Japan's organic intelligence capability in its amphibious force is generally capable of conducting limited organic collection and processing of intelligence from amphibious vessels.

- Logistics: We assess that Japan currently has limited real-world experience conducting logistical support operations necessary to support a range of amphibious missions. We expect that as Japan further develops its amphibious capabilities, this assessment will improve.

    - Medical Support: In general, Japan's amphibious forces do not deploy with a significant medical capability. We must note, however, that the *Izumo*-class destroyers provide more medical capability than is common for a ship of its size and will alter this assessment when fully integrated into the amphibious fleet.

- Force Protection: We assess Japan capable of providing maximum force protection in the HA/DR scenario because its sea-based connectors are highly survivable. We assess Japan capable of providing most force protection needs in a NEO scenario because of a limited capability to protect rotary wing aircraft operating in dispersed locations.

- Interoperability with the United States: We assess Japan as highly interoperable with the United States because its amphibious force trains with USMC forces stationed in Japan; it is adopting

many elements—from doctrine to tactics, techniques, and procedures—from the USMC; and Japan purchases much of its equipment from the United States.

The Philippines

Table 4.6. Assessment of Philippine Amphibious Capability

The Philippines			
	HA/DR	NEO	Raid
Command and Control			
Doctrine			
Maneuver			
Maritime Maneuver			
Aerial Maneuver			
Ground Maneuver			
Fires			
Intelligence			
Logistics			
Medical Support			
Force Protection			
Interoperability w/ United States			

The Philippines amphibious force was the least capable of the forces assessed in this study. Numerous countries have offered to partner with the Philippines on training or matériel improvements, including the United States, Japan, and Australia. The Philippines itself has prioritized improving its naval and amphibious capabilities in recent years. Together, these factors could be expected to improve amphibious operations; however, we anticipate that operating beyond the immediate Philippine archipelago will remain highly limited for some time.

- C2: We assess the Philippines to have insufficient C2 to lead response in any of the scenarios posited in this report. When the Philippines Navy commissions the *Makassar* vessels acquired from Indonesia, this will ameliorate much of the challenge related to afloat C2, though it will take some time to develop a well-trained human element for C2.
    - Doctrine: We assess the Philippines as having major doctrinal deficiencies, which in part can be attributed to the lack of overall capacity of the force. As the Philippines looks to

build out its amphibious force in the coming years, the matériel acquisitions will need to be linked to the development of amphibious doctrine.

- Maneuver:
    - Maritime Maneuver: We assess maritime maneuver as either orange or red for all scenarios. The capability of the Philippines LST to unload via a bow door provides a minimal necessary capability for amphibious operations, but the small size of its ships constrains its ability to provide sufficient personnel or matériel to effect a response for the HA/DR or NEO scenarios without assistance.
    - Aerial Maneuver: We assess the Filipino amphibious fleet as providing inadequate aerial maneuver. When delivered, the *Tarlac*-class and embarked aviation assets will provide some aerial maneuver capability.
    - Ground Maneuver: We assess the Philippines to have limited ground maneuver capability based on capacity limitations in the current fleet.
- Fires: We assess the Philippines to be unable to provide fires for amphibious operations.
- Intelligence: We assess the Philippines to have only a limited capability to collect and process intelligence from its amphibious vessels.
- Logistics: We assess that the scale of logistics support required for the HA/DR and NEO scenarios would exceed the capacity of the current Philippines amphibious fleet. The logistical requirements of a raid scenario are likely to be smaller, so the Philippines force would be able to meet some requirements.
    - Medical Support: We assess that the age and size of the Philippines amphibious vessels render it unable to meet medical support requirements for either the HA/DR or raid scenarios through organic amphibious capabilities. The expected lower demand from the NEO scenario could be met in some areas.
- Force Protection: We assess that the Philippines would be able to offer some level of force protection in the permissive HA/DR and NEO scenarios. The capabilities of the opposition force posited in the raid scenario would exceed the current force protection capabilities of Philippines amphibious forces.
- Interoperability with the United States: We assess that interoperability with the United States is somewhat lower than that of other U.S. partners, based on the capabilities of the Philippines assets and uneven readiness levels in the Philippines force.

Singapore

Table 4.7. Assessment of Singaporean Amphibious Capability

Singapore			
	HA/DR	NEO	Raid
Command and Control			
Doctrine			
Maneuver			
Maritime Maneuver			
Aerial Maneuver			
Ground Maneuver			
Fires			
Intelligence			
Logistics			
Medical Support			
Force Protection			
Interoperability w/ United States			

Singapore's amphibious force is composed of a single class of vessel, the *Endurance* class, which was purpose-built to leverage a high degree of automation. This allows Singapore to operate its vessels with a crew approximately half the size of similarly sized ROK vessels. Consistent with other parts of the Singapore Armed Forces, the amphibious forces are well-trained and Singapore remains capable of being a meaningful contributor in any of the scenarios posited. However, Singapore is limited in the capacity of its amphibious forces. The capacity limitations are reflected in it being assessed at a generally lower level. Notwithstanding these assessments, Singapore remains capable of being a meaningful contributor in any of the scenarios posited.

- C2: We assess Singapore's C2 as limited because its relatively small vessels do not possess robust afloat C2 capabilities.
    - Doctrine: We assess Singapore's doctrine as not fully formed, which in part can be attributed to Singapore's limited objectives and the largely conscripted nature of its force.

- Maneuver
    - Maritime Maneuver: We assess maritime maneuver as orange for all scenarios because Singapore's largest SSC has a maximum capacity of 18 tons. This significantly limits throughput and the types of equipment one can move over the beach.
    - Aerial Maneuver: We assess Singapore's aerial maneuver as limited because its amphibious vessels have limited capacity to embark or sustain rotary wing and aerial maneuver assets.
    - Ground Maneuver: Singapore is generally capable of conducting ground maneuver. It is able to deploy with a large number of ground vehicles and readily disembark them.
- Fires: We assess fires as unlikely to be successful in the raid scenario because of the lack of a dedicated aerial fire support platform. Singapore's amphibious forces, combined with its surface navy, provide some level of fires support. The sea-based, and if needed, shore-based fires to support a NEO would likely be sufficient for mission success.
- Intelligence: We assess Singapore's organic intelligence capability as generally able to meet requirements in the HA/DR and NEO scenarios. We assess it as less capable in a raid scenario, largely because of limited capacity for processing intelligence.
- Logistics: We assess Singapore's logistics capability as unlikely to achieve mission success in the HA/DR scenario. The size of Singapore's amphibious vessels makes it unlikely that it would be able to carry all necessary equipment to successfully deliver HA/DR support while sustaining the Singapore units providing assistance over a period of time. The logistical requirements of a NEO and a raid are much lower, and we assess that Singapore would be generally able to succeed in those two scenarios.
    - Medical Support: We assess Singapore as unable to meet the medical support need in an HA/DR scenario. Its amphibious vessels lack sufficient medical facilities to accommodate or treat the quantity of casualties expected in such a scenario. Singapore's medical support facilities would likely be highly stressed in both the NEO and raid scenarios as well, though they could probably provide a minimally necessary level of throughput.
- Force Protection: We assess Singapore as generally capable of force protection in the HA/DR and NEO scenarios. Singapore lacks a robust capability to provide force protection in the more stressing raid scenario.
- Interoperability with the United States: We assess Singapore as highly interoperable with the United States in an HA/DR scenario, due to common language and extensive exercising over a number of years. Interoperability decreases as the scenarios become more stressing, as Singapore's amphibious fleet is not primarily focused on undertaking such missions and the United States and Singapore have not routinely exercised together for them.

South Korea

Table 4.8. Assessment of Republic of Korea Amphibious Capability

ROK			
	HA/DR	NEO	Raid
Command and Control			
Doctrine			
Maneuver			
Maritime Maneuver			
Aerial Maneuver			
Ground Maneuver			
Fires			
Intelligence			
Logistics			
Medical Support			
Force Protection			
Interoperability w/ United States			

The ROK Marine Corps and Navy are a well-developed amphibious force that has benefited from close cooperation with the United States. Due to the realities of the Korean Peninsula—specifically the ongoing state of war that still exists between South Korea and North Korea—this cooperation is mostly focused on high-end amphibious entry operations.

At current levels of capacity and threat, it is unlikely that South Korea would dispatch sizable amphibious forces to an out-of-area contingency. However, should the security situation on the Korean Peninsula significantly improve, planned increases in South Korea's amphibious capacity could create a situation in which amphibious forces would undertake an out-of-area contingency.

- C2: We assess South Korea's capability as sufficient to fulfill necessary mission requirements. This assessment is based on overall levels of C2 of the ROK armed forces, which are still generally reliant on U.S. capability for specific elements.

- Doctrine: We assess that South Korea has a solid understanding of amphibious operations from consistent interactions with the United States, and it has a clear external forcing function for the development of amphibious capability. The ROK has not yet fully integrated air operations into its amphibious operations.

- Maneuver

  - Maritime Maneuver: We assess maritime maneuver for these scenarios as at the level of the United States across the board, operating comparable surface connectors across the ROK fleet.

  - Aerial Maneuver: We assess aerial maneuver below the United States in HA/DR and NEO due to a lack of naval aviation capacity and heavy-lift helicopters. The ROK is improving its aerial connectors with the addition of marinized Wildcat helicopters. The raid requirements are less stressing on aerial connectors. The ROK has exercised the use of land-based helicopters on-board ship, but its applicability to extended deployments is unproven.

  - Ground Maneuver: We assess ground maneuver at the same level of the United States for the raid scenario, which should not be surprising given the ROK's focus on high-end warfighting. Ground maneuver is assessed below the United States in HA/DR and NEO due to the smaller vehicle capacity of the ROK's amphibious force.

- Fires: We assess South Korea to be capable of providing necessary fires capability to conduct a NEO operation. However, its fires capability would likely be insufficient in a raid scenario because of a lack of fixed wing and helicopter aircraft organic to ROK Marine units.

- Intelligence: We assess ROK intelligence as capable of meeting most mission requirements in all three scenarios.

- Logistics: We assess ROK logistics capability as unlikely to provide all necessary mission requirements for HA/DR scenarios as a result of insufficient cube and square on its amphibious vessels for supplies. This is less of an issue in the NEO and raid scenarios as the logistics requirement are far less stressing.

  - Medical Support: We assess medical support as insufficient for all but the raid scenario due to a lack of capacity. For the raid scenario, the ROK Marines rely on embedded ROK Navy capabilities for medical treatment similar to the USMC.

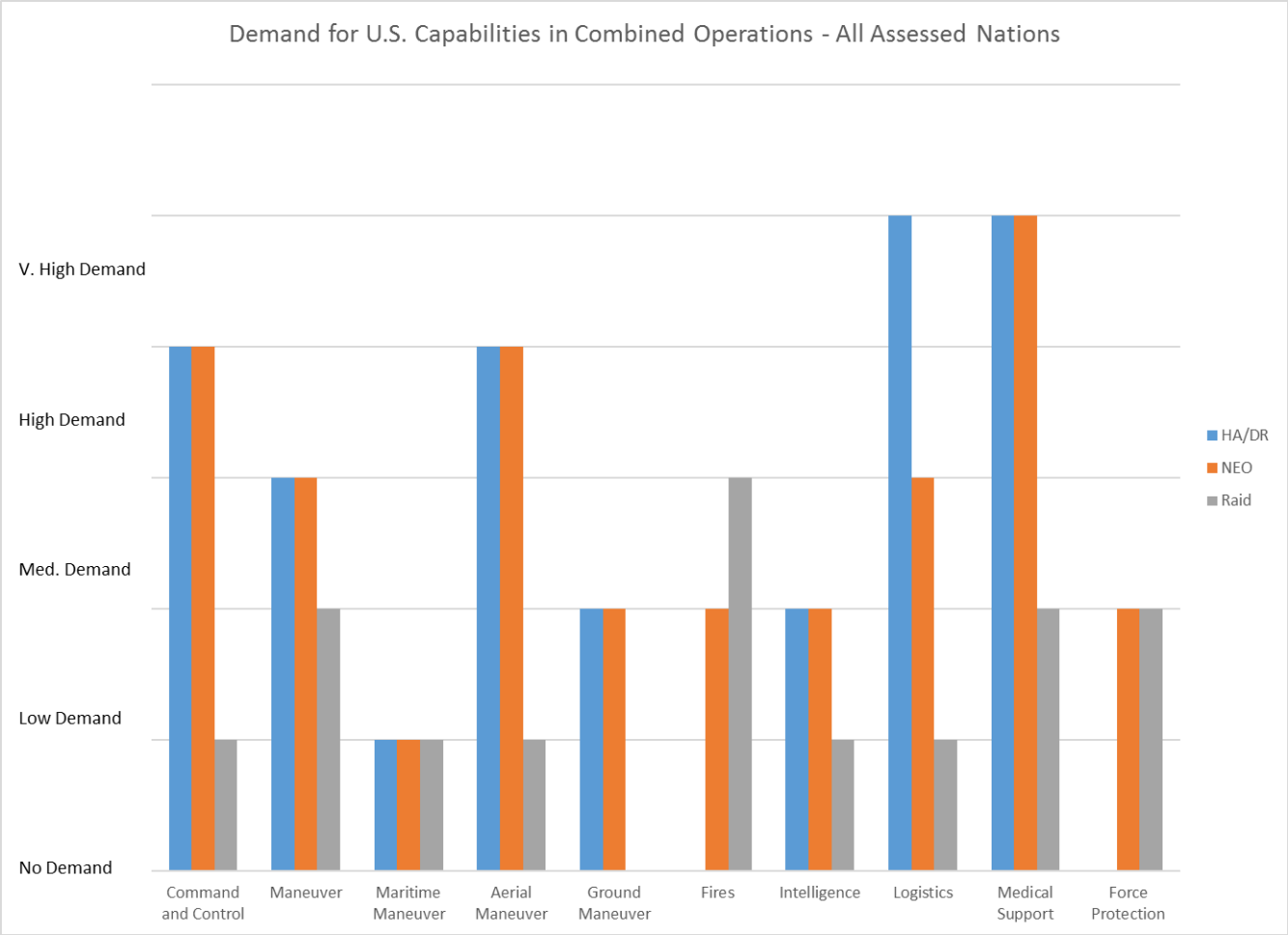
- Force Protection: We assess that ROK forces would provide sufficient force protection in all scenarios, though the current capability would be most stressed in the raid scenario due to the lack of high-capacity, high-water-speed surface connectors.

- Interoperability with the United States: We assess the ROK and the United States as highly interoperable, especially if the forces are integrated vertically rather than horizontally. Interoperability is a minor concern in the raid scenario due to spectrum and encrypted communications issues.

Implications for the United States

These shortfalls in allied and partner capabilities have implications for how the United States can most effectively work with these nations in combined formations. Figure 4.1 shows the demand for capabilities across all six nations included in the study. Across the board, the highest areas of demand—that is, areas where allies and partners need help from the United States—are medical support, logistics, C2, and aerial maneuver.

Figure 4.1. Demand for U.S. Capabilities in Combined Operations—All Assessed Countries



Medical support was an area that the team expected to be in demand at the outset of this analysis. Some of the most capable afloat medical facilities, short of dedicated hospital ships, are located aboard big deck amphibious assault ships. This can be attributed in part to their design as flagships for a larger amphibious force and their sheer size, which provides space for significant medical spaces. Experience from past HA/DR operations has demonstrated the high demand for this U.S. capability.

Logistics support is another area where the United States is clearly the global leader and where the expectation is for the United States to shoulder the majority of the burden. In the scenarios where logistics was a major factor in mission success, the U.S. ARG/MEU is substantially more capable than other nations' fleets. This imbalance grows when U.S. alternative platforms and the MPRSON are added

to the analysis. This demand is unsurprising given the sheer capacity difference at play. For example, a U.S. ARG/MEU displaces over 90,000 tons at full load. Australia's comparative formation, the second most capable in Asia, displaces around 70,000 tons at full load, and all three of Japan's *Osumi*-class LPDs displace 42,000 tons at full load.

C2, although in high demand, is challenging to partners and allies. Issues of classification, radio and computer system compatibility, language barriers, and different organizational structures all make providing command and control in combined operations difficult. These issues may be partially mitigated through bi- and multi-lateral engagements that enable familiarization, bridge technical shortcomings, and inform commanders of potential organizational mismatches.

Aerial maneuver is another challenging capability to provide because the aerial connectors most in demand, primarily heavy-lift helicopters such as the CH-53 family, operate on a limited number of naval vessels due to their weight. Several of the nations assessed in this study operate variants of the C/MH-47 Chinook, which carries slightly more payload than the V-22 and approximately two-thirds of the payload of the current CH-53E. However, these C/MH-47s are not marinized, a limitation that will slow their operational tempo. In addition, only Australia and South Korea operate full deck amphibious warships with significant aviation capabilities. If the United States provides these capabilities, it will have to deploy dedicated amphibious assets. However, the USMC has been working with regional allies on V-22 interoperability from a range of naval assets. These efforts may decrease the requirement for the United States to source an amphibious platform in support of aviation support requests.

Figure 4.2. Demand for U.S. Capabilities in Likely Combined Operations

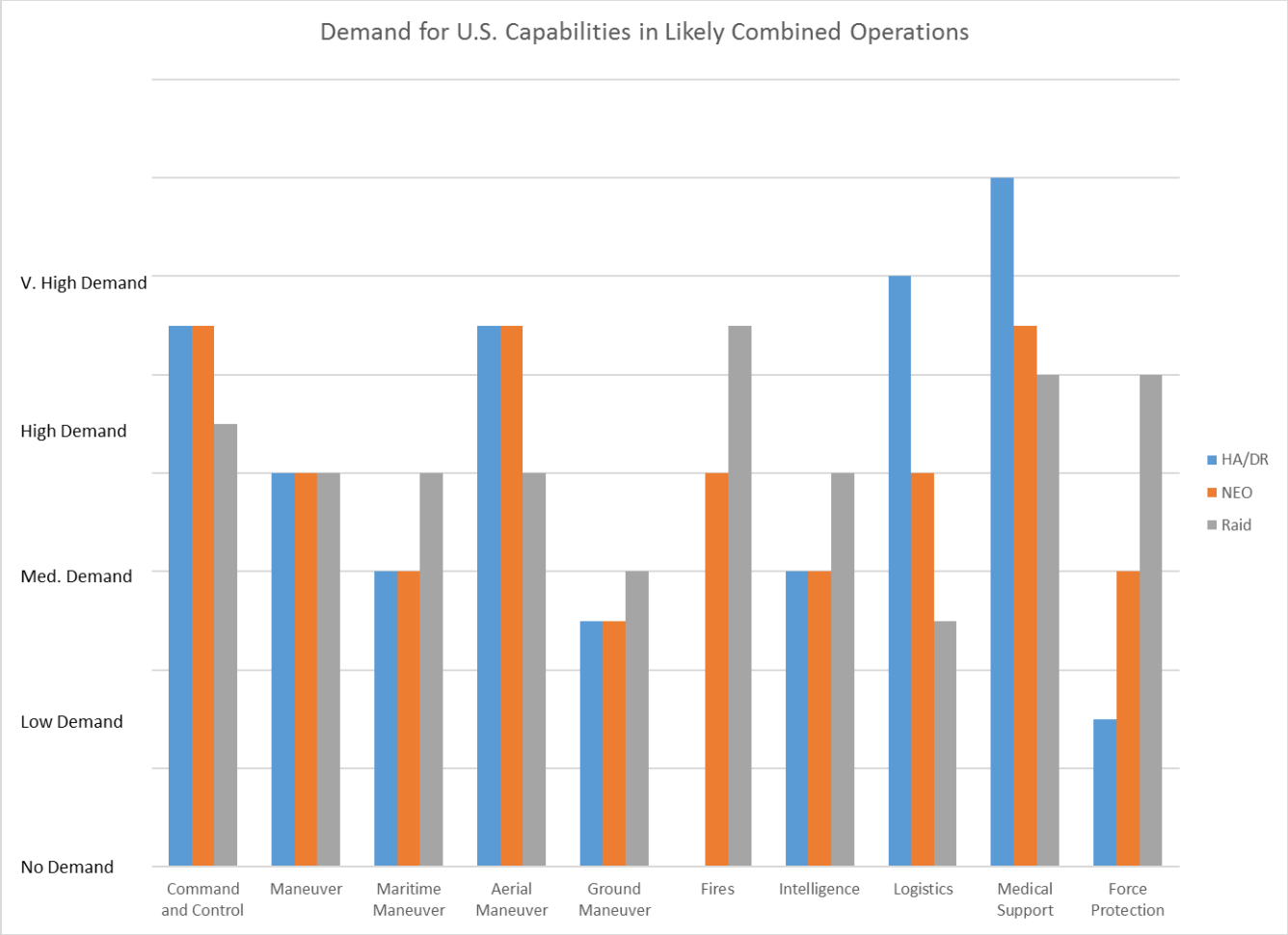


Figure 4.2 shows demand for U.S. amphibious capabilities for those regional allies with which the United States has the closest military-to-military relationships: Australia, Japan, and South Korea. The demands from these nations are different from those identified in Figure 4.1 as each is more capable in conducting a raid. However, each nation will likely still require U.S. support in core enabling areas such as C2 and logistics.

In addition, the technical complexity of supplying some of these capabilities may be significantly higher. For example, the United States may need to support one of these nations with certain intelligence collection capabilities such as an unmanned aircraft. This aircraft would need to be interoperable with an ally's intelligence and C2 functions, which is more complex than the United States providing C2 and intelligence capabilities as a discrete function. In addition, the United States would need to have a prepared deployable force package. At present, the Marine Corps does not have these sub-MEU-level deployable capability sets. The need to augment these allies with a high level of capabilities may require new deployable capabilities and, in certain cases, may call for bespoke task-oriented solutions.

5 Meeting the Demands

To meet COCOM demands for amphibious forces as well as emergent allied and partner demand for U.S. amphibious capabilities, the Navy and Marine Corps may need to make changes to their processes and organizations as well as potentially alter the structure and composition of the amphibious fleet. The study team offers options along both lines. In some instances, it would be impossible to fully leverage Navy force structure changes without altering Marine Corps processes and organizations.

Better meeting COCOM engagement and crisis response demands is vitally important for building regional capability and furthering U.S. interests. In PACOM, amphibious forces are one of the most visible signs of U.S. commitment to the region. Marine Corps HA/DR response missions are an exceptional soft power tool. The United States may be able to work with close allies in the region to grow their capacity in order to share some of the amphibious demands. However, as argued previously, these allies will likely continue to rely on the United States for certain amphibious capabilities. The U.S. experience with building truly interoperable capabilities within NATO should serve as a cautionary tale for those who believe that the United States will be able to fully transition certain amphibious missions to allies.

Options for Process and Organizational Adjustments

The Navy and Marine Corps may need to adapt their organizations and processes in order to maximize their efficacy in planned engagements with allies and partners over the long term—increasing task orientation where possible and modifying the Marine Corps force generation process to best leverage alternative platforms. Protecting the Marine Corps' core warfighting capabilities is paramount, creating challenges for implementing some changes that could improve partner opportunities.

Options for Planning

The easiest of the three process adaptations to implement is improvements to the Marine Corps' planning and liaison work with allies and partners to ensure that the relationship is providing maximum value for both sides.

Some nations do not appear to have improved their amphibious capabilities and competencies despite a long history of engagement with the United States. While there is an element of political will involved in these prospective improvements, the United States should ensure that its amphibious exercises are building partner capability along a long-term roadmap. These individualized roadmaps should consider how bi- and multi-lateral exercises will further that partner's capabilities to operate independently and, with the United States, to undertake progressively more difficult challenges.

An important step in achieving this long-term roadmap is to place a USMC exchange office directly in the partner-nation's military. Not only can these officers serve as powerful interlocutors with U.S. visiting forces and the COCOM staff, they can also provide a readily available wealth of knowledge on amphibious matters, which can help a partner-nation sustain momentum in developing its indigenous amphibious capability. Such a constant presence can help overcome the "cargo cult" nature of annual or biannual U.S. exercises where temporary excitement and interest does not translate into sustained improvements.

Options for Organizations

The Navy and Marine Corps recognize the inherent tension between how the force is used and how it is designed. A full ARG/MEU is too much force for many of the most commonly performed day-to-day, phase 0 activities. It is too little force for most, if not all, of the stressing, high-end scenarios in PACOM. The Navy and Marine Corps have adapted to this misalignment between the ARG/MEU and its most common missions by operating in split and disaggregated fashions. In addition, the services are considering how to best use alternative platforms such as the T-AKE and EPF to meet many demands in the region, especially as they pertain to partners. Experiments with alternative platforms have also included considering how these vessels may be used in a supporting role in high-end entry operations.[159] Both the Navy and Marine Corps should be lauded for their current efforts at maximizing their combined capabilities.

For these reasons, General Joseph Dunford, the then Marine Corps Commandant, commented that the Marine Corps is having to make changes to its organizational construct and associated equipping and training.[160] One radical change the Marine Corps could consider is a restructuring of the MEU. A restructured MEU might have a larger logistics element offset by a smaller GCE. Heavy warfighting equipment, including tanks and artillery, would be removed. This new MEU would be task-oriented for engagement and low-threat crisis response, primarily HA/DR. It would trade some of the MEU's deterrent value for overall increases in capacity at the low end of the range of military operations. In addition, it may be easier to operate such an MEU in a disaggregated manner if the size of the Command Element and Navy's Fleet Surgical Team were similarly increased.

The downside to such a radical restructuring is that it creates a new unit composition that would require changes to the force generation cycle to support. This new MEU does not have the traditional warfighting capabilities of the traditional MEU nor the deterrent value of particular use in Northeast Asia.

A less radical option that still increases the ability of the Marine Corps to work with partners by fully leveraging alternative platforms would be to create either a standing or rotational SP-MAGTF for PACOM. This formation would be task organized to work with distributed alternative platforms in the PACOM AOR and would be additive from a command structure perspective, but would likely draw on existing I MEF forces. WESTPAC (Western Pacific) SP-MAGTF could fully maximize the promise of alternative platforms by allowing Marines to cross-deck with multiple Expeditionary Support Ships (ESS) and MPF vessels and better respond to partner training requests and some contingency operations. This would be in addition to the existing PACOM Air Contingency MAGTF that provides a rapidly deployable, joint task force certified C2 capability.

A SP-MAGTF-CR-WESTPAC could cover a sizable portion of partner engagements and potentially serve as an initial crisis response force. A WESTPAC SP-MAGTF would likely be structured around a company-sized ground combat element with robust C2 and logistics enablers. As part of the WESTPAC unit, the Marine Corps would need to explore the potential for rapidly deployable logistics and command

[159] Megan Eckstein, "3rd Marine Division Experimenting with Using MSC Ships in Higher Level Operations," *USNI News*, January 12, 2016, https://news.usni.org/2016/01/12/3rd-marine-division-experimenting-with-using-msc-ships-in-higher-level-operations.

[160] Megan Eckstein, "Dunford: Marines Must Fundamentally Rethink Deployment Strategies, Training," *USNI News*, June 25, 2016, https://news.usni.org/2015/06/25/dunford-marines-must-fundamentally-rethink-deployment-strategies-training.

elements. Leveraging self-deploying V-22s, a company-sized element could cover approximately 3 million square miles without in-air refueling. This translates into an area stretching from roughly Okinawa in the north to the Celebes Sea in the south with the center over Manilla.

An example of a task-organized HA/DR response by the United States, enabled by the V-22, was the Nepal earthquake response and the initial stages of Operation Damayan. In both cases, the Marine Corps quickly moved forces to the affected areas via V-22 with KC-130 tanker support. The downside of this option is that, barring nearby amphibious or MPF ships, the Marines of the SP-MAGTF will not have access to the heavy engineering or logistics equipment necessary for most HA/DR missions. This could be mitigated by working toward rapid airfield opening, but this approach then stresses USAF airlift assets. Chapter 1 posited that there may be 450 ship/days of allied and partner engagement demand. If this concept could meet between a quarter of this demand, it would buy back 112 days of L-class ship availability in PACOM.

The SP-MAGTF WESTPAC concept increases planning complexity as it necessitates having ESS and MPF ships in the right places at the right times to support its activities. This requires additional time and space variables for planners and increases the overall points of friction in the system. This concept also has force generation implications as it requires additional forces to be provided at a high state of readiness. In the current fiscal climate, it is unlikely, especially given the exceptionally high demand for USMC aviation capabilities. There are creative alternatives that would use charter aircraft to bring Marines onboard distributed alternative platforms during foreign port calls. This option brings its own political and operational drawbacks such as the need for clearance by foreign governments and appropriate air and seaports nearby.

Options for Concepts of Operation and Employment

A concept that links air mobile Marine forces with ESS and MPF ships could also be implemented on a smaller scale with more of a focus on capabilities in demand by allies and partners. For example, elements of a MEU Command Element could be flown onto a T-AKE equipped with an expanded C2 module to support a combined operation. A similar idea would have modular surgical capabilities added to either a T-AKE or ESB. This would allow a Fleet Surgical Team to rapidly deploy to a forward facility other than an amphibious assault ship or forward field hospital. These tailored approaches directly address the partner capability needs identified in the assessment chapter.

The main drawback to this concept is that there is a limited pool of capabilities. In addition, it may be challenging to make some of these capabilities, especially C2, air deployable. This second issue may be solved if alternative platforms were already equipped with necessary C2 equipment to support a fly-in Command Element. The limiting factor to this workaround is cost.

Another way to make better use of ESS and MPF ships would be to have the Military Sealift Command (MSC) alter its manning concept to increase the ships' availability. ESS and MPF ships have a much higher availability than battle force ships and also rely on civilian mariners. The standard tour for a MSC civilian is four months; however, tours can be voluntarily extended and ships often deploy for longer than their crew's tour.

The Navy could reduce ESS and MPF downtime by conducting foreign port or in-stream crew swaps. If funding were made available, these vessels, especially those built to commercial cargo standards, might

be able to steam almost continuously. Continuous operations would allow for Marine forces to use these vessels as roving bases throughout the AOR.

The drawback of hot swapping crews to maximize ship availability is high cost. Current operations budgets do not support the robust funding of MSC ships necessary make this concept viable. In-stream crew swaps also raise familiarization challenges as the crews must seamlessly transition roles while ensuring continuity of ship operations.

Forward stationing of these vessels would reduce their transit times to likely deployment areas. At present, there are MPSRONs with T-AKEs and ESDs (planned) at Guam and Diego Garcia. Moving two to three MPF vessels from Guam to South/Southeast Asia and/or forward basing EPFs in the region would provide more capacity for HA/DR response and partner engagements.

Options for Force Structure Changes

Another approach is to alter the force structure of the amphibious fleet to expand U.S. capabilities in the areas of highest partner demand without sacrificing warfighting capability. The study team developed five such options. As an illustrative force structure baseline, all of these options use the current 34-ship objective amphibious force (11 LHA/LHDs, 12 LPDs, and 11 LSDs), a 15-ship expeditionary support fleet (11 EPF, 2 ESD, and 2 ESB), and a 12-ship MPF. The options are summarized in Table 5.1 and Figures 5.1 and 5.2, and discussed in detail in the subsequent sections. The options are:

1. Increase the L-class amphibious force to 38 ships.

2. Increase the L-class amphibious force to 38 ships, but build small LSDs.

3. Improve the ability of ESS/MPF ships to support the traditional amphibious force ("L"-class ships).

4. Create a Fleet Station Force (FSF).

5. Expand procurement of enhanced ESS ships.

For each option, the team provides a cost estimate, an assessment of what capability areas that option provides for combined operations, and an assessment of the option's ability to enhance U.S. capabilities across the range of military operations.

The team developed a cost model that allowed it to compare total force costs including O&M over a 20-year period on a rough order of magnitude basis. (See Appendix 2 for a full description of this cost-analysis tool.) Costs are rated as being low, $0 to $5 billion above baseline; medium, $5 billion to $10 billion above baseline; high, $10 billion to $15 billion above baseline; or very high, $15 billion+ above baseline. These are total costs over a 20-year period.

The team also assessed how the formations relate to the likely partner demands identified in a previous section. The team did not compare the total capacity added by each option; rather, the team considered how each option delivered a specific capability.

Table 5.1. Options for Force Structure Changes

	Value for Partner Engagement	Cost	Pros	Cons
Option 1: Increase the L-Class Amphibious Force to 38 Ships	• Command & Control (C2) • Maneuver • Fires • Intelligence • Logistics • Force Protection • More platforms for engagement	Very High ($15 billion+)	• Increases amphibious capacity in all scenarios • Greatest relevance for contested operations	• High procurement cost relative to other options • Little increase in availability of high-demand capabilities for C2 and medical
Option 2: Acquire Small LSDs	• Maneuver • Logistics • More platforms for engagement	Medium ($5–10 billion)	• Increases amphibious capacity in most scenarios • Low cost offset for loss of well deck in Flight 0 LHA • Provides same number of ships as option 1 but at less cost	• Potentially challenging procurement process • Does not increase availability of high-demand capabilities such as C2 and medical
Option 3: ESS/MPF Enhancement	• Command & Control • Maneuver • Logistics	Low ($0–5 billion)	• Increases capability of alternative platforms especially in areas of high partner demand • Corrects several identified weaknesses with existing platforms • Low cost	• Least relevant in a stressing conflict scenario of any option considered • May require a WESTPAC SP-MAGTF and structural adjustments of USMC force generation to properly leverage
Option 4: Create a Fleet Station Force	• Command & Control • Maneuver • Intelligence • Logistics	High ($10–15 billion)	• Creates new options for force employment optimized for low-end partner demand • Greatly improves the utility of follow-on logistics support for forcible entry	• Long and challenging procurement process • Requires significant changes to USMC force generation and employment

	• More platforms for engagement			
Option 5: Expand Enhanced ESS Buy	• Command & Control • Maneuver • Logistics • More platforms for engagement	High ($10–15 billion)	• Increases capability of alternative platforms especially in areas of high partner demand • Allows E-class ships to operate independently of L-class vessels	• Potentially high operational costs • May require a WESTPAC SP-MAGTF and structural adjustments of USMC force generation to properly leverage

Additionally, the team considered how each option would augment the Navy's and Marine Corps' capabilities across the range of military operations. The team considered, in ascending order, Building Partnership Capacity (BPC) (low intensity), HA/DR, BPC (high intensity), NEO, raid, and forcible entry scenarios. Figures 5.1 and 5.2 compare the L-class options (options 1 and 2) and the E/T-class options (options 3–5) on separate charts for clarity. These ratings use a 0 through 4 scale, where 0 indicates no added capability for a given operation and 4 indicates significant added capability. The low rating for option 1 in low-intensity BPC is due to the fact that large amphibious ships may not be the best tool for low-level engagements. The lower ratings for option 2 in raid and forcible entry are due to their less robust aviation facilities and commercial build.

Figure 5.1. Added Capability across the Range of Military Operations—L-Class Options

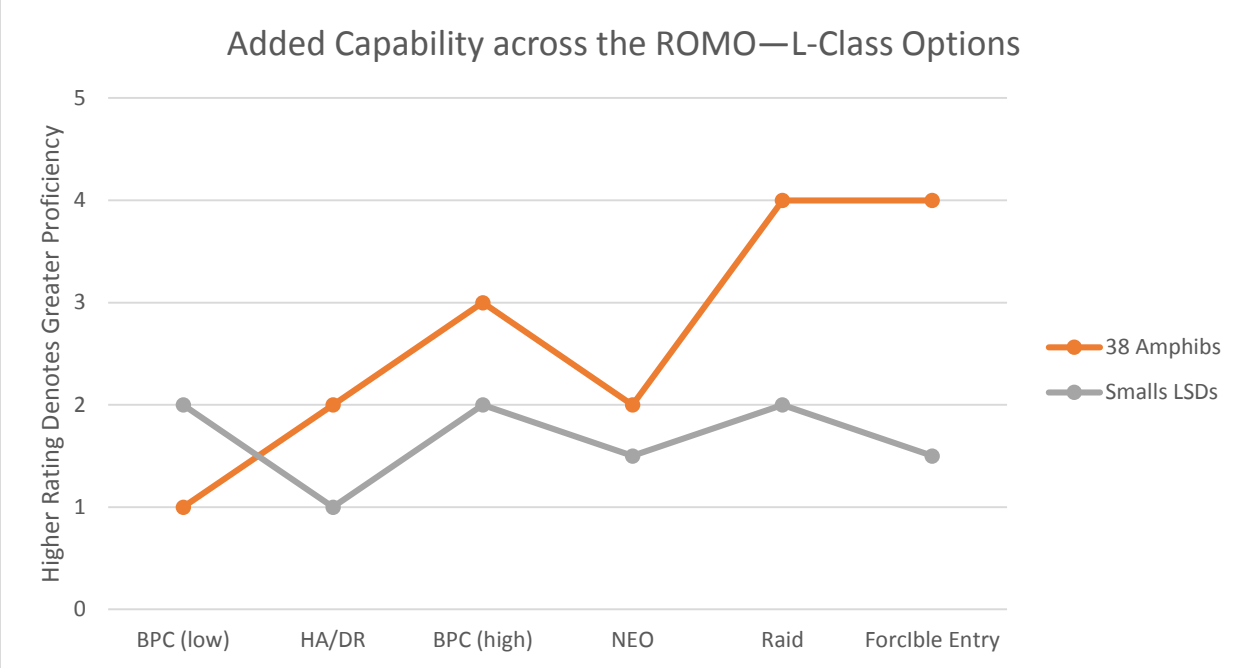
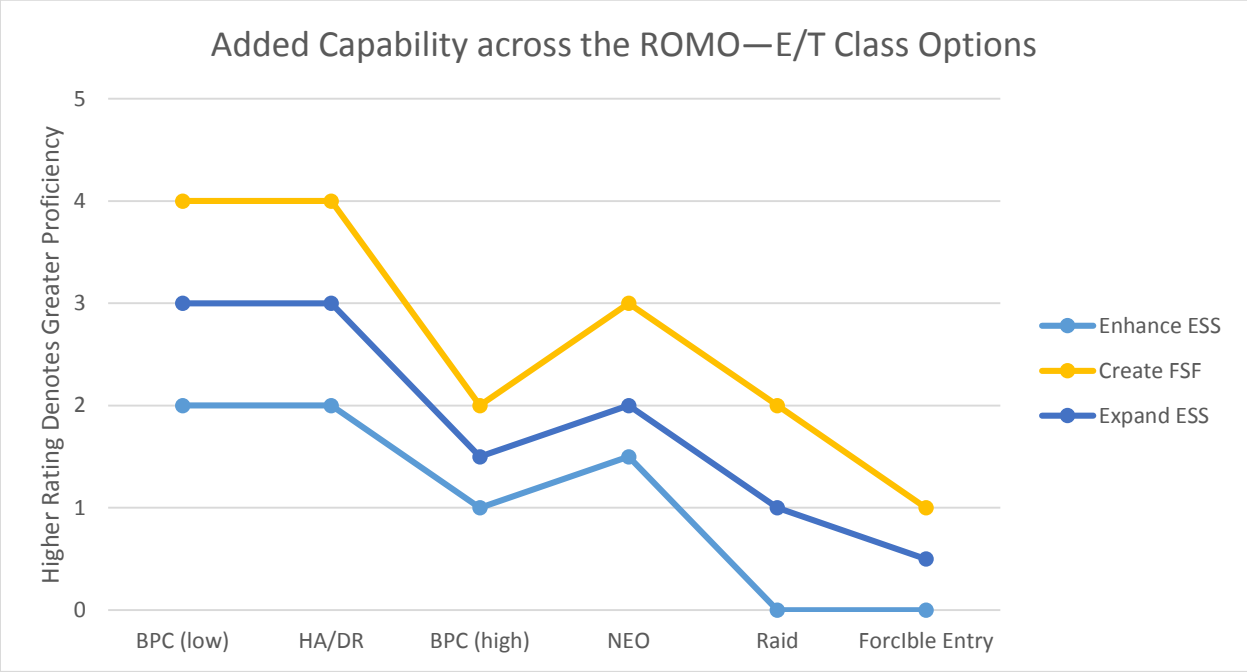


Figure 5.2 shows that the capability enhancements offered by options 3 through 5 roughly correlate with how expensive each option is. Option 4, the most expensive of the three in the team's cost model, performs the best especially in engagements at the lower end of the range of military operations. In

addition, it maintains some relevance for forcible entry operations as a follow-on, sea-based logistics force. The other options more or less follow the pattern established by option 4.

Figure 5.2. Added Capability across the Range of Military Operations—E/T-Class Options



Option 1: Increase the L-Class Amphibious Force to 38 Ships

Amphibious Force	
LHA/LHD	12
LPD	12
LSD	14

Expeditionary Support Ships	
EPF	10
ESD	2
ESB	3

Maritime Prepositioning Force	
T-AKR	5
T-AKE	2
T-AK	5

What the Option Does

This option increases procurement of the traditional amphibious warships and maintains a force of 38 amphibious vessels over the long term: 12 LHAs/LHDs, 12 LPDs, and 14 LSDs. The current shipbuilding plan reaches 38 amphibious warships in only one year (2028). This option would meet the full wartime requirement of 38 ships for an extended period.

The larger number of ships increases the capacity of the Navy and Marine Corps team to meet growing, geographically dispersed demands, not just in the Asia Pacific but globally as well. This would give the United States the most robust amphibious force of any of the options considered. By building amphibious warships, it increases capacity not just for engagement but for high-end scenarios as well. However, to fully employ the increase in total ARGs would require a larger Marine Corps and/or adverse changes to the deploy-to-dwell ratio, so secondary effects need to be considered.

In addition, this force may not be able to meet all of the requirements associated with the new normal of split and disaggregated ARG operations. Although the option has more ships that are more capable, the current ship designs do not reflect the requirements of split or disaggregated operations. For example, LPDs and LSDs may not have the necessary C2 and aviation facilities when separated from a LHD/LHA. The Marine Corps and Navy are aware of these challenges but in some instances, especially with regards to LSD aviation capacity and capability, there are no easy solutions.

What the Option Costs

Very High ($15+ billion over baseline)

The greatest downside to this option is its high cost. In the study team's costing model, the procurement cost is $10 billion more than the baseline. This force also requires additional operations and support funding to sustain the ships.

How the Option Helps Partner Countries

C2	Maneuver	Fires	Intelligence	Logistics	Force Protection
X	X	X	X	X	X

How the Option Enhances U.S. Capabilities

BPC (low)	HA/DR	BPC (high)	NEO	Raid	Forcible Entry
1	2	3	2	4	4

(0 = no enhancement, 4 = most enhancement)

Option 2: Increase the L-Class Amphibious Force to 38 Ships, but Build Small LSDs

Amphibious Force	
LHA/LHD	11
LPD	12
LSD	11
LSD (Small)	4

Expeditionary Support Ships	
EPF	10
ESD	2
ESB	3

Maritime Prepositioning Force	
T-AKR	5
T-AKE	2
T-AK	5

What the Option Does

This option would augment the 34-ship structure with four small LSDs of a new design. The "small" designation is relative. Although smaller than the planned LXR (20,000+ tons), they are envisioned as roughly 15,000-ton ships and based conceptually, if not actually, on existing European designs such as the Spanish/Dutch *Enforcer*.[161] The benefit of this approach is added capacity at lower cost. However, because this is an off-the-shelf design, some characteristics, desirable in a custom design, would be lost. In a more stressing scenario, these small LSDs would likely have to be used in lower threat areas or after the initial phase of operations. These restrictions arise because the *Enforcer* design is built to commercial standards.[162] Other non-U.S. designs, such as the French *Mistral*-class, are also built to a less robust specification than U.S. counterparts.[163]

These small LSDs would give the commander additional options for sourcing low-end amphibious demands. There are many engagement activities for which even a single amphibious warship of present design is overkill. Having a greater diversity of assets would allow the Navy to more appropriately match amphibious ships to mission need. In turn, this would permit the more capable amphibious warships to

[161] "Rotterdam Class Landing Platform Dock (LPD)," *Naval Technology*, accessed April 13, 2016, http://www.naval-technology.com/projects/rotterdam/.
[162] "Enforcer Series amphibious support ships," *Global Security*, accessed April 13, 2016, http://www.globalsecurity.org/military/world/europe/enforcer.htm.
[163] "Our View: The Mistral Amphib Is a Goldmine of Good Ideas," *Defense News*, February 5, 2012.

focus on deterrent activities and training with highly capable partners. This concept for a small LSD has been described in previous studies that have considered overall fleet composition.[164]

What the Option Costs

Medium ($5 billion–$10 billion over baseline)

Existing designs suggest that such vessels could be acquired for about one-half to one-third the cost of an LPD-17 or between $530 and $850 million per vessel.

How the Option Helps Partner Countries

C2	Maneuver	Fires	Intelligence	Logistics	Force Protection
	X			X	

How the Option Enhances U.S. Capabilities

BPC (low)	HA/DR	BPC (high)	NEO	Raid	Forcible Entry
2	1	2	1.5	2	0

(0 = no enhancement, 4 = most enhancement)

[164] Robert O. Work, *The US Navy: Charting a Course for Tomorrow's Fleet* (Washington, DC: Center for Strategic and Budgetary Assessment, 2008), 76–81.

Option 3: Improve the Ability of ESS/MPF Ships to Support the Traditional Amphibious Force ("L"-Class Ships)

Amphibious Force	
LHA/LHD	11
LPD	12
LSD	11

Expeditionary Support Ships	
EPF-E	10
ESD-E	2
ESB	3

Maritime Prepositioning Force	
T-AKR	5
T-AKE	2
T-AK	5

What the Option Does

This is the lowest-cost option. It does not acquire any new vessels. Instead, it enhances the alternative platforms to make them more usable for peacetime engagement and expeditionary operations. The capabilities it adds to the E-class vessels are highly relevant to the likely demands on U.S. forces operating in a combined manner. It also increases operational funding for the ESS and MPF ships to support an enhanced operational tempo. This may "buy back" availability of L-class ships, allowing them to be aligned against more stressing requirements.

This option includes accelerating development of the advanced mooring systems for the ESD and other MPF vessels. This technology permits the at-sea mooring of the ESD and another vessel in a greater range of sea states with a minimum of personnel. If fielded, it would improve the in-stream offloading capabilities of the ESD and, by extension, the MPSRON.

With regard to the EPFs, the most pressing deficiency is the weakness of its ramp.[165] This option would therefore strengthen the EPF ramp, giving it the ability to interface with other vessels above Sea State 1. Ramp improvements would also give the EPFs the ability to launch amphibious assault craft (AAVs or ACVs) directly into the water.[166] This change would allow the EPFs to support basic amphibious training with nations that have less well developed amphibious capabilities.

ESDs would be modified to give them the ability to interface with and transport LCUs. This modification would allow ESDs to offload MPF vessels directly, as at present they do not deploy with their own connectors.[167] This is a major limitation in realizing the full potential of these vessels. The original concept for the MLP was a vessel with six LCACs, but the design was downscaled to meet cost limitations. Restoring the ability of these vessels to carry connectors would more fully support distributed logistics and enhance the operationalization of the MPF assets. This option would not fund

[165] Megan Eckstein, "DOT&E: JHSV Effective at Intra-Theater Transport but Challenged in Other Missions," *USNI News,* October 16, 2015, https://news.usni.org/2015/10/16/dote-jhsv-effective-at-intra-theater-transport-but-challenged-in-other-missions.
[166] U.S. Marine Corps, "Connector Summit Results—Way Ahead Seabasing OAG," PowerPoint presentation, July 22, 2014, http://www.mccdc.marines.mil/Portals/172/Docs/Seabasing/Documents/2.9Connectorswebsite.pptx.
[167] *Expeditionary Force 21, Forward and Ready: Now and in the Future* (Washington, DC: Department of the Navy, 2014), http://www.mccdc.marines.mil/Portals/172/Docs/MCCDC/EF21/EF21_Capstone_Concept.pdf.

the addition of full support facilities for LCACs because this would require significant and costly modifications of the ESD's core capability set.

T-AKEs have already been used as alternative platforms to give the Navy and Marine Corps team more capacity. This option would fund a number of mission modules for the T-AKE that would give it more robust C2 capabilities as well as increased berthing spaces. With these enhancements, the vessel could host a small Marine Corps detachment as well as provide C2 facilities for combined forces.[168] The capabilities would be extremely useful in situations where the United States is working alongside allies and partners. As the study has shown, C2 and logistics capacity are two areas where allied and partner forces have limitations.

This option would also have the Navy lease a portion of the Army's fleet of *Frank S. Besson*–class LSVs These vessels represent an underused amphibious resource. Despite being classified as LSVs, these 5,000-ton ships are functionally LSTs. They could be used to support exercises where larger amphibious warships would overwhelm the capacity of the partner-nation. They could also help increase the lift of maritime connectors in various contingency scenarios especially when MPF vessels are activated.

The primary drawback of this option is that it does not increase the number of hulls beyond the LSV realignment. The improvements to alternative platforms and increased operational funding for these vessels will permit slightly increased presence but will not increase capacity.

What the Option Costs

Low ($0–$5 billion over baseline)

These changes can be achieved relatively cheaply. This option does not add any new vessels and therefore does not introduce significant increases in operations or personnel costs. The additional funding for this option goes to the ship modifications as outlined, increased operational funding for MPF vessels, and slight increases to total personnel associated with upgraded E-class platforms.

How the Option Helps Partner Countries

C2	Maneuver	Fires	Intelligence	Logistics	Force Protection
X	X			X	

How the Option Enhances U.S. Capabilities

BPC (low)	HA/DR	BPC (high)	NEO	Raid	Forcible Entry
2	2	1	1.5	0	0

[168] *Annual Report for Program Objective Memorandum 2017: Seabasing*; Leed, McCreary, and Flynn , *Advancing U.S.-Australian Combined Amphibious Capabilities.*

(0 = no enhancement, 4 = most enhancement)

Option 4: Create a PACOM Fleet Station Force (FSF)

Amphibious Force	
LHA/LHD	11
LPD	12
LSD	11

Expeditionary Support Ships	
EPF-E	10
ESD-E	2
ESB	3
ESD-L	1
ESB-L	1

Maritime Prepositioning Force	
T-AKR	6
T-AKE	3
T-AK	5

What the Option Does

This option adds nontraditional hulls to increase the capability and capacity of the total force at lower cost than adding "L"-class ships. It builds on concepts developed for the canceled Maritime Prepositioning Force (Future) program. The goal of MPF(F) was to deploy a robust, operational prepositioning squadron that could support multiple MEBs in a full-scale contingency operation using sea-based logistics that would limit the ashore footprint of a U.S. force.[169] The defining characteristic of the original MPF(F) concept, massive lift coupled with substantial amphibious and airborne connectors, could be adapted to support activities lower on the range of military operations.[170] The FSF is a formation optimized for engagement, HA/DR, and maritime security, but retains utility as a follow-on force in a major amphibious operation.

This option includes all of the enhancements in option 1. In addition, the Navy would acquire two new vessels based on commercial designs as well as an additional T-AKR and T-AKE. The new design vessels would be larger versions of the current ESBs and ESDs. The notational ESB-Large (ESB-L) would be a converted New Panamax[171] cargo vessel with substantial aviation and C2 capability and with spaces to support a fly-in medical capability on par with present LHDs. Such a vessel could also have relatively robust cargo capability and, given its commercial design, could be crewed by a small number of civilian mariners. To give some sense of scale, New Panamax vessels max out at 120,000 tons. The new ESD-Large would be slightly smaller, given its specialized nature, but it would have three to four organic surface connectors and berthing spaces for approximately half the personnel associated with an MEU's GCE.

This new FSF would then be a five-ship squadron comprised of an ESD-L, ESB-L, the congressionally added 12th LPD-17 as the command ship, a T-AKE, and a T-AKR. This formation would not normally operate together. Instead, all of the vessels except for the T-AKR would normally operate independently to meet geographically dispersed missions, especially for partner engagements. Bringing two or three of the vessels together would give the commander a powerful force with a capability and capacity exceeding that of a traditional ARG for some missions, especially at the low end of the range of military

[169] Button, *Maritime Prepositioning Force (Future) Capability Assessment.*

[170] Button, *Maritime Prepositioning Force (Future) Capability Assessment.*

[171] "New Panamax" vessels fit through the new Panama Canal locks. This increases the maximum dimensions of vessels able to transit the canal by more than 25 percent for length and more than 50 percent for width compared with the old locks. The new canal locks are estimated to be complete by mid-2016.

operations. The embarked equipment sets aboard the T-AKE, T-AKR, and ESB-L would be oriented toward engagement missions, crisis response, and low intensity conflict. This option would ease the burden of day-to-day demands on the traditional amphibious force.

What the Option Costs

High ($10 billion–$15 billion over baseline)

Costs for the T-AKE and TAK-R are known. Costs for the ESD-L and ESB-L are rough estimates based on existing analogous ships.

The new ship designs may be too large to be built in an existing U.S. yard,[172] which adds another layer of complexity to this option. There are U.S. allies with the ability to produce such a vessel relatively cheaply that could then be fitted out in a U.S. yard. The United States could also retrofit an existing hull in a U.S. yard. This may be extremely affordable given potential oversupply in commercial shipping.[173] As with the small LSD option, this one brings with it a host of issues about domestic production.

How the Option Helps Partner Countries

C2	Maneuver	Fires	Intelligence	Logistics	Force Protection
X	X		X	X	

How the Option Enhances U.S. Capabilities

BPC (low)	HA/DR	BPC (high)	NEO	Raid	Forcible Entry
4	4	2	3	2	1

(1 = least enhancement, 4 = most enhancement)

[172] The one yard that may be able to handle these vessels, Newport News Shipyard, may not have the capacity to do so because it is already engaged in building the *Ford*-class carriers.

[173] Caroline Varin, "Freight shipping prices sink on oversupply, China slowdown," *Business Insider*, February 22, 2015, http://www.businessinsider.com/afp-freight-shipping-prices-sink-on-oversupply-china-slowdown-2015-2.

Option 5: Expand Procurement of Enhanced Expeditionary Support Ships

Amphibious Force	
LHA/LHD	11
LPD	12
LSD	11

Expeditionary Support Ships	
EPF-E	10
ESD-E+	4
ESB-E	5

Maritime Prepositioning Force	
T-AKR	5
T-AKE	2
T-AK	5

What the Option Does

This final option would procure an additional two ESDs and two ESBs while funding enhancements for these vessels above and beyond those included in the first option. Two out of the five ESBs should be allocated to PACOM to support steady state engagement and crisis response activities. The two currently planned ESDs are both allocated for the two MPSRONs that are also located in PACOM. At least one of the additional ESBs would be permanently forward-stationed in PACOM.

The enhancements funded under this option, in addition to those in option 1, include providing full support facilities on the ESDs for LCAC operations, adding modular C2 and medical facilities to the ESDs and ESBs, funding increased berthing spaces on both the ESDs and ESBs, and upgrading the flight deck of the ESBs to support V-22 and VTOL F-35 operations.

Giving the ESD the ability to deploy with and maintain organic LCACs corrects one of the major deficiencies with the ESD's initial design. This would enable the Marine Corps to use a single ESD to support a landing force exercise with a partner-nation without an amphibious warship. This would also let the ESDs offload MPSRON T-AKs and T-AKRs in stream without requiring the support of an amphibious warship with a well deck.

Improvements to C2 and berthing facilities onboard ESS vessels would allow them to support the SP-MAGTF-CR-WESTPAC activities described previously. The last set of improvements to the ESDs would greatly improve their aviation capabilities by treating the deck to withstand the heat generated by V-22s and F-35s. V-22s greatly expand the reach of embarked forces. F-35s based on ESDs could support distributed operations and provide aerial support in counterinsurgency scenarios without requiring the presence of an amphibious assault ship or shore-based aviation facilities.

What the Option Costs

High ($10 billion–$15 billion over baseline)

Surprisingly, this is a high-cost option. While the vessels themselves are less expensive than conventional L-class amphibious vessels, they are still expensive and may be costlier to operate, as they would have significantly higher availability per year. In addition, the enhanced capabilities in aviation and surface connectors added to these platforms increases their personnel and maintenance requirements. The team's costing model estimates that this option would have the highest yearly O&M cost of the options examined.

How the Option Helps Partner Countries

C2	Maneuver	Fires	Intelligence	Logistics	Force Protection
X	X			X	

How the Option Enhances U.S. Capabilities

BPC (low)	HA/DR	BPC (high)	NEO	Raid	Forcible Entry
3	3	1.5	2	1	0.5

(0 = no enhancement, 4 = most enhancement)

6 Recommendations

The research for this report leads the study team to seven conclusions. Each can be undertaken independent of the others, and each would contribute to the development of a more capable, more flexible, more present amphibious force for U.S. commanders globally. In particular, these recommendations would provide the capabilities and capacity needed to meet the range of missions and requirements that exist within PACOM. These recommendations are divided into those that the study team believes could be realized over the short term and those that could be implemented in the mid-term to long term.

Short Term

Recommendation 1

Increase PACOM O&M funding to ensure it can continue experimenting with alternative platforms in a variety of real-world and exercise scenarios. Alternative amphibious platforms, especially those built to commercial specifications, are designed to operate for a much higher percentage of the year than military-specification Navy ships. In some cases, commercial cargo ships are designed to operate nearly continuously for 10 months a year, with only a two-month maintenance period. Navy ships, by contrast, are deployed approximately four to six months per year to meet crew training and readiness requirements as well as maintenance needs. Getting the most out of commercial-derivative alternative platforms requires additional O&M funding to pay for crews, which are often civilian or merchant marine crews, and to fund additional fuel and underway maintenance.

Recommendation 2

To best leverage the capabilities and capacity of the E-class vessels, establish a SPMAGTF-CR for the Western Pacific. The model for such a force is SPMAGTF-CR for AFRICOM. Such a force would serve as a small self-deploying force from which units or the full force could deploy to meet up with E-class vessels for small-scale crisis response and for small-unit amphibious force training. In the near term, it likely makes the most sense to base this formation on Guam, given the existing facilities there and planned force movements. In the mid-term, this force may be able to undertake rotational deployments to the Philippines, especially if the two nations agree on further U.S. locations under the new Enhanced Defense Cooperation Agreement.

Recommendation 3

Conduct a pilot program to test the viability of using Army-owned logistics support vessels (LSV-class) as an alternative platform in the Pacific. The Army operates eight *Frank S. Besson*–class LSVs that are capable of self-deploying up to 5,500 miles with 2,000 tons of cargo or equipment. These vessels offer a capability that would be a meaningful training opportunity for many less-capable partners, as the vessels are of a similar size and capability as those operated by partners. Additionally, deploying a relatively small vessel would "preserve" larger L-class vessels for more stressing requirements.

Recommendation 4

Develop a low-cost modular mechanism to rapidly expand the C2 capabilities of all L-class ships in the fleet. Scenario analysis for this report highlights the consistent shortfall in partner-nation amphibious

capability. The increasing need to operate ARGs in disaggregated and "split ship" formations will likely result in greater demands for Command and Control from all ships of deployed ARGs, not simply on the expected command ship. A modular, deployable C2 mechanism will enable all U.S. ships to quickly expand C2 to meet needs in a contingency.

Mid-Term to Long Term

Recommendation 5

Explore codeveloping, and even coproducing, with partners or allies a commercial-derivative auxiliary ship such as the ESB, including designs based on larger hulls. Two factors—falling defense budgets in the United States and for most of its allies and partners and, at the same time, the growing capability and tonnage of ships (along with their costs)—will likely decrease the number of hulls collectively purchased. Leveraging the comparative strengths of allies, as well as the opportunities to buy a larger number of nearly identical ships, could result in a lower per-ship cost for a higher-capability ship. It would also have the advantage of providing interoperability and familiarity for all participating countries. One potential option for such an undertaking would be a U.S.-designed E-class vessel built in a Japanese or Korean shipyard, with final outfitting in a U.S. shipyard.

Recommendation 6

Change the home-porting of two MPF vessels currently stationed in Guam to ports in Southeast Asia. Forward stationing of these vessels by the Navy would reduce transit times to likely deployment areas. The relatively small crew and, optimally, limited time spent in port for MPF vessels would reduce concerns about basing or housing. Particularly for vessels that are civilian-crewed, housing for the small number of personnel involved could be arranged through leased housing—especially in any major port city in the region. Ports of particular interest include Kota Kinabalu, Singapore, Subic Bay, Tacloban, Cebu City, and Jakarta.

Recommendation 7

Urge the Marine Corps and Navy to partner on an analysis of alternative amphibious forces to consider how force adaptability could be increased while preserving warfighting capabilities. The Marine Corps is currently engaged in a series of exercises to inform thinking on its 2025 force design. Such efforts will not be complete if they do not adequately incorporate the Navy's contribution to amphibious capability. For this reason, the two services should consider how alternative amphibious forces may better meet future demands at a level of specificity beyond that offered in this study. This follow-on analysis must seriously consider the types of missions the Marine Corps is most likely to undertake in the future.

Appendix 1. Categories of Amphibious Vessels

There is no internationally codified definition for naval ship classes. Thus countries can use whatever designations they like. This can create some confusion for those who are not already familiar with the capabilities of specific naval vessels. For example, the Japanese *Osumi*-class LST is more similar to an LPD than a traditional LST. To avoid confusion, this study reclassified amphibious vessels into the following standard categories. The team's standardized categorization is included in parentheticals.

Amphibious Ships

Amphibious Cargo Ships (LKA)—These ships blur the line between sealift ships and true amphibious warfare vessels. They do not have a well deck but do have their own landing craft and often have roll-on, roll-off ramps to support at-sea loading of connectors or rapid off-loading once in port.

Landing Craft Heavy (LCH)—These are the smallest amphibious vessels that can "self-deploy." Despite the craft designation, they are too large to be embarked on other amphibious ships. They operate in the same fashion as LSTs and LCTs. They are quite popular in archipelagic nations with smaller navies and can be used by larger navies to provide intra-theater and seabase-to-shore lift.

Landing Craft Tank (LCT)—Smaller version of the LST. A limited number of these vessels are in service.

Landing Helicopter Dock / Landing Helicopter Assault (LHD/ LHA) – These designations are primarily used by the Navy, although there is little to no functional difference between LHAs and LHDs. Like LPHs, they have a full flight deck, but generally have a well deck to support landing craft. As a consequence, carrier classifications are generally not applied.

Landing Platform Helicopter (LPH)—Vessels designed to support amphibious operations with aviation primarily. These ships have a full flight deck but no well deck to support landing craft. They may also be classified as helicopter carriers (CVH) or light carriers (CVL).

Landing Platform Dock (LPD)—Smaller than the LPH and LHD/LHA classes, LPDs possess some measure of aviation capability but have a large well deck and extensive storage for material and berthing for troops.

Landing Ship Dock (LSD)—Roughly comparable to the LPDs, these ships trade aviation capability, berthing space for embarked infantry, and (in some cases) C2 capability for greater cargo storage and well deck size.

Landing Ship Tank (LST)—These ships are easily recognizable due to their method of operation. They will beach themselves as part of the amphibious landing so that vehicles can drive straight onto the beach via bow doors or bow ramp. In Western navies, these vessels are increasing scarce. However, they remain popular in Asia due to their simplicity and relatively large capacity.

Connectors

Landing Craft Air Cushion (LCAC)—The most modern version of landing craft, LCACs can transport roughly the same amount of cargo as LCUs but at much greater speeds. However, they require a larger well deck than more conventional landing crafts due to their hovercraft design.

Landing Craft Mechanized (LCM)—The smallest class of modern Ship-to-Shore Connectors (SSCs), LCMs vary in size, configuration, and capacity. They are widely used across the globe by navies large and small because of their reliability and versatility.

Landing Craft Utility (LCU)—The workhorse landing craft for most nations, capable of transporting hundreds of troops or several large armored vehicles to shore at once. These are also used in a standalone capacity by smaller navies, especially in archipelagic nations.

Appendix 2. Description of Cost-Analysis Tool

The team provides rough cost estimates for the options. To compare the different force structures on a rough order of magnitude basis, the team constructed a costing tool.[174] This tool does not build a shipbuilding plan for each option; instead, the tool costs the entire force in terms of procurement, personnel, and operations. The tool uses the same costs inputs, allowing for the consistent comparison of total costs across the different force structures.

This cost tool traces its heritage to CSIS's Force Cost Calculator, which enables analysts to make decisions about strategic-level inputs for force structure and capabilities and then connect those inputs to a topline budget level. While drawing inspiration on the Force Cost Calculator, the tool developed for this study aims to cost different naval force structures in a rapid manner. It does not provide the same level of granularity as the original.

Given the unavailability of data for certain ship classes, the study team used a relative cost approach based on known data points of similar vessels.

The baseline cost estimates use a 34-ship force of 11 LHDs/LHAs, 12 LPDs, and 11 LSDs/LXRs.

[174] Caroline Varin, "Freight shipping prices sink on oversupply, China slowdown," *Business Insider*, February 22, 2015, http://www.terradaily.com/reports/Freight_shipping_prices_sink_on_oversupply_China_slowdown_999.html.

About the Authors

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From 2006 to early 2009, Hicks served as a senior fellow at CSIS, leading a variety of research projects in the national security field. From 1993 to 2006, she was a career civil servant in the Office of the Secretary of Defense, serving in a variety of capacities and rising from Presidential Management Intern to the Senior Executive Service. She received numerous recognitions for her service in the Department of Defense (DOD), including distinguished awards from three secretaries of defense and the chairman of the Joint Chiefs of Staff. She also received the 2011 DOD Senior Professional Women's Association Excellence in Leadership Award. She holds a PhD in political science from the Massachusetts Institute of Technology, an MA from the University of Maryland's School of Public Affairs, and an AB magna cum laude and Phi Beta Kappa from Mount Holyoke College. Hicks is an adjunct with the RAND Corporation and a member of the Council on Foreign Relations. She currently serves on the National Commission on the Future of the Army, the Board of Advisors for the Truman National Security Project, and the Board of Advisors for SoldierSocks, a veterans' charity.

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Andrew Metrick is a research associate with the International Security Program at CSIS. His work has covered a broad range of issues, including amphibious warfare, maritime capabilities, emerging technologies, and unmanned systems. Before joining CSIS, he was the team lead for the 2012–2013 "Global Go To Think Tank Index Report," responsible for a global survey process and the production of the final report. Additionally, he served as a teaching assistant for a capstone writing and research class at the George Washington University. He holds a BA in international affairs from the George Washington University with concentrations in conflict and security and international politics. His writing has appeared in *War on the Rocks* and *Defense One*, and he has been a contributing author on several CSIS reports and publications.

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