LEADERSHIP OR HEGEMONY? INVESTIGATING U.S. COMMAND OF THE SEA AND IMPLICATIONS FOR U.S. GRAND STRATEGY

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Art of War Scholars

by

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The United States was recognized as the sole international superpower following the Cold War and has since based its grand strategy on a universally acknowledged command of the global commons. At the turn of the 21st century, the U.S. was fully dominant in its command of sea and space, and largely uncontested in its command of the air. However, in the years since, China, Russia, Iran, and North Korea have made significant military advances in all three arenas and the global picture has expanded to include cyberspace and nonstate actors. This work argues that the U.S. no longer commands the sea; offers implications for naval doctrine, strategy, and acquisitions; and provides vital lessons to inform U.S. grand strategy.

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ABSTRACT

LEADERSHIP OR HEGEMONY? INVESTIGATING U.S. COMMAND OF THE SEA AND IMPLICATIONS FOR U.S. GRAND STRATEGY, by LT Jennifer M. Edwards, 148 pages.

The United States was recognized as the sole international superpower following the Cold War and has since based its grand strategy on a universally acknowledged command of the global commons. At the turn of the 21st century, the U.S. was fully dominant in its command of sea and space, and largely uncontested in its command of the air. However, in the years since, China, Russia, Iran, and North Korea have made significant military advances in all three arenas and the global picture has expanded to include cyberspace and nonstate actors. This work argues that the U.S. no longer commands the sea; offers implications for naval doctrine, strategy, and acquisitions; and provides vital lessons to inform U.S. grand strategy.

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ACRONYMS

AIP	Air-Independent Propulsion
ASW	Anti-Submarine Warfare
EEZ	Exclusive Economic Zone
MSC	Military Sealift Command
UNCLOS	United Nations Convention on the Law of the Sea

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CHAPTER 1

INTRODUCTION

Background and Significance

We share a lot of space in modern life. Our economies rely on one another; our ideas bump into each other; our activities generate air-, water-, even noise-pollution for our neighbors. The world can feel very small, and crowded, and conflict-ridden. But our livelihood relies on our ability to overcome inconveniences, misunderstandings, and conflicts because the space we share is more important than it has ever been in human history: the global economy depends upon secure travel through it. Developing nations and first world economies alike rely on the 90 percent of world commerce valued at $8 trillion that floats through international waters every year.

For the global economy to work, our oceans, the airspace above them, the atmospheric space above that, and the invisible cyber world around everything must all be secure. Commodities of all kinds—from milk to meat to weapons—travel between shipping ports and the virtual currency of modern life travels between USB ports. But it is a treacherous journey; ships and bytes contend with pirates, airborne missiles, satellite orbits, firewalls, and malware as they travel through our shared space. This shared space—the "commons"—are areas that no one state owns and that provide access to much of the globe.

Stability and security of the commons have since the Cold War relied upon the credible threat of the United States as an international superpower. Due to an astounding overmatch of economic and military power, the U.S. and its allies have enjoyed almost completely unopposed movement of goods and armies through the commons. Freedom of

movement through the sea commons—the ability to move merchants and armies through the sea, and to prevent an opponent from moving theirs—is typically referred to as "command of the sea." The decades-long U.S. command of the sea has enabled both the rapid response to threats that arise in any part of the world and the resulting secure commerce that's grown the global economy. But times, they are a-changing.

In the 20 years since the fall of the Soviet Union, the global picture has expanded to include the economic rise of several states, the military modernization of others, and the emergence of agile and well-armed nonstate actors. Rising economic powers developed their navies; defunct regimes transferred precision-guided munitions to nonstate organizations, and near-instantaneous exchange of information connected ideological demagogues with their sleeping armies. The economy and access we all rely on are the same machines that efficiently deliver inexpensive weapons to the hands of our technologically savvy opponents. As a result, the sea commons are increasingly crowded and increasingly dangerous. This situation requires a careful assessment of the world as it is, rather than as it was just a short time ago. Specifically, the situation begs an analysis of whether the U.S. still commands the sea.

To what extent does the U.S. retain its ability to move commerce and armies across the oceans unopposed—and to what extent do capable opponents now have the ability to block that movement? How able is the U.S. to block the travel of adversary commerce and armies across the oceans? In the case of nonstate actors, is this capability relevant? In the process of assessing these realities, it is important also to answer the question of whether one must exercise a capability for it to serve its purpose. That is, can the deterrence of U.S. sea power sufficiently provide command of the sea, or can the

mere threat of adversary action in the world's oceans and littorals sufficiently undermine it?

Today, all of the commons are more important and under more threats on more fronts than ever before. An analysis of the sea commons—the arena with the most concrete reality, the longest history, and the most actors in play—should illuminate lessons for the others. In an increasingly interconnected world, the security of the global commons underwrites nearly all of worldwide trade, travel, and telecommunications. Thus, understanding the sea commons and assessing who is in command of the sea helps shape foreign policy decisions that affect both U.S. national interests and worldwide exchange. In the end, this work is not an international relations dissertation, but it should reliably inform them.

Limitations and Assumptions

Command of the commons, even using a narrow definition, is a question of assumptions and semantics, and is an underdeveloped area of study. There are a handful of exceptions, but the preponderance of extant research and scholarly discussion relating to command of the commons centers on the U.S. position as a superpower rather than explicitly addressing the command of the global commons, or command of the sea in particular. Experts that do study the commons struggle to apply their understanding across disparate fields, and tend to have little interest in the idea of commanding them.[1]

[1] Elinor Ostrom, Nobel-prize winning economist and "commons" expert, helped establish the *International Journal of the Commons* in part due to a lack of inter-disciplinary understanding amongst scholars addressing common-pool resources like the ocean, the internet, or the Amazon rainforest. The Journal and the Association that funds it focus on solving commons problems, rather than discussing who should be "in charge"

Thus, one limitation of this research will be in making logical and palatable assumptions about the measure of command in a body of knowledge that has not yet agreed upon the metrics. Where command is impossible to determine or unconvincing in its reliability, it will be important to acknowledge the limitation.

Regarding means of assessment, one must keep in mind that it is not possible to evaluate command of the sea by whether it is used or by how it is used. Command of the sea is a strategic condition enabled by particular naval capabilities, and power may be vested in the threat of a capability in addition to the active use of it. Indeed, this is even truer as capabilities grow in lethality; reference nuclear weapons for one example of a capability that need not be used to provide significant influence.[2] Moreover, possessing a set of capabilities that results in command of the sea does not imply responsible use of that command. Members of the liberal international order, such as the United States, believe that responsibly using command of the sea commons retains them open and free for international trade and navigation. But not all actors who could gain or exert

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of them. Frank van Laerhoven and Elinor Ostrom, "Traditions and Trends in the Study of the Commons," *International Journal of the Commons* 1, no. 1 (October 2007): 3.

[2] Bernard Brodie, "The Anatomy of Deterrence," U.S. Air Force Project Rand Research Memorandum RM-2218 (July 23, 1958): 7-17. Interestingly, though perhaps not coincidentally, Brodie began his career as a naval theorist before becoming a nuclear deterrence theorist. The U.S. Navy states about deterrence: "We achieve deterrence by convincing potential enemies that they cannot win or that the cost of aggression would be unacceptable… Conventional deterrence is provided by naval forces through the overwhelming combat power of our Carrier Strike Groups with embarked airwings; surface and subsurface combatants with precision attack weapons; and the scalable, deployable, expeditionary combat power of Marine Expeditionary Forces (MEF), Marine Expeditionary Brigades, and Marine Expeditionary Units employed from various combinations of amphibious ships, maritime prepositioning, and forward bases. United States Navy, *A Cooperative Strategy for 21st Century Seapower* (March 2015): 22.

command of the sea would necessarily be interested in responsible command, or ensuring a "global security environment that permits unrestricted global systemic flow."[3] Thus, analysis must be inductive rather than deductive; one cannot measure command of the sea by responsible usage effects, such as how unrestricted the sea commons might be, and one cannot disregard an adversary capability simply because it has not been exercised.

In terms of space and time, this analysis has practical delimitations that service the question but also provide opportunities for future study discussed in chapter 7. First, this work will not include evaluation of command attained by non-naval means. While using cyber-attacks or space effects could be the force multiplier needed for a weak navy to exert influence over the sea, those details are not central to command of the sea. And although influence may be exerted over the sea through political/diplomatic, economic, or even informational means, this analysis will concern only the preponderant influence that occurs through the use of physical naval power (i.e. military power).[4]

Likewise, this work is neither a comprehensive comparison of all naval assets nor the finer elements of naval power. Command of the sea is viewed as a measurable set of credible capabilities: those that provide naval influence in peacetime relative to other navies in the field, and those that defend sea interests threatened by adversary attacks on local sea control. There are plenty of other naval assets that are useful for other purposes, such as amphibious ships for marine assaults; ballistic missile submarines for second

[3] Robert C. Rubel, "Command of the Sea: An Old Concept Resurfaces in a New Form," *Naval War College Review* 65, no. 4 (Autumn 2012): 27.

[4] Examples of influence through other means are the threat of sanctions if trade is blocked, the use of allied exercises in a contested region to demonstrate unified resolve, or even the informational threat of mines—whether they are in place or not.

strike nuclear deterrence; and aircraft carriers for land and air power projection from the sea. These are important capabilities that powerful nations rightfully work to attain, but this analysis will distinguish between naval assets that are indispensable in commanding the sea and those that are "good to have." In addition, the finer elements of naval power—training, doctrine, leadership, and organizational structure—all play an important role, but are difficult to cast as decisive aspects of power. Without the context of a specific battle between specific states and access to precise knowledge of current conditions in those navies, the evaluation of fine naval power is speculative. It must be assumed the states that have invested in naval assets have also invested in the means to successfully employ them.[5]

A final delimitation is the purposeful exclusion of alliances. History is rife with examples of failed or shifting alliances; although one need not assume all alliances will fail, neither may one assume any will succeed. It is acknowledged that many alliances stand on decades of history and interwoven economies. This delimitation does not assume that the United States must retain the capabilities to defeat a major and capable ally such as the United Kingdom, but it will not count British forces as available to American conflicts or commensurate with American naval power. Insofar as command of the sea is a position held by a single state, it cannot be the result of forces external to the

[5] Those who would argue the U.S. advantage in the finer elements of naval power need only look to history for their folly. The Japanese developed doctrine well beyond any the U.S. thought possible in the six months prior to the attack on Pearl Harbor, and the U.S. was thus caught unaware of a threat that it deemed unimaginable at the time. Savvy statesmen should assume that other states can accomplish equal feats if they possess the same equipment. One should afford adversaries the same faculties of guile, creativity, flexibility, and mobilization that one's own state would muster.

state. While they are essential in the management of global challenges, alliances are born of relationships; people are fickle, and no superpower can reasonably base its central power upon the promises of another state.[6]

In the interest of a liberal handling of the topic, this thesis will include some economic and international relations theory in addition to naval theory. To improve brevity and limit scope, it will detail only those thinkers whose ideas have informed naval strategy or are pervasive in modern thought. The primary thinkers on naval issues are Alfred Thayer Mahan, Sir Julian Corbett, Bernard Brodie, Paul Kennedy, and Robert Rubel. The relevant economic theorists are William Forster Lloyd, Garrett Hardin, and Elinor Ostrom; and the modern scholars on issues of power and strategy are Barry Posen, William Wohlforth, and Joseph Nye. Relevant ideas offered by other scholars are included in the rest of the thesis, but these are the major authors forming the foundational language of the literature review.

Chapter Overview

The chapters of this work are designed to engage the reader progressively as ideas are developed. Chapter 2 provides a nuanced understanding of terms and concepts relating to the topic, including the commons, the sea, and national power and strategy. Chapter 3 conceptually frames how one can evaluate command of the sea and offers a two-part metric to that end, which chapters 4 and 5 investigate separately. Chapter 6 concludes that the United States no longer commands the sea and provides implications

[6] Carl von Clausewitz, *On War*, trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 75.

for U.S. naval doctrine, education, strategy, and acquisitions. Chapter 7 details the flawed model of national power and resulting implications for U.S. grand strategy. Areas of future study abound; they are offered in closing and represent a promise to the reader that this topic will be the defining question of our times.

CHAPTER 2

UNDERSTANDING COMMONS, POWER, AND THE SEA

Terms used in international scholarship often have both colloquial meaning and academic meaning. Because the findings of this thesis are central to the precise meaning of "command of the sea" and relevant to the idea of "command of the commons," this literature review will detail each aspect of the phrases. First, the meaning of "commons" is explained, including identification of the relevant modern commons. Next, the review addresses naval terminology: sea power's source and nature are explored, and local sea control is distinguished from command of the sea. Finally, the reader is acquainted with the basic language of sea control or sea command, and the ships thought necessary to achieve them.

Commons and sea power have colloquial understanding and a mostly unconfused history, but as we will see here, "command" is a slippery slope, and the idea of command of the world's oceans or other commons is particularly tricky for modern thinkers.

The Commons and Contested Zones

Any legitimate discussion of sea power and related tenets begins naturally with naval theorist Alfred Thayer Mahan. Writing over 125 years ago, before the advent of modern ballistics, globalization, or deep ship-based land effects, Mahan attempted the first comprehensive history of sea power's influence. His work is most often cited, if not for its precise modern value, then as a starting point of language.

Though the term "common" was used by economists discussing shared plots of land and other public commodities, Mahan was the first to use it to describe shared

international sea space. He wrote that the sea "presents itself as a great highway . . . a wide common, over which men may pass in all directions, but on which [they] choose certain lines of travel [more] than others."[7] The reference to sea as a common was accepted amongst theorists without much fanfare, and none addressed the implications of the term. An understanding of economic theory relating to commons is thus useful in analyzing dynamics in international space.[8]

Sixty years before Mahan published his work, University of Oxford mathematician William Forster Lloyd presented two lectures about population control detailing what he called the tragedy of the commons. According to Lloyd, the problem of societies attempting to share common spaces and resources is that individuals within a shared-resource system will act in accordance with their own self-interests and, by collectively over-using resources, will deplete the shared resource.[9] For example, farmers sharing a common pasture for cows to graze each benefit from grazing more cows of their own on the shared land. If each farmer uses the shared land to graze more cows than it can sustain, the group will collectively over-graze the land until none of their cows can survive on it. He termed this dynamic a tragedy because it results in unintentional and often painful checks on population.

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[7] Alfred Thayer Mahan, *The Influence of Sea Power upon History, 1660-1783* (Boston, MA: Little, Brown, 1890.), 25.

[8] For several hours of recent thinking on the topic, see Grand Strategy Conference 2016 videos, Texas A&M University's Bush School for Government and Public Service, accessed 30 April 2017, https://vimeo.com/196423845, https://vimeo.com/196419390, https://vimeo.com/196415210.

[9] William Forster Lloyd, "W. F. Lloyd on the Checks to Population," *Population and Development Review* 6, no. 3 (1980): 483.

Garrett Hardin advanced the theory in his 1968 work "Tragedy of the Commons," which was cited in a 1993 study as one of the most formative works for biologists.[10] Hardin asserted that societies naturally abandon "sharing behavior" as problems mount in shared spaces. "The commons," he wrote, "if justifiable at all, is justifiable only under conditions of low-population density. As the human population has increased, the commons has had to be abandoned in one aspect after another." Hardin described several examples of societies "abandoning" the idea of free commons as they identify ways shared space could damage their own interests. He cited enclosing farm land as an abandonment of shared pasture; private property as an abandonment of shared land; the restrictions on sewage disposal and pollution production as an abandonment of shared community space. He even hinted at restrictions on noise production and public advertisements as an abandonment of free pleasure in the commons. Hardin referred to these restrictions as "alternatives to the commons" and clarified they "need not be perfectly just to be preferable."[11]

Much research has focused on ways people would be motivated to rearrange the commons to prevent Hardin's tragedy. If individuals perceive unbalanced use or premature depletion of a shared resource, they may collectively attempt to manage its use. One of the proposed solutions is to appoint a leader to regulate access to the commons. Hardin explained that groups are more likely to endorse a leader when a common resource is being depleted and when managing a common resource is perceived

[10] Laerhoven and Ostrom, "Traditions and Trends," 3.

[11] Garrett Hardin, "The Tragedy of the Commons," *Science* 162, no. 3859 (13 December 1968): 1247.

as a difficult task. Others have pointed out that groups prefer leaders who are elected, democratic, and prototypical of the group, and these leader types are more successful in enforcing cooperation. A general aversion to autocratic leadership exists, although it may be an effective solution, possibly because of the fear of power abuse and corruption.[12]

An alternative line of thought in the idea of commons management came from Nobel Prize winning political economist Elinor Ostrom, who asserted that common-pool resources and common-property institutions are not all small, local, and outdated. "In addition to the prototypic local resources," she wrote, "the oceans, the gene pool, and the atmosphere are all common-pool resources."[13] Her work takes issue with the widely accepted view that the commons only matter to economists, and that the only two possible solutions exist to commons problems: either the commons are privatized (or abandoned, in Hardin's words); or a superseding body must manage them. Her findings show that local populations can solve local problems with locally-tailored solutions in order to maintain commons rather than abandon them, and that those populations are better off when a superseding body is not involved. Far from a tragedy, she reiterated in 2009, the depletion of the commons is simply a problem to be managed.[14]

More and more, in part due to Ostrom's work, the study of the commons extends to fields outside economics. The importance of the commons and common-pool resources

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[12] Laerhoven and Ostrom, "Traditions and Trends," 5.

[13] Ibid.

[14] Elinor Ostrom, phone interview with Chana Joffe-Walt and Adam Davidson, "Planet Money," National Public Radio, 23 October 2009, accessed 5 May 2017, http://www.npr.org/sections/money/2009/10/podcast_elinor_ostrom_checks_i.html.

are growing in prominence in many other academic fields such as biology, ecology, or even social scientists. Climate change experts, ecologists who study forestry and fisheries, and public policy-makers analyzing common healthcare all find value in understanding the dynamics at work and potential solutions. Yet the commons—and especially their problems—are not exceptionally attractive to military thinkers. The military and others who think in terms of power have scarcely made the connection between global shared space and anything other than its exploitation for movement.

MIT professor Dr. Barry Posen introduces the term "global commons" to the international relations discourse by in his 2003 paper "Command of the Commons: The Military Foundation of U.S. Hegemony."[15] Posen is an expert in security studies, has served as a consultant for defense agencies, and has published three widely acclaimed books on U.S. strategy and policy. His article remains the most-cited source in the discussion of command of the commons and was the basis for a 2006 Pentagon banner about commanding the commons.[16] In his paper, Posen defined the commons as "areas that belong to no one state and that provide access to much of the globe." He identified three separate commons- sea, space, and air- but argued essentially that command of the sea denotes command of all three, which he collectively terms "the commons." Posen said as recently as 2015 that he does not yet identify cyberspace as a commons because

[15] Barry R. Posen, "Command of the Commons: The Military Foundation of U.S. Hegemony," *International Security* 28, no. 1 (Summer 2003): 5-46.

[16] Craig H. Allen, "Command of the Commons Boasts: An Invitation to Lawfare?" in *International Law Studies, vol. 83, Global Legal Challenges: Command of the Commons, Strategic Communications, and Natural Disasters*, ed. Michael D. Carsten (Newport, RI: U.S. Naval War College, 2007), 39.

he does not understand it well enough.[17] As with Mahan, his definition stuck amongst scholars without much fanfare or analysis and is today the accepted definition of "commons" or "global commons" in international relations theory and military parlance.

Defining precisely where the commons begin and end has proven a complex challenge. A nuanced detail of Posen's commons is the idea that there are margins on the edge of the commons that may expand or contract occasionally, making their boundaries fluid rather than fixed. Posen termed these regions on the fringes of the commons, where local actors or multiples states claim territorial holdings or other rights, the "contested zones."[18] According to Posen, power dynamics are different in the contested zones than in the rest of the commons and conflict mostly takes place there. Conventional combat commonly occurs in areas closest to enemy-held territory, and in them the enemy will be more competitive, and weak adversaries have a good chance of doing real damage to U.S. forces. This difference is a result of local actors being more willing to suffer due to strong political interests, typically having a preponderance of military-aged males, and possessing some sort of "home-court advantage." In addition, these adversaries have studied U.S. war and tactics, and benefit from the relatively inexpensive and constantly improving weapons of the "close fight." Posen posited that the contested zone would ever expand, and in fact six years later, the Under Secretary of Defense for Policy evoked the

[17] Barry Posen, "Author's Response to Roundtable 8-16," H-Diplo/ISSF Roundtable 8, no. 16 (July 2016). Dr. Posen repeated this statement during his keynote address on 28 November 2016 at the Texas A&M Bush School Grand Strategy Conference.

[18] The most well-known contested zone today is the South China Sea, where seven different states make conflicting territorial claims. The Arctic is likely to be another highly contested region.

term in her article "The Contested Commons" to discuss the increasingly contested global shared space.[19]

There are occasional arguments made to expand the term "global commons" to include ungoverned areas of land. These areas, such as Somali lands that do not have effective government, can affect all nations because they serve as a haven for terrorists and provide transit for weapons of mass destruction. However, such ideas are rare and are defunct by legal precedent. As lawyers have noted, prevailing international law and six decades of U.S. foreign policy are on the side of respecting the sovereignty of land.[20] As they are understood in scholarly literature, the commons do not include any land territories, but the sea commons do begin there.

International agreements define the boundaries between territorial and international waters, yet the sea commons involve more than these disputed lines and encompass more than international waters. According to the United Nations Convention on the Law of the Sea (UNCLOS), a state's sovereign territorial sea is defined as a belt of water 12 nautical miles from the agreed upon territorial baseline.[21] Waters between 12nm and 24nm are called a state's contiguous zone, waters up to 200nm are the state's

[19] Michèle Flournoy and Shawn Brimley, "Contested Commons," *Proceedings Magazine* 135, no. 1277 (July 2009): 17.

[20] Allen, "Command of the Commons Boasts: An Invitation to Lawfare?" 23. On this point, Allen references the work of VADM Jacoby, "The Global Commons and the Role for Intelligence" in the same volume.

[21] See Appendix B for a relevant selection of UNCLOS Articles and definitions.

exclusive economic zone (EEZ), and waters outside 200nm are termed the high seas.[22] On the high seas, also referred to as international waters, no state may subject any part of the seas to its sovereignty, and all states have unhindered freedom of action for peaceful purposes. Specifically, all states enjoy freedom of navigation, overflight, laydown of submarine cables or pipelines; construction of artificial islands and installations; fishing; and scientific research in international waters.

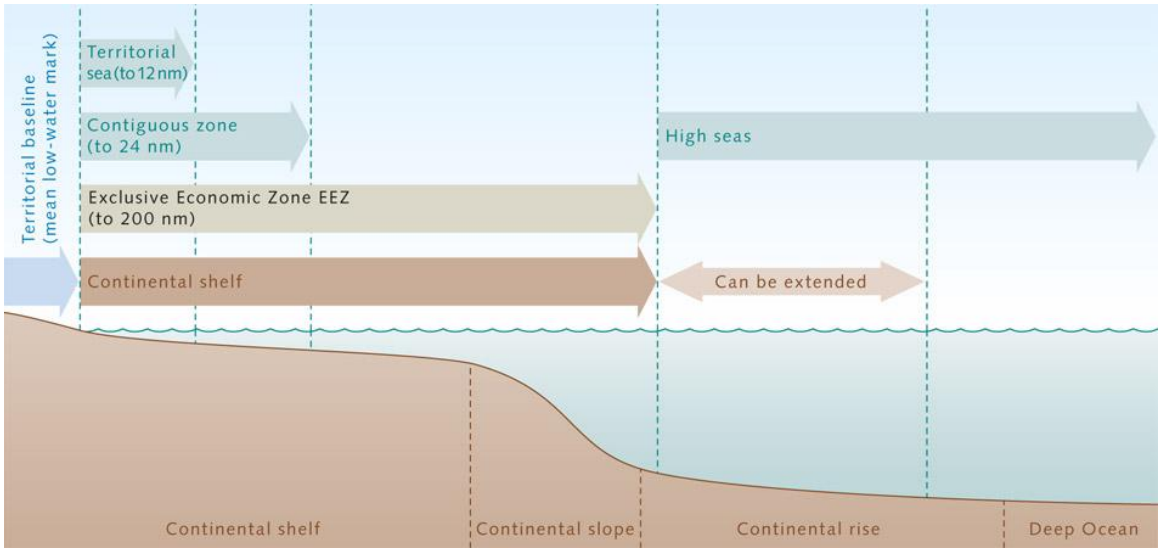

Figure 1. UNCLOS Zones of Coastal State Rights and Jurisdiction

Source: World Ocean Review, "Law of the Sea," accessed 5 May 2017, http://worldoceanreview.com/en/wor-1/law-of-the-sea/a-constitution-for-the-seas/.

The Convention gives each coastal state special security provisions in its territorial sea and sole rights to the resources in its EEZ, but permits the travel of both

[22] The EEZ was first recognized by UNCLOS 1972-1983. Prior to that, the 1958 Convention on the High Seas identified only territorial seas and high seas.

international merchant shipping and military warships through them for the purpose of peaceful navigation.[23] The territorial sea and contiguous zones were envisioned as defensive barriers. The coastal state is protected from hostilities originating from inside its own territorial waters, and in the event hostilities do arise in territorial waters it is permitted to continue pursuit of malcontents into its contiguous zone. In addition, a coastal state may restrict peaceful navigation through its territorial waters to specific routes, also called sea lanes, in order to protect its interests. For example, if a state wants to direct traffic around a coral reef, or would benefit from sole access to a particular area for oil mining, the Convention allows the state to divert peaceable traffic as it sees fit, as long as the state does not encroach upon the rights of non-coastal states to peaceably traverse territorial waters. Importantly, the Convention clarifies that navigation through EEZs is governed by the same rules as the high seas: coastal states retain near-exclusive rights to fishing, mineral resources, and environmental responsibilities, but all states enjoy unhindered freedom of movement through waters outside 12nm from land. Although shipping traffic may be directed by coastal states to restricted sea lanes, free and secure navigation through both those sea lanes and all coastal state EEZs is the crux

[23] Travel through territorial waters may be done by "innocent passage" and travel through straits constrained by territorial waters may be done by "transit passage." UNCLOS defines each as a way of acknowledging coastal state territorial claims and distinguishes them from freedom of navigation (FON) operations, which directly contest territorial claims. A crucial difference between innocent passage and FON is that UNCLOS Article 20 (Appendix B, page 120) states that, during innocent passage in the territorial sea, "submarines and other underwater vehicles are required to navigate on the surface and to show their flag." Also of note, the United States has exercised an active FON program since 1979, the purpose of which was codified in President Ronald Reagan's 1983 U.S. Oceans Policy, accessed 4 May 2017, https://www.state.gov/documents/organization/143224.pdf.

of the global economy. Scholars agree that the commons are areas that belong to no one state—but part of the modern problem is that the sea lanes of the sea commons go straight through waters that do in fact belong to individual states.[24]

Moreover, the other portion of the sea commons—the high seas that belong to no one state—are equally as important. Economists forecast that in the next ten years, over 60 percent of the world's liquid natural gas will be contained in offshore deposits outside the EEZ of any nation. In addition, as coastal waters are overfished, international waters are increasingly primary sources of nutrition. Perhaps most relevant to the topic at hand, the undersea data cables that carry over 99% of the U.S. military's communications are under the sea commons.[25]

Thus, the sea commons are the high seas, plus all coastal state EEZs, and the sea lanes used to traverse EEZs and territorial seas. In short, the sea commons are all waters outside the 12nm belt from land and the sea lanes used to travel through the belt.

[24] See UNCLOS Article 87 (Appendix B, page 125). Scholars have mistaken EEZ privileges as an expansion of areas that states "own," but this analysis is confused. The commons are not "shrinking" as states expand their use of existing EEZs because commons, by definition, are areas that states do not own. Thus, commons as they relate to coastal state EEZs can be separated into two parts: for navigation, the entire EEZ is part of the commons; and for resources, none of the EEZ is a part of them. Aviad Rubin and Ehud Eiran on behalf of the Haifa Research Center made the assertion that the commons are "shrinking" most recently 29 November 2016 at the Bush School Grand Strategy Conference.

[25] Satellite circuits comprise under one percent of active U.S. international communications circuits. Cathy Hsu, "2010 Section 43.82 Circuit Status Data" (FCC International Bureau Report, March 2012), 15, 27.

Sea Lanes and Maritime Chokepoints

Sea lanes are an important part of the sea commons because they allow states, including those without direct ocean access, to efficiently export goods and armies for trade, colonialism, and war. Where sea lanes are especially restrictive or are the only means of transport from one place to another, they are called chokepoints. As ideal locations for naval blockades or diplomatic sanctions, chokepoints vary in size, location, and purpose, but have fared prominently in history as far back as 480 B.C. The Dardanelles, for example, is the 38-mile strait that connects the Black Sea with the Mediterranean Sea; it was involved in the Trojan War, the defense of Constantinople, the Ottoman conquest of Gallipoli, the Crimean War, the WWI Gallipoli campaign, and Turkish WWII negotiations with both the U.S. and the Soviet Union. Yet not all straits stand the test of time. The Mozambique Channel, for example, is the stretch of water between Madagascar and the east coast of Africa. One thousand nautical miles long and 250 nautical miles wide at its narrowest point, it was the primary trade route between Asia and markets in Europe and the Americas until the Suez Canal opened in 1869. The Suez Canal provided alternative navigation around the continent of Africa, splitting travel time and costs in half and rendering it the "forgotten chokepoint."[26]

Strategically, crucial sea lanes were first defined by British Admiral of the Fleet John Arbuthnot "Jacky" Fisher, and have changed very little in the two hundred years since. Other than the English Channel, Fisher explained the value of nine "thoroughfares," the security of which he viewed as vital to the defense of the British

[26] Louis Bergeron, "The Forgotten Chokepoint: The Mozambique Channel's Rich Past and Bright but Insecure Future," *Strategic Insights* 54 (November 2014): 5-10.

Empire and continued trade with its colonies spread across the globe. These included the southern extremities of Africa at the Cape of Good Hope and South America at Cape Horn, as well as the man-made passages at Egypt's Suez Canal and Panama's Panama Canal. To facilitate trade through the Mediterranean Sea and Indian Ocean, Fisher named the straits of Gibraltar, Bab el-Mandeb, and Hormuz. To the North, he identified the Turkish straits, made of up the Dardanelles and the Bosphorus; and to the South, he noted the Strait of Malacca to enable trade with Asia. Today, the major global chokepoints are nearly identical, and all of them are contained in territorial waters

In most cases, these maritime chokepoints are the only link between territorial waters and the high seas. For example, the Strait of Hormuz between Iran and the United Arab Emirates is the only link between the Persian Gulf and the high seas of the Indian Ocean, and the Strait of Malacca on the northern coast of Indonesia is the shortest sea route between the Persian Gulf and Asian markets in China, Japan, and the Korean Peninsula. These two straits alone represent over half of the world's maritime oil trade. Of the entire world's 96 million barrel oil supply, approximately 60 million barrels travel the high seas. Every day, 17 million barrels leave the Persian Gulf through Hormuz, and 15.2 million of those enter Asian markets through Malacca. Alternate routes via land pipelines or seagoing routes the long way around land masses nearly double the cost of shipping and as of today cannot handle a fraction of the volume provided by the maritime straits.[27]

[27] U.S. Energy Information Administration, 1st Quarter 2017 Report, "Short Term Energy Outlook," accessed 30 April 2017, https://www.eia.gov/outlooks/steo/report/global_oil.cfm.

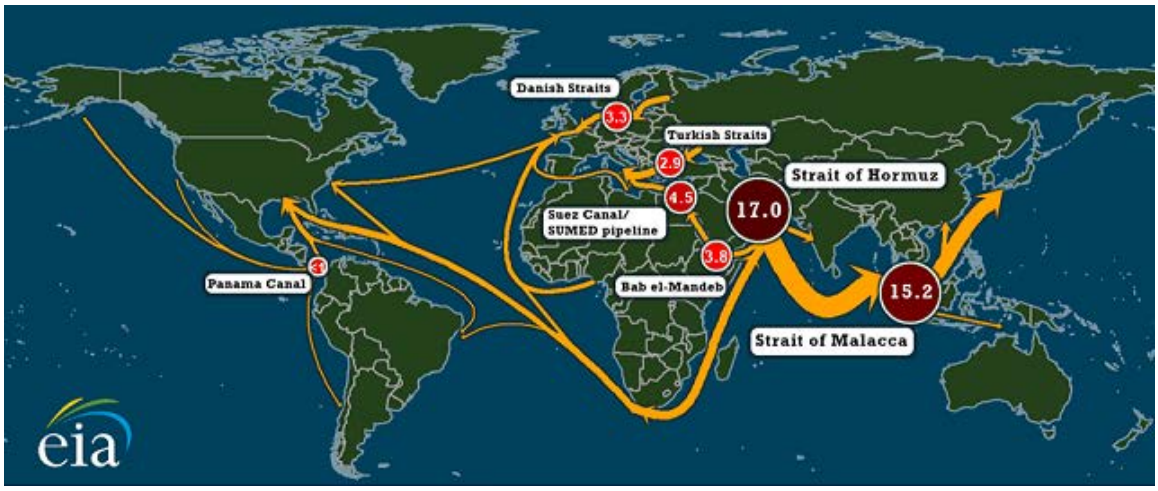

Figure 2. U.S. Energy Information Administration World Oil Transit Chokepoints

Source: U.S. EIA, "World Oil Transit Chokepoints," 10 November 2014, accessed 30 April 2017, https://www.eia.gov/todayinenergy/detail.php?id=18991.

Note: In 2014, the world supply was 90 million barrels and 56.5 traveled by sea. In 2017, the EIA did not recalculate precise barrels moving by sea, but trade is essentially the same. For comparison, total world oil supply in the first quarter of 2017 was 96.89 million barrels and newly commissioned supertankers transport approximately 2 million barrels at a time; the change in seven million barrels over three years is notable, but does not appreciably impact the trade patterns depicted in this image.

Goods entering and leaving markets in the Baltic States or southern Europe have two main routes to the high seas: either through the Mediterranean Sea to the Atlantic Ocean or through the Red Sea to the Indian Ocean. The Turkish straits connect Russia and the Baltic states on the Black Sea with the Mediterranean Sea, and the Strait of Gibraltar connects the Med to the Atlantic. The Suez Canal connects the Mediterranean to the Red Sea, and the Bab el-Mandeb Strait links the Red Sea with the waters leading to the Indian Ocean. Due to both the economic value of mineral exports and the physical

value of food and fuel imports, these four chokepoints are the sole mechanism for survival of nearly every landlocked nation on the Eurasian continent.

The vital regional and worldwide chokepoints in 2017 total 15 in all, separated into eight main naval theaters. Eight are found in Europe and the Middle East, while only two are in the Americas. For an in-depth explanation and depiction of the Eight Naval Theaters, see Appendix A.

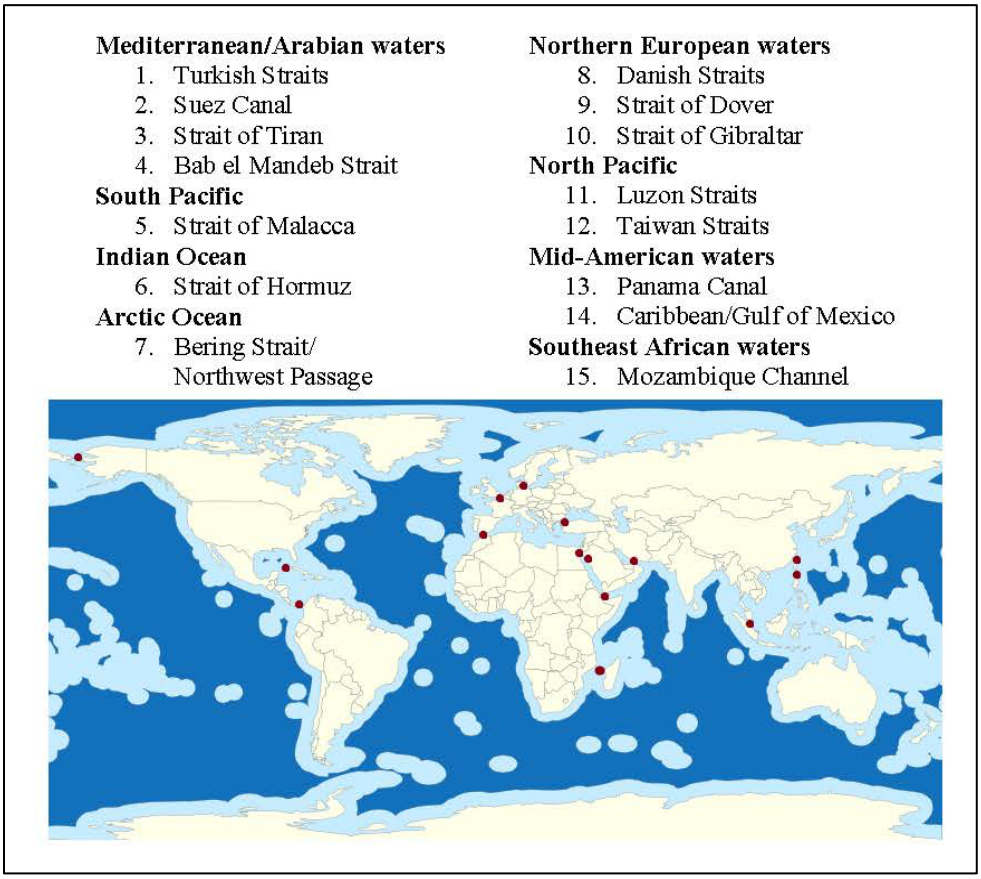

Figure 3. Maritime Chokepoints and Coastal State Waters

Source: Created by author. For the map, author added red points for 15 global maritime chokepoints to base map from Wikimedia Commons, accessed April 6, 2017, https://commons.wikimedia.org/wiki/File%3AInternational_waters.svg.
Note: Other chokepoints, such as the Soya Strait off the coast of Japan, are of vital importance to their states, but are not a part of this thesis because they do not represent significant global impacts if blocked.

Comparing global EEZs with maritime chokepoints, one sees that every modern chokepoint lies inside at least one state's territorial waters or EEZ. The relevance of this circumstance is twofold: they are frequently the source of local conflict, and they are under the growing influence of both benign and hostile nonstate actors.

Local conflict can arise at chokepoints when nearby nations have disputing territorial claims, disagree on jurisdiction, or even go to war with one another. According to UNCLOS, territorial waters are divided in half when lands are closer together than 24 nm and their territorial seas have no space between them. For example, the Strait of Hormuz is 21 miles wide at its narrowest point, which means that the territorial waters of Iran and Oman overlap and no high seas between them exists for the strait navigation. International shipping relies on nonthreatening interaction between the two states. In addition, in straits narrow enough for even rudimentary modern weapons to cross, both benign and hostile nonstate actors have significant potential to impact straits navigability.

The Panama Canal is one clear example of the rise of nonstate actor influence and the folly of thinking about chokepoints only in terms of naval power. The Canal is under the territorial jurisdiction of Panama, and the nation's primary trading partner is the United States, but the two ports bookending the Canal itself are run by the Panama Ports Company, which is a subsidiary of a Chinese investment firm.[28] Thus, the government-

[28] Panama Ports Company was a holding of the firm Hutchison-Whampoa, which merged in March 2015 with Cheung Kong Holdings. The new Hong Kong conglomerate, CK Hutchison Holdings Limited, retains Panama Ports Company. In 2008, a Congressional testimony assessed minimal negative impact of this arrangement. See the hearing before the Subcommittee on the Western Hemisphere, "The New Challenge: Chine in the Western Hemisphere," 11 June 2008, accessed 3 May 2017, https://www.gpo.gov/fdsys/pkg/CHRG-110hhrg42905/pdf/CHRG-110hhrg42905.pdf.

owned Panama Canal Authority has territorial control of the chokepoint, but the U.S. has great economic power over its operations, and CK Hutchison has legal rights to influence shipping entering or leaving the Canal. Although all three sea powers have competing influence over a major thoroughfare, the Chinese company is a nonstate actor that is unbound by international laws governing behavior between states. This dynamic leaves the U.S. particularly vulnerable to both the company itself and the Chinese government by proxy because the Canal allows the United States to mass its ships on either coast quickly, and attempting a major naval defense without it would be exceptionally difficult. While this situation is not simple, it is benign in that China benefits from smooth Canal operations. Hostile nonstate actors often do not benefit from maintaining the status quo, and can have a destabilizing impact on maritime chokepoints.

Terrorist networks have the potential to project power into constricted sea lanes to either damage shipping traffic or cause enough doubt to divert traffic. The Bab el-Mandeb strait is within 100 km of five different tumultuous nations: Yemen, Djibouti, Eritrea, Ethiopia, and Somalia. Since the effective range of even the least advanced anti-ship missiles in the Middle East is 120 km and the traffic in the Bab el-Mandeb Strait is extremely slow and limited to channels that are two miles wide, warships and oil tankers are easy targets for potential foes. As a point of reference, in 2016 Houthi rebels firing from Yemen destroyed the USS Swift, a former U.S. ship operated by the United Arab Emirates. The ship attack and mining action in the area were in response to longstanding territorial tensions with Saudi Arabia. In order to stabilize the region and keep shipping lanes open, the U.S. deployed two destroyers to patrol the Red Sea. Within days, one of the destroyers launched a precision strike on land at a rebel sight believed to have

originated rockets shot at one of the U.S. destroyers. Tensions ended, but this incident was one of many examples of nonstate actors asserting their influence on the sea commons.

And coastal states may follow their lead. Although the sea commons are accessed by all nations and less than a dozen nations in the world today have the ability to project power onto the high seas, nearly 40 states can project some form of power into their contiguous littorals.

Sea Power and National Power

Unlike other forms of physical power, theorists do not simply think of sea power as the sum total of a nation's ships. There are certain considerations that make sea power possible in the first place, aspects that make it more potent than it might otherwise be, and commercial considerations that confound it. Also, because sea power involves a common rather than sovereign national territory, much of sea power involves power projection, both in the form of offensive naval action and effective naval defense.

Sea power begins of course with a navy, and a navy is born of access and intention. Access and intention mean that a nation must be near water, its government must be willing to fund a navy, and its people must be willing to staff it. Mahan described in depth the conditions affecting the sea power of nations: geographical position, physical conformation, territory, population, character of people, and character of government.[29] Population, character of people, and character of government all essentially mean that in

[29] Mahan, *The Influence of Sea Power Upon History*, 28. See also John T. Kuehn, "What was Mahan Really Saying?" *U.S. Military History Review* 1, no. 1 (December 2014): 66-80.

order to want or be able to project power over the sea, a nation must have a seagoing people who will undertake the rigors of sea life, a prevailing interest in the commerce of sea lanes, and a government to put the people to action. Regarding geographical position, Mahan explained that a major contributor to sea power is when a nation enjoys beneficial geography. Specifically, it is located at a place in the world in which it is not "forced to defend itself by land nor induced to seek extension of its territory by way of land;" has access to the high seas; is distanced by the sea from an enemy; or has control of one of the great thoroughfares.[30]

Specific conditions affecting and elements adding to sea power have varied since Mahan's writing, but little deviation exists from his original thoughts. As prominent British historian Paul Kennedy analyzed in *The Rise and Fall of British Naval Mastery*, virtually all descriptions of sea power are based heavily on Mahan's conclusions. He offers as example the 1960 work *Sea Power: A Naval History* written by Naval Academy history professor E.B. Potter and Admiral Chester Nimitz. In their volume, Potter and Nimitz essentially recounted Mahan's ideas in more modern terms, and included alliances as a new aspect. They wrote:

> The elements of sea power are by no means limited to combat craft, weapons, and trained personnel but include the shore establishment, well-sited bases, commercial shipping, and advantageous international alignments. The capacity of a nation to exercise sea power is based also upon the character and number of its population, the character of its government, the soundness of its economy, its industrial efficiency, the development of its internal communications, the quality

[30] Mahan, *The Influence of Sea Power Upon History*, 33. In his discussion of the five conditions affecting a nation's ability to possess or leverage the power of the sea, Mahan detailed the value of geographical position. He explained that sea power is best gained if a nation is not forced to defend itself by land nor induced to seek extension of its territory by way of land; that it enjoys a distance from the enemy; and that it either has access to the high seas or control of one of the great thoroughfares.

> and numbers of its harbors, the extent of its coastline, and the location of homeland, bases, and colonies with respect to sea communications.[31]

Put simply, the key to sea power is not in the possession of a navy, but in the use of it. Mahan wrote that in addition to military strength afloat, sea power includes "the peaceful commerce and shipping from which alone a military fleet naturally and healthfully springs, and on which it securely rests."[32] There is debate about whether he was correct that a military fleet springs from commerce and shipping, but most theorists do agree that a commercial fleet rests securely on a military fleet. Renowned nuclear theorist Bernard Brodie, who is often called the American Clausewitz and started his career as a naval theorist, wrote that sea power "has never meant merely warships. It has always meant the sum total of those weapons, installations, and geographical circumstances which enable a nation to control transportation over the seas during war time."[33] The utility of a navy has traditionally been to protect shipping and communications and to safeguard harbors, but a modern navy can also project power ashore or provide the threat of a survivable second-strike nuclear attack via submarine-launched ballistic missiles.

Although modern exercises of sea power have been more varied and perhaps even more influential than in the time of wooden ships, the point is the same: there is no power to a navy that is not used in its nation's seagoing interests. Most theorists before,

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[31] Paul M. Kennedy, *The Rise and Fall of British Naval Mastery* (London, England: Penguin Books, 2001), 4.

[32] Mahan, *The Influence of Sea Power Upon History*, 28.

[33] Bernard Brodie, *A Guide to Naval Strategy* (Princeton, NJ: Princeton University Press, 1942), 2. Original emphasis by Brodie redacted by author.

between, and after Mahan in 1890, Brodie in 1942, and Kennedy in 1976 agree that sea power has to do with a nation's ability to influence the sea. Regardless of its source or its means, sea power is a nation's ability to aquatically advance its ends: to enforce its national interests on, through, or from the sea.

Sea power is but one part of a larger picture of total national power, both resulting from national power and adding to it. Total national power is the combination of all resources and options available to a state to advance its national objectives.[34] Capable navies extend from total national power because they require particular resources and circumstances as explained above. Navies are expensive, especially in modern times; both their establishment and maintenance require considerable economic and physical resources. Yet they are not mere showpieces; capable navies are also vital instruments of national power.

Within total national power, there are instruments—political/diplomatic, economic, informational, and military power—and forms—hard power or soft power.[35] The Department of Defense Joint Publication 1 defines the instruments of national power and Joseph Nye, Jr. coined the term "soft power." Nye served under President Clinton as the Assistant Secretary of Defense for International Affairs and the Chair of the National Security Council, and was voted in 2014 as one of the most influential scholars in the world. He explained that hard power and soft power are distinguished from each other

[34] Author's definition.

[35] Instruments of national power from US Department of Defense, Joint Publication 1, *Doctrine of the Armed Forces of the United States* (Washington, DC: Government Printing Office, 2013), 1.

not by which instruments they use, but by their approach, where hard power uses coercion and soft power uses inducements.[36] While sea power is part of the military instrument of power, it can be used as either hard power or soft power. For example, national interests may be advanced by threatening naval action, a coercive hard power approach; or by ensuring naval protection, an inducing soft power approach. In this way, a capable navy is both a result of national power and a versatile instrument of it.

While discussing his ideas on soft power, Nye points out that power is conceptually over simplified by those who view it as a simple equation of more vs. less. Rather, he says, power in today's world depends on context and is distributed in a pattern that resembles a complex, three-dimensional chess game:[37]

> On the top board (representing the first context in which power resources may be analysed), military power is largely unipolar. But on the middle board, economic power among states is already multipolar, with the United States, Europe, and Japan representing a majority of world economic output, and China's dramatic growth rapidly making it the fourth major player. On this economic board, the United States is not a hegemon, and often must bargain as an equal.
>
> The bottom chessboard is the realm of transnational relations that involve actors crossing borders outside of government control. This realm includes players as diverse as bankers electronically transferring sums larger than most national budgets, terrorists transferring black-market weapons and hackers disrupting Internet operations. On this bottom board, power is widely dispersed, and it makes no sense to speak of unipolarity, multipolarity, or hegemony. And yet it is from this bottom board that many of the most important security challenges arise. Those who recommend a hegemonic American foreign policy based on traditional military power are relying on inadequate analysis, and like one-dimensional chess players in a three-dimensional game, they will eventually lose.

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[36] Joseph S. Nye Jr., *Bound to Lead: The Changing Nature of American Power* (New York: Basic Books, 1990).

[37] Joseph S. Nye Jr., "Recovering American Leadership," *Survival: Global Politics and Strategy* 50, no. 1 (February 2008): 55-68.

A final point to consider: although sea power interfaces with the world on all three chessboards (which makes it a crucial part of American national power), it is not necessarily permanently relevant in itself. Writing during the greatest naval battles of all time, when not a single other theorist could conceive of navies ever being obsolete, Brodie did. He wrote, "If in the future the greater part of ocean transport is carried in aircraft rather than in ships, or if the transfer of men and commodities across the seas becomes unimportant, sea power as such will cease to have meaning."[38] Although these conditions are unlikely to obtain even in the distant future (rather, the seas are growing in importance), if sea power could not be used to advance a nation's interests, it would have no meaning of its own. Indeed, the ways in which sea power is used to advance a state's interests illuminate the greater context of power and the very question of this thesis.

Command of the Sea vs. Sea Control

Having clarified the sources of national power at sea and the centrality of protected interests, theorists turn next to how much and in what ways a nation with significant sea power might dominate shared sea space. Note that in naval discussions, command of the sea commons implies command of all sea commons; it is expressed as "command of the sea," occasionally shortened further to "sea command." This is different from "sea control," and each of these ideas will be discussed further. There is consensus on the point that shared space domination is not thought of as permanent or unchallenged, but there is some evolution of language in the terms used to discuss

[38] Brodie, *A Guide to Naval Strategy,* 2.

warring sea powers, as well as some later inclusion of the dynamics between sea powers not in active war with one another.

Although Mahan never explicitly defined sea power or command of the sea, he referred to a warring navy as having "that overbearing power on the sea which drives the enemy's flag from it, or allows it to appear only as a fugitive, and which by controlling the great common, closes the highways by which commerce moves to and from the enemy's shores."[39] Without clearly explaining whether control of the great common was required or possible in all oceans at all times, or distinguishing between local control of thoroughfares and general control of all oceans, Mahan's writings did not fully illuminate this topic.

The compelling ideas about command of the sea were from his contemporary, Sir Julian Corbett, an influential British historian who was chosen in 1905 to serve as an advisor to the Admiralty in command of the Royal Navy. Like Mahan, Corbett tended to discuss command of the sea in the context of war, stating that the object of naval warfare is "the control of communications, and not, as in land warfare, the conquest of territory," and "must always be directly or indirectly either to secure the command of the sea or to prevent the enemy from securing it." He explicitly connected communications and command later in his work: "Therefore the 'command of the sea' means the control of communications in which the belligerents are adversely concerned."[40] Corbett's wartime

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[39] Mahan, *The Influence of Sea Power Upon History*, 138.

[40] By "communications" here, Corbett does not mean sending and receiving of messages, but the naval terminology "sea lines of communications" (SLOCs)—simply routes of sea travel between ports. Julian S. Corbett, *Some Principles of Maritime Strategy* (London, England: Longman's, Green, 1918), 91, 316.

definition of command of the sea was simple and based in action: possessing command of the sea meant controlling sea lines of communication.

Brodie and Kennedy echo this active, trade-centric definition. In Brodie's words: "The side which is able to carry on its own commerce and stop that of the enemy is said to be in 'command of the sea' in the region where it enjoys that marked advantage."[41] In Kennedy's words: "If it is possible for a nation generally to preserve its traffic along these "well-worn paths" and to deny the privilege to the enemy, then it would possess command of the sea: its trade would flourish, its links overseas would be maintained, and its troops would pass freely to desired destinations."[42]

Corbett, Brodie, and Kennedy also agreed that the preponderance of sea power leading to command of the sea does not imply impunity or an absence of regional struggle. Corbett differentiated between general and local command, and both definitions were accepting of occasional lapse. In his view, local command of the sea is essentially a temporary condition because it is "liable to interruption" from naval forces in other theaters. Further, general permanent command of the sea means in practical terms that an enemy is no longer able to send forces to sea, but even general command does not mean one's enemy can do nothing. Rather, it means that he cannot sufficiently interfere with operations to seriously affect war's outcome.[43] Again, evolving thought echoed Corbett's assertions. Brodie: "Command has never meant a control which was either complete in

[41] Brodie, *A Guide to Naval Strategy*, 91.

[42] Kennedy, *The Rise and Fall of British Naval Mastery*, 2.

[43] Corbett, *Some Principles of Maritime Strategy*, 318.

degree or unbound in maritime space."[44] Kennedy: "Command of the sea has never implied a total possession of oceanic waters: this is both physically impossible and strategically unnecessary."[45]

But wartime and peacetime distinctions confounded these simple ideas. Because Corbett thought of command of the sea in terms of war, he took issue with the idea that the sea is generally in command at all. "One of the commonest sources of error in naval speculation is the very general assumption that if one belligerent loses command of the sea that command passes at once to the other belligerent." Because the sea resists possession, it is not like territory. "The normal position is not a commanded sea, but an uncommanded sea."[46] Later in his work, Corbett did offer a peacetime definition of command of the sea, which was not based in action or events, and on which he did not expound further than one sentence. He wrote, "Command of the sea exists only in a state of war. If we say we have command of the sea in time of peace it is a rhetorical

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[44] Brodie, *A Guide to Naval Strategy*, 91.

[45] Kennedy, *The Rise and Fall of British Naval Mastery*, 2.

[46] Corbett explains his reasoning in detail: "The fallacy of the idea is that it ignores the power of the strategical defensive. It assumes that if in the face of some extraordinary hostile coalition or through some extraordinary mischance we found ourselves without sufficient strength to keep the command, we should therefore be too weak to prevent the enemy getting it—a negation of the whole theory of war, which at least requires further support than it ever receives. And not only is this assumption a negation of theory; it is a negation both of practical experience and of the expressed opinion of our greatest masters. We ourselves have used the defensive at sea with success, as under William the Third and in the War of American Independence, while in our long wars with France she habitually used it in such a way that sometimes for years, though we had a substantial preponderance, we could not get command, and for years were unable to carry out our war plan without serious interruption from her fleet." Corbett, *Some Principles of Maritime Strategy*, 92.

expression meaning that we have (*a*) adequate Naval positions; (*b*) an adequate Fleet to secure the command when war breaks out."[47] Corbett did not define adequate, and he did not acknowledge whether more than one peacetime navy could possess command of this sort, or whether that command would be general or local, permanent or temporary.

Corbett and Brodie saw command of the sea as a continuum of active influence in which the preponderant naval power operationalizes command of the sea by controlling the sea lines of communication. Corbett wrote, "The question then in the consideration of any proposed operation or line of operations will be, not 'Have we the command of the sea?' but 'Can we secure the necessary lines of communication from obstruction by the enemy?'"[48] This is a relevant point, but since the last 60 years of naval operations and modernization have occurred during a period of relative peace when dozens of modern navies have ably sent forces to sea, there remains a need for discussion differentiating between naval powers in relative peace.

Kennedy coined the term "naval mastery" to describe a preponderance of sea power that serves to deter adversary action—an idea that can be thought of as a peacetime command comparable to Corbett's permanent general command. The definition does not imply an active control over a belligerent's commerce, but an obvious and foreboding threat to it. The details are worth reading in his words at their full length:

> Sea power appears in practice to lack quantification: almost any state can claim to have or have had a certain amount of sea power. . . . By the use of the term "naval mastery," however, there is meant here something stronger, more exclusive and wider-ranging; namely a situation in which a country has so developed its maritime strength that it is superior to any rival power, and that its predominance

[47] Corbett, *Some Principles of Maritime Strategy*, 318.

[48] Ibid., 321.

> is or could be exerted far outside its home waters, with the result that it is extremely difficult for other, less states to undertake maritime operations or trade without at least its tacit consent. It does not necessarily imply a superiority over all other navies combined, nor does it mean that this country could not temporarily lose local command of the sea; but it does assume the possession of an overall maritime power such that small-scale defeats overseas would soon be reversed by the dispatch of naval forces sufficient to eradicate the enemy's challenge. Generally speaking, naval mastery is also taken to imply that the nation achieving it will usually be very favourably endowed with many fleet bases, a large merchant marine, considerable naval wealth, etc., all of which indicate influence at global rather than regional level.[49]

Kennedy's description of naval mastery is the most illuminating description of command that exists since the time of Mahan and Corbett, and it helps to distinguish "command" from "control." Others have used the term naval supremacy or naval superiority describe local or general command or control, and even Kennedy uses the confusing term "local command of the sea." These ideas will be discussed further, and this thesis will not adopt the term "naval mastery," but the image he paints of a peacetime navy with vast and latent influence is precisely the caricature of the modern navy in command of the sea.

Command of the sea implies a largesse not held by most navies in history, in the 21st century, the meaning of "command" has shifted from a purposeful exertion of rare capabilities to a latent position of rare potential. In addition, command of the sea and other military prowess have merged in popular discussion with estimations of total national power. Posen began this trend in 2003 when he adapted "naval mastery" to describe not just U.S. command of the sea, but U.S. command of all commons. The collusion of "naval mastery" with national power and "command of the commons"

[49] Kennedy, *The Rise and Fall of British Naval Mastery*, 9.

carried into scholarly dialogue for most of the decade following his work and will be reviewed separately in chapter 7. Outside that discussion, the last relevant scholar in command of the sea terminology is Robert C. Rubel, retired U.S. Navy captain and former Dean of Naval Warfare Studies at the U.S. Naval War College.

Writing nearly 100 years after Sir Julian Corbett, Rubel explained in modern terms the key components of and differences between command of the sea and control of the sea. He notes that the U.S. Navy was so uncontested in its command of the sea in the 20 years since the 1990 fall of the Soviet Union that it stopped talking about sea control completely.[50] Rubel resurrected the Corbettian idea that command of the sea is a position of power enabled by one's main battle fleet, and control of the sea is the exertion of power, delimited in space and time, usually fought for and exercised by smaller combatant ships that are both less expensive and more numerous than the flagships of a powerful navy.[51] He also offered his own definition in 2010: "a fleet that commands the sea establishes conditions in which an opposing navy could not come out of port and challenge it."[52] But within two years, his definition changed, and he devoted an entire paper to the topic.

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[50] Robert C. Rubel, "Talking About Sea Control," *Naval War College Review* 63, no. 4 (Autumn 2010): 38.

[51] Rubel, "Command of the Sea," 22. Rubel clarifies that in his view, the word command does not have to do with control of water areas, but instead "strictly denotes the balance of power between or among navies." He also writes that in modern navies, fighting for and exercising command of the sea are not necessarily done by combatants and the main battle fleet respectively. These ideas are counter to this author's, but worthy of mention.

[52] Rubel, "Talking About Sea Control," 39.

In “Command of the Sea: An Old Concept Resurfaces in a New Form,” Rubel addressed the change of the global picture, how once-minor skirmishes now have global repercussions, and how that change impacts command of the sea definitions. He detailed the crux of his argument in a few very salient sentences:

> In today’s world, sea power, even for nations with small coastal navies, cannot be properly understood on any scale less than global. Command of the sea . . . is directly associated with overall military and economic superiority, which in turn allows a nation to establish a world order on its terms. . . It is useful to understand modern command of the sea as a condition of naval superiority that influences other nations’ decision in a way that is congenial to U.S. interests…The point lies in the nature of the global system that has emerged and in the potential consequences for that system if the U.S. Navy suffers even a local defeat.[53]

From here, Rubel defines command of the sea as “the condition in which the U.S. Navy, in conjunction with allies and partners, is able to maintain a global security environment that permits unrestricted global systemic flow.”[54] This definition implies a collectivity that he later acknowledges in phrases such as “continuous and systemic exercise of command of the sea” and even in defining the global security environment as “a corporate command of the sea by an informal condominium of nations.”[55] Although Rubel may be right that command is an increasingly corporate endeavor, the definition need not accommodate its changing nature. For the purposes of this work, command will be understood colloquially and as it applies to a single entity rather than a group.

Command is defined in the vernacular as the exercise of legitimate authority to influence, control, or force—and this is a useful starting point for a reasonable definition

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[53] Rubel, “Command of the Sea,” 24-26.

[54] Ibid., 27.

[55] Ibid., 31.

that lends itself to evaluation. Command in naval discussions refers to both deduced influence and expressed control. That is, other entities base their actions on the threat of your response (command in the form of influence); and when other actors do challenge your influence, their effort is either sufficiently defended against, or lost influence is quickly recovered (command in the form of control or force). Command of the sea commons is the marriage of these ideas.

Command of the sea thus means influence in all sea commons during peacetime and successful defense (or rapid recovery) of local sea control during conflict. The distinction between general and local command of the sea is irrelevant during peacetime because a state losing sufficient influence in one area of the globe to achieve its interests means that state is disadvantaged in the global economy, and experiences a corresponding reduced influence in the rest of the commons. In addition, influence in all sea commons rather than influence in any sea common is the difference between largesse and a lack thereof. As discussed in this thesis, control is local, but command is always general. Command can be thought of as the composite of global influence and local control.

For the sake of clarity, local sea control is that condition most people imagine when they refer to command of the sea, but the two are different. A navy that has control of the sea in a defined area can accomplish its interests- from moving its merchants and armies, to blocking those of its adversaries, to controlling international traffic and access to resources in the area. This local sea control can be exerted temporarily by navies other than the single navy in command of the sea, and in that case, local sea control can be lost temporarily while still retaining command of the sea. In addition, local sea control may

even be achieved using non-naval means such as with land-based weapons or local air superiority. Several theorists have analyzed the ideal ships a navy might need to exert or defend local sea control, and they use detailed language that helps illuminate a thorough discussion.

Verbs and Ships of the Sea

Corbett went into great detail about tactics and ships a defending navy might use to exercise command, or an opposing navy might use to dispute command. He wrote that command of the sea is exercised by conducting defense against an enemy's invasion, by attack on and defense of maritime commerce, and by support of military expeditions. Conversely, an opposing fleet may challenge or dispute command of the sea by conducting minor tactical actions or using fleet-in-being threats.[56] Further, he believed that *permanent general control* could only be secured by the practical annihilation of the enemy's fleet, while *local and temporary control* may be secured by: (a) A defensive action not necessarily entirely successful (containing); (b) Forcing concentration on the enemy elsewhere (diversion); (c) Superior concentration so as to render impotent the enemy's force available in the special theatre of operations (masking or containing).[57] Corbett envisioned that command of the sea would be ensured by large, expensive capital

[56] Fleet in being is a term of particular import in today's naval picture and will be discussed further in Chapter 5. It means that a fleet can exert influence and deter actions without ever leaving port; its strength is so great that its mere existence is a factor in the calculations of its opposers.

[57] Corbett, *A Guide to Naval Strategy*, 321.

ships capable of annihilating an entire navy while smaller, more dispensable ships would battle in disparate locations for local sea control.

Rubel's contribution to the discussion of sea control is again a modern adjustment of timeless ideas. He counters the assertion that capital ships are necessary to command the sea; in his view, modern times have inverted the ships required to gain command of the sea or to exert control of the sea. In previous times, "one fought for command of the sea—via battle, if possible—and exercised sea control, via dispersed security operations. Now . . . our most capable ships, the carriers, are best used to exercise command of the sea—that is, maintain the security environment—while smaller, more numerous forces may have to fight a decisive battle for local or regional sea control."[58]

Brodie's analysis focuses primarily on the differential of forces present between navies actively in battle. He explains that "to assert command may require only a modest margin of superiority to the enemy in fighting power- and no superiority at all if the enemy's bases are distant from the area which one wishes to command- but to protect a vast shipping even after command is established may require a great number of additional and usually specialized warships and aircraft beyond that margin of superiority."[59] Brodie also distinguishes between the numbers of naval forces required to "assert" command and "protect" it, which are somewhat different from the two widely accepted Corbettian tactical verbs "exercise" and "dispute." The upshot here is that Corbett and Brodie agree that protecting, or exercising, command of the sea is vastly more expensive for a navy

[58] Rubel, "Command of the Sea," 30.

[59] Brodie, *A Guide to Naval Strategy*, 92.

than asserting or challenging command. That is, the navy in command of the sea must work harder, spend more money, possess more forces, and project more power than any force attempting to disrupt command.

Regardless of the ships required or the verbs used, the point for this thesis is the same: command of the sea is a strategic condition, while local sea control is a tactical exchange, and a navy in command of the sea will exert local sea control as needed. The following chapter will distill these ideas into a metric for assessing command of the sea.

CHAPTER 3

ASSESSING COMMAND OF THE SEA: A TWO-PART PARADIGM

In the modern paradigm of war, command of the sea is a strategic condition, sea control is its operationalization, and specific naval maneuvers are its tactics. In order to conceptually frame the evaluation of command of the sea, this chapter will use the definitions of command and commons, and the means of naval maneuvers, to propose a two-part metric for command of the sea. Chapters 4 and 5 will then separately apply each of the metric's parts—global naval influence and local sea control—to evaluate the extent of U.S. command of the sea.

Recall from chapter 2 the meaning of sea commons and the definition of command of the sea. Sea commons encompass all waters outside the 12nm belt from land, including the sea lanes used to travel through the belt. Although modern analysis tends to focus on the sea lanes part of the commons, the high seas outside 12nm and beyond EEZs are also vitally important because they contain undersea data cables and natural resources that all nations may exploit. Command of the sea means influence in all sea commons during peacetime and successful defense (or rapid recovery) of local sea control during conflict. These two aspects of sea command are quite different, and are thus analyzed separately.

Measuring Global Naval Influence in Peacetime

Measuring global influence with absolute precision is impossible, but measuring the influence of one state relative to others is certainly manageable. "Influence" is the ability to affect things—to shape policy, direct decisions and movements, ensure

favorable treatment, and the like. In the sea commons, indicators of effective influence are the ability to globally navigate and trade at will, or to prevent adversaries from navigating or trading at their will. Other examples of exerting influence in line with national interests include gaining or restricting rights to resources, or protecting the rights of navigation and rights to resources of one's allies. As command of the sea is that largesse of one navy over all others, the global aspect of influence is the key to this part of command. Since no nonstate actor currently has the ability to influence all sea commons, the analysis of influence will compare only states to states.

Naval influence results primarily from the credible threat of offensive naval power, and the threat is furnished by a measurable set of capabilities. Global naval influence requires substantially more complex capabilities than local influence. In addition to the sheer size of a state's navy and high seas capability that allows it to maneuver into multiple theaters at once, global naval power includes the survivability and capabilities of its assets as well as the capacity and mobility of a state's reserve of naval power. A global navy must possess a high seas capability either to battle in the open seas, or to traverse them to battle in an adversary's home waters. During peacetime, the size of a navy provides simultaneous service to multiple theaters, while ship survivability, advanced offensive and defensive capabilities, and a naval reserve that can be mobilized quickly, all work together to produce a credible threat that can swell forces worldwide as needed. Expansive and expensive, global naval influence requires sustainable global capability.[60]

[60] Global naval influence may come from different capabilities at some time in the distant future; the important thing here is that analysis address current capabilities

Today, global naval influence is achieved by a combination of two capabilities: long-term, long-range power projection, and stealth. With current technology, states can accomplish distant power projection with long-range missiles carried by sustainable aircraft, surface ships, or submarines. Stealth comes from ships and aircraft that have low radar cross-sections, or submarines that are quiet or remain hidden. Yet not all of these assets are created equal, and not all are ideal for global naval influence.

Surface ships have traditionally been the cornerstone of naval power because they carry a compelling amount of firepower, but they present several problems for global reach. Large surface ships are difficult and costly to sustain, easy to detect, and expensive to lose, both in dollars and in life.[61] Globally sustainable ships can weather battle as well as the high seas, and have long-term fuel, food, and weapons provisions. For fuel, this could mean ships with massive fuel tanks, those with refueling capability, or those that are nuclear-powered, but all these propulsion options are expensive in today's operational framework. Food and weapons may come from underway replenishment, forward basing, or stocks of cans or ready-made meals such as MREs. In today's world, globally sustainable ships require long sea lines of communication made up of strings of logistics/supply ships, which are defended by even more warships.[62] Paradoxically, while

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required. Some outlandish but not impossible means of long-range reach in the future would be electrifying the ocean, for example, or imagine arming Sound Surveillance System (SOSUS) arrays or dispatching a fleet of artificially intelligent unmanned sea animals.

[61] Asset survivability is especially important in times of fiscal constraints—it comes from ship self-defense, material quality, and damage control systems, or from the use of unmanned vehicles that aren't required to be survivable.

[62] A Naval Postgraduate School study found that 47 percent of all personnel afloat are occupied either on carriers or in supporting roles for them. Juan L. Carrasco, "A

massive surface ships are useful for asserting local sea control and for projecting power at sea and onto land with missiles and aircraft, they are not the primary contributors to command of the sea because the logistics required are extraordinarily expensive and the long tail of ships complicates stealth while drastically reducing survivability.

On the other hand, submarines embody deterrence, enhance survivability, and are easier to sustain due to their smaller crews and access to sanctuary under water.[63] A submarine need not be present in theater to provide a credible threat; its mere absence from port heightens the possibility of its presence anywhere in the world. And unmanned submarines are doubly powerful: the combination of global reach, lethality, surprise, and survivability enable a nearly unlimited means to protect state interests. The major limitation of submarines as compared to large surface combatants is their payload—so any estimation of naval influence should not treat submarines and surface combatants as interchangeable assets. But because their stealth makes them more than a weapons delivery vehicle, the most important facet of naval power that leads to global naval influence in the current era is a fleet of well-armed submarines. It may even be possible to build a globally influential navy around submarines, using surface ships solely as

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Manpower Comparison of Three U.S. Navies: The Current Fleet, a Projected 313 Ship Fleet, and a More Distributed Bimodal Alternative" (master's thesis, Naval Postgraduate School, 2009), accessed 8 May 2017, http://calhoun.nps.edu/handle/10945/4657.

[63] In the minds of naval theorists, sanctuary is the vital requirement of any capable Navy, and sanctuary is increasingly difficult to find above water. Note that submarines must also be sustained globally, but where surface combatants require logistics support every 3-5 days or a port call once a month and weapons come from only a few places in the world, submarines commonly leave port with several months of provisions and a powerful battery of stealth weapons that remain onboard until they are expended or return to port.

means of logistics or land power projection, and supplementing extremely quiet nuclear submarines with affordable diesel variants.

Because deterrence does not work without firepower, the second facet of credible offensive naval power is the volume and reach of weapons that can be mobilized quickly in the event of conflict. This includes weapons maintained in the active fleet that may be launched from operational submarines, globally sustained surface ships and aircraft, or unmanned vehicles. Deterrent weapons also include reserve fleet weapons that are stockpiled and can be mobilized quickly and launched from either operational vessels or from a standing fleet of naval reserve vessels. It is obvious that stockpiles of weapons are useless without vehicles to deliver them; therefore, this analysis must include an assessment of capable delivery vehicles in addition to mere numbers of weapons.

The third facet of offensive naval power leading to global naval influence in peacetime is the deterrent value of naval power reserves. A reserve of naval power is more than a standing reserve fleet and stockpiles of weapons; it is an expensive and complex component of global naval influence because it provides the longevity required for more permanent credibility. If adversaries assess that a state lacks the ability to generate naval assets beyond those fielded for a conflict, they could mass a comparable fleet and mount an attack that would handicap the navy attempting to command the sea. But a reserve of naval power creates a navy that can project power throughout a protracted conflict and generate capabilities as needs arise during war. Naval power reserves are comprised of a merchant marine fleet that can be weaponized and that provides legions of capable mariners, a robust shipbuilding capability, and an efficient naval research & development process that can equip the fleet as needed. This facet of

offensive naval power conveys a deep well of resources that few adversaries are wont to challenge.

Finally, in addition to the credible threat of submarines, ships, and weapons, and the deterrent value of a large naval reserve, global naval influence is achieved by a navy's effective defense against primary threats to its survival. That is, if all of a state's offensive naval capabilities are indefensible, these capabilities are essentially irrelevant as a mechanism of influence. Since the most important facet of naval power is a fleet of submarines, they are also the first primary threat, and the most important facet of naval defense is antisubmarine warfare (ASW). ASW can be accomplished using mines or torpedoes launched from any platform, including unmanned vehicles and even satellites. The second primary threat to global navies are the missiles designed to attack non-submarine assets, including expensive surface combatants and aircraft. Many of these missiles are inexpensive, and many are land-based. Missile defense can be achieved by using technologies that launch anti-missile defenses or that create electronic barriers preventing missile launch, or even by using unmanned vehicles that don't require survivability after releasing their payload. Whether submarines, aircraft, or surface ships, naval assets must be defensible for offensive capabilities to be credible.

Thus, there are four modern metrics of peacetime global naval influence. The first is the size, stealth, and capability of a state's submarine fleet. Second is the total weapons payload available for long-range delivery, regardless of weapons delivery vehicle and including stockpiles of reserve weapons. Third is a state's ability to mobilize a high seas reserve of naval power, which includes its merchant marine fleet, shipbuilding capacity, and research and development capability. Fourth is a state's ability to defeat primary

threats. Submarines, Weapons, Reserves, and Defense make up the measurable components of a globally influential navy.

There are less than a dozen states worldwide that have the ability to field all of these components. As midfield navies grow and modernize, their capabilities may be analyzed against others in the same manner once their reaches are global and the reserves capabilities are robust enough to sustain long-term command of the sea. But simply massing sea power is not sufficient to command the sea. The other half of fielding a navy that commands the sea is its ability to consistently defend its interests against attacks on local sea control.

Measuring Defense of Local Sea Control

A state that has or claims command of the sea will inevitably be challenged, and at those times must be able to defend against adversary acts vis-a-vis its local sea interests. As previously established, command of the sea does not imply absolute control at all times or that the navy with command is all-powerful or able to defeat all other navies combined. There is no need to have policing forces in all global theaters at once; in fact, the largesse of command implies that employing police forces in all places at all times is unnecessary. But a state in command of the sea ought to be able to defend local challenges in the sea commons from adversaries as they arise.

Command of the sea is concerned with local sea control because it enables the state that has command of the sea to accomplish its interests. As the U.S. Navy puts it, “achieving local or regional maritime superiority may be a goal for a limited duration in order to accomplish specific objectives. For example, naval forces could establish local

maritime superiority in the Strait of Hormuz or regional maritime superiority in the Arabian Gulf to facilitate the free flow of commercial shipping."[64]

If a challenger makes an attempt to take control of a local area, successful defense of control would mean the state in command can still accomplish its interests, and the challenger either cannot achieve its interests, or is only able to do so with the commander's tacit permission.[65] Since no navy is likely to survive undefeated indefinitely, regardless of the preeminence of its power, it is probable that even a powerful navy will occasionally lose local sea control when an adversary has mounted a focused campaign. A navy that possesses command of the sea will, however, be able to mass forces and rapidly recover local control in order to maintain command of the sea. Rapid recovery of control can be measured by the ability to regain control fast enough to retain influence. That is, if a state's defense of sea control is too slow to maintain the credibility of its threat, then the state does not express control.

In general, the aggressors attempting to overturn local sea control are from two sources: those states whose home waters are under more outside influence than they prefer, or those nuisance forces whose primary aim is to detract from the preponderant influence of the state in command of the sea. It is also possible that a battle for local sea

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[64] United States Navy, *Naval Doctrine Publication 1* (March 2010): 28. A couple paragraphs later: "Strategic maritime geography, the (Combatant Commander's) regional requirements, the capabilities of potential adversaries, and enduring U.S. national objectives drive the scale of forward-deployed naval presence and surge capability necessary to deter aggression at sea and, when required, establish maritime superiority in a specific locale."

[65] Kennedy first introduced this idea of tacit consent or permission in his definition of "naval mastery."

control could take place around a resource that is outside all states' home waters, such as a natural gas reserve or an unclaimed island. Challenge of local control may happen as a form of testing during peacetime, during a time of escalating tensions, or during a full-blown battle or major theater war. In order to assess a state's ability to defend local control, one can analyze its past success in defending attempts on its control, or one can compare its capabilities against viable regional threats that might attempt to exert local control in the future. Local sea control capabilities are slightly—but fundamentally—different from those needed to maintain global influence.

In the current era of threats in the Mediterranean/Arabian waters and the South Pacific, analysis of local sea control decreases the relevance of high seas capability and adds the importance of home-court advantage. Local sea control is synonymous with the ability to block naval movement or access to sea commons for duration of the controller's choosing, where the controller is either the state that commands the sea or the state that has challenged that command. Blocking can be achieved with traditional or asymmetric methods. Historically, large navies have achieved this localized influence with naval blockades, but in the modern world large navies, small navies, or nonstate actors could also use alternate means such as small patrol craft or mine laying measures.[66] It is even possible to achieve local naval influence with land-based weapons or the mere threat of suicide craft or mines. If an actor causes enough damage on several occasions to result in shipping diverting around a particular area and naval movement diverts at a cost to

[66] Reference the bombing of the USS Cole, Houthi rebels laying mines in the Gulf of Aden, and the Sea Tigers, the exceptionally effective naval wing of the Sri Lankan insurgency group Liberation Tigers of Tamil Eelam.

interested states due to a threat that is deemed credible, then the challenger has exerted influence on the system and achieved a measure of local control.

It is worth noting that defense of control might fail—and later be recovered—while maintaining command of the sea. In some attacks on local sea control, the state that commands the sea will lose the battle by being overrun by local naval assets, land-based weapons, or asymmetric advantage. But to retain command of the sea, that local control must eventually be regained. Regaining control must be timely and clear; much of command is achieved through the perception of threat rather than through active expression of control. Some indications that a state's sea control credibility is diminished are increased challenges on its control; lack of adherence to treaties or international norms; changes in non-naval indicators of power such as stock exchanges; or prevailing international opinion. These are complex to understand and even more difficult to assess, but may be useful in helping states determine whether to exert control of not.

Because the state in command must retain at all times those capabilities required to defeat all likely threats—no matter how distant those regions or how disparate those threats—it is much more expensive to retain command of the sea than it is to challenge it. For the U.S. to defeat today's most likely threats—the navies of China and Russia, as well as Iran and nonstate actors in the Middle East—its necessary capabilities are vast and varied. These include anti-submarine warfare to protect the vital submarine fleet; mine countermeasures to defeat mining action designed to block littoral straits; defense measures to face a variety of threats, from sophisticated missiles based on land in Russia or China, to rudimentary land-based weapons at chokepoints or launched from small, mobile patrol craft, to those needed to face swarms of small ships, including suicide

attacks and remote-controlled vessels. In addition, just as offense can be defensive in nature, defense can be offensive in nature—the U.S. benefits significantly in these theaters from offensive mining, as well as from advanced submarine warfare and precision targeting of land objectives. As is no surprise, many of the facets of offensive naval power that lead to naval influence are also vital in the defense of local sea control, while longer-term facets, such as reserve mobilization, are less relevant in the short-term battle.

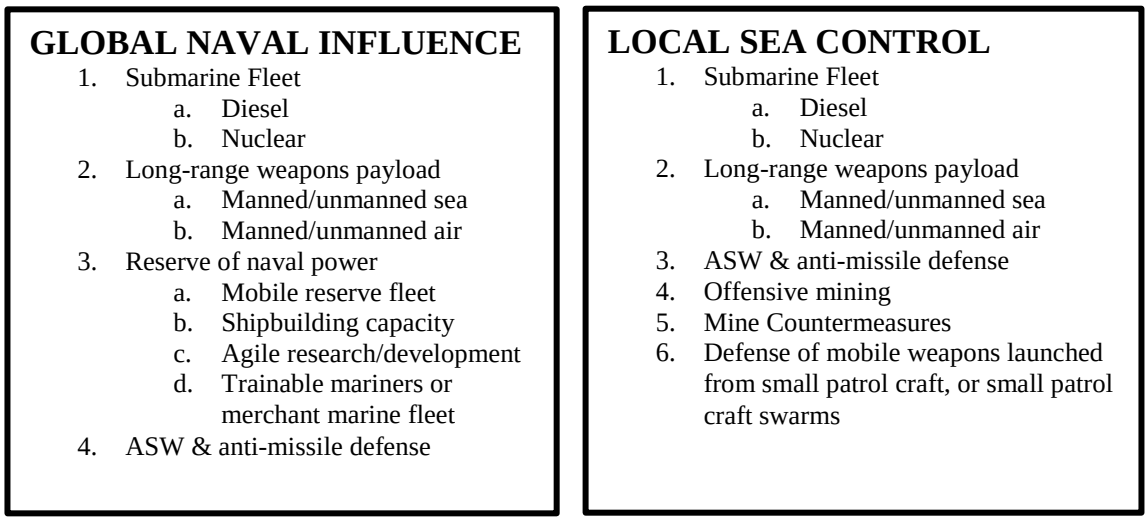

Figure 4. Capabilities That Enable Command of the Sea

Source: Created by author.

The United States retains the most powerful Navy in the world, but this fact does not necessarily confer on it the command of the sea. This chapter has detailed the two necessary parts of command of the sea—global naval influence and local sea control—and has revealed the specific set of capabilities that provide them in today's world.

CHAPTER 4

EVALUATING GLOBAL NAVAL INFLUENCE

Of 195 internationally recognized nations, 113 have naval forces of some kind. Most are riverine or constabulary forces unable to project power regionally or even to the reaches of their own EEZs. Approximately two-dozen navies worldwide currently possess the capability to influence their entire EEZ, and only 13 are assessed to be able to project power beyond their home waters. These nations are Australia, Brazil, China, France, Germany, India, Italy, Japan, Russia, Spain, South Korea, the United Kingdom, and the United States.[67] This chapter provides a simple binary analysis of whether top navies are globally influential or not using two basic metrics distilled from the original four.

Nations achieve global naval influence with a lethal, stealthy submarine force; long-range weapons delivered from vessels that can be sustained far from a state's home waters; a high seas reserve of naval power; and the ability to defeat primary threats. Yet all four of these aspects do not lend themselves to unclassified study or timely conclusions. For example, advanced military states can evolve their weapons and defense

[67] The U.S. Office of Naval Intelligence (ONI) assesses U.S. capabilities against a variety of threats. Its database of worldwide acoustic ship signatures and weapons capability is unrivaled in the international naval intelligence community and its civilian counterparts at the Janes Intelligence Review and RAND Corporation provide the non-military context of military analyses. Basic ship inventories are provided in Appendix C for the United States and the other powerful navies discussed. The most comprehensive open-source unclassified reports of Chinese and Russian capabilities were published in 2015 by ONI, with updates provided in the 2016 U.S.-China Economic and Security Review Commission reports to Congress and several small 2017 offerings from Janes, RAND, and ONI.

systems fairly quickly, fielding longer-range weapons or more capable defense platforms as their research and development industries provide the technologies, and many of these advances are closely guarded state secrets. Thus, the analysis of both weapons ballistics and defensive naval technologies are best left to classified analysis documents with up-to-the-minute information. Moreover, a reserve of naval power is a complex and detailed index of economic, intellectual, and industrial capacities that both supports and tends to mirror a state's active fleet of naval power. Its analysis is the most detailed and the least illuminating of any measurable aspect of influence. Thus, the two key aspects of global naval influence do lend themselves to study are the extent of submarine lethality and stealth, and the sustainment available for long-term, long-range power projection.[68]

Long-range weapon delivery is possible from a variety of platforms, but all of them have to get at least halfway to the target to be useful and remain on station to be influential.[69] Unmanned vehicles are an increasingly important means of weapon delivery, but are as yet not in sufficient numbers to be of global importance. Thus, submarines, ships, and aircraft are today's weapon delivery vehicles, and their long-range sustainment enables global naval influence. The U.S. Navy estimates that for every one

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[68] There are some outstanding open-source documents for analyzing weapons, defenses, and reserves. For weapons characteristics, see RAND's interactive U.S.-China Military Scorecard, accessed 22 April 2017, https://www.rand.org/paf/projects/us-china-scorecard.html (print version is also available). For indexes of comparative economic, intellectual, and industrial capacities, see the comprehensive analysis of Stephen G. Brooks and William C. Wohlforth, *America Abroad: The United States' Global Role in the 21st Century* (Oxford, England: Oxford University Press, 2016), 14-47.

[69] As unmanned technology advances, this reality may quickly vanish. Subhunting drones are said to have ranges of 10,000 miles. Kris Osborn, "Navy Sub-hunting Drone Goes on Offense," accessed 30 March 2017, https://defensesystems.com/articles/2017/01/11/seahunter.aspx.

surface combatant carrying weapons to a theater, five auxiliary ships are deployed to provide it fuel, mechanical support, or food for the crew onboard. Global logistical reach is the most challenging and expensive aspect of putting a weapon on a target.

Since global naval influence is most enabled by a quiet, lethal submarine fleet and most limited by global logistical reach, these aspects of influence will be the two metrics for analysis.

Submarine Stealth and Weapons

The ideal submarine fleet is quiet, lethal, and versatile. Extremely quiet propulsion maximizes surprise and survival, enabling a navy to project a submarine threat that may not be present and perform reconnaissance undetected while also preserving the submarine's ability to return to the fight for weapons delivery or off-board targeting. A wide variety of accurate submarine-delivered weapons offers a navy that commands the sea options for targeting surface vessels, submarine adversaries, aircraft threats, and even land targets.

Beginning in the 1940s, nuclear-powered submarines were considered superior to diesel submarines in noise attenuation, but the introduction of Air Independent Propulsion (AIP) has changed this estimation somewhat.[70] Prior to AIP, diesel submarines suffered from the frequent need to surface in order to run the diesel engine and charge batteries, which created several weaknesses for adversaries to exploit.

[70] Engineers go to many other great lengths to make submarines stealthy, including degaussing to reduce magnetic signature, hull quieting to separate the pressure hull from the internal hull, and even tennis shoes worn by the crew to prevent the loud sound of footsteps. AIP range and endurances citation needed.

Surfacing a diesel gave aircrews a sail to spot, a magnetic anomaly to detect, and greater noise for sonar operators to track. The AIP upgrade is a hull modification to existing diesel submarines that enables them to remain submerged for longer time periods, in particular to run after firing a weapon. And in some cases where a nuclear-powered submarine emits engine noise, AIP diesels are even quieter.[71]

The United States has a fleet of 70 submarines that is entirely nuclear-powered, exceptionally quiet, and superbly trained. It includes 18 submarines with specific missions--14 of which carry strategic nuclear ballistic missiles (SSBNs) and 4 of which are designed to carry guided cruise missiles for land targeting (SSGNs). The remaining 52 submarines in the American fleet are available for the attack mission, and most carry a mixed payload of missiles and torpedoes.[72] They sprint at speeds in excess of 25 miles per hour, many are outfitted with compartments that make their port calls significantly more efficient than conventional replenishment operations, and their crews train regularly to spend consecutive months on patrol. They are capable of delivering anti-submarine

[71] Lest one conclude AIP is the panacea solution to submarine warfare, note that they are still not suitable as long range independent ships to the extent that nuclear-powered submarines are suitable because they require a complex set of logistics support deployed forward in support of the propulsion system.

[72] All 14 U.S. SSBNs can carry up to 24 Tridents; each Trident has 8 warheads, and each warhead contains a payload 25 times more powerful than the atomic bomb released on Hiroshima. The total number of deployed nuclear warheads is limited by treaty to 1,090. U.S. torpedo payload is also substantial. Different classes carry different amounts, but even the designated strategic missile submarines can carry 13 torpedoes in addition to their ballistic or cruise missile armament. For a point of comparison, Russia's two largest submarines can carry 16 to 20 Trident missiles each. Janes World Navies Equipment in Service Inventory, 8 May 2017, accessed 16 May 2017, https://janes.ihs.com/SecurityCountryRisk/Display/1322795.

torpedoes, Tomahawk Land Attack Missiles (TLAMs), anti-surface and anti-aircraft missiles—and U.S. Navy SEALs.

Worldwide, few states possess even 10% of the U.S. submarine fleet, never mind readiness and capability due to these very advanced weapons. North Korea (85 submarines), Russia (83), China (62), India (25), Iran (24), Japan (21), South Korea (24) the United Kingdom (11), and France (10) are the only states that have more than seven submarine vessels, but their stealth and reach are not necessarily commensurate with their numbers. For example, although the Japanese Maritime Self-Defense Force (JMSDF) submarine fleet is comprised of only 21 total submarines, 19 of them are diesel/AIP powered, less than 20 years old, outfitted for the attack mission, and operated by internationally lauded seamen. The remaining two are dedicated training and testing platforms. Japan's submarine fleet is global; it crosses the Pacific biannually to participate in the Rim of the Pacific Exercise hosted off the coast of Hawaii. On the other end of the spectrum, Iran's 24 submarines are comprised of 3 attack submarines, with the remaining 21 being either midget submarines or semi-submersibles, and fully half of North Korea's fleet is either more than 35 years old and/or midget submarines. All 109 submarines operated by Iran and North Korea combined are conventionally diesel powered rather than AIP augmented and manned by crews that are not highly proficient at lengthy underway periods. It is noteworthy, however, that the littoral waters around Iran and the Korean Peninsula contain so many shipping traffic diesel engines that it is difficult to acoustically track a diesel submarine—even with a proficient crew.

The United Kingdom and France are both able to project power globally. Although their fleets are very capable, this projection is not due to a preponderant

inventory of submarines. The United Kingdom's 11 submarines are all nuclear-powered, operated by an exceptionally well-trained officer corps, and carry both the Spearfish torpedo and the TLAM. French submarines number 10 total, are pump-jet propelled like those of the U.S., and carry both torpedoes and land attack missiles. In addition, both nations have strategic ballistic missile capability, with each of their four SSBNs capacity of 16 missiles with 12 warheads each, for a total of 768 warheads deployable at any one time. As of 2015, it is British policy to deploy only 8 Tridents per boat with a total of only 40 warheads on board.[73] In times of financial strain, budget cuts have affected both navies, but both chose to cancel aircraft carriers in exchange for the development of modern submarines.[74]

While neither Russia nor China is currently able to project power globally, both are "near-peer" competitors in numbers of submarines, and both are in the middle of a naval modernization program focused on quality over quantity.[75] Russia is thought to have approximately 68 useful submarines, of which 9 carry strategic nuclear weapons.[76]

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[73] Jane's Sentinel Security Assessment—Western Europe—United Kingdom—Navy, accessed 25 May 2017, https://janes.ihs.com/Janes/Display/jwna0159-weur. See also recent debates about the UK retaining Trident capability, accessed 4 June 2017, http://www.bbc.com/news/uk-politics-13442735.

[74] Francois Holland, "French White Paper: Defence and National Security 2013," accessed 22 April 2017, http://europeangeostrategy.ideasoneurope.eu/files/2013/05/Long-Post-51.pdf.

[75] Remarks during Strategic Command briefing to Art of War Scholars, U.S. Strategic Command, 14 March 2017.

[76] Here "useful" means operational; 15 Russian submarines are designated for salvage and rescue. Also, Janes estimates vary between 7 and 11 for how many strategic ballistic missile submarines are currently operational following upgrades, fires, and rentals to India.

Those strategic weapon submarines plus 8 designated as surface-to-surface and 11 designated as auxiliary make up Russia's nuclear-powered submarine assets, leaving approximately 40 conventionally powered Russian assets for operational missions. China is in a similar situation, with 67 useful submarines of varying capability and stealth. All five of its nuclear-powered submarines are ballistic missile strategic weapons, but it also has 57 conventionally powered diesels, plus five more designated auxiliary. The most capable Chinese submarines have traditionally been Russian vessels sold before the deterioration of Sino-Soviet relations, but indigenous capability has advanced, and Chinese engineering is now able to compete with the quiet and payload of Western submarines.[77] While their current navies are not yet at the level of modernization of the United States, United Kingdom, France, or Japan, both Russia and China are set to exert global submarine influence within a few years if they continue on their current trajectory. Moreover, both states are developing ever-capable weapons for delivery from those submarines.

Global Logistical Reach

The gap between the weapons payload of a submarine and a surface ship closes as technology evolves, but the significant payload of surface combatants is prominent in both theater war plans and the ideal fleet architecture of a globally influential navy. Although submarines form the backbone of a navy that commands the sea, surface ships

[77] Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities- Background and Issues for Congress*, CRS Report RL33153 (Washington, DC: Library of Congress, Congressional Research Service, 2017), accessed 23 April 2017, https://fas.org/sgp/crs/row/RL33153.pdf.

remain an inviolable part of its makeup—and the logistics that sustain those ships are a vital aspect of global naval influence.

In terms of global reach and logistics support, the United States is in a class all its own, in part due to the size of its force. The U.S. Navy estimates that 47 percent of its personnel are tied up in carrier positions or those that support carriers.[78] In order to serve its surface fleet of ten aircraft carriers, nine large amphibious ships, 22 cruisers, 62 destroyers, and 17 frigates, the U.S. military leverages a functional combatant command called U.S. Transportation Command (USTRANSCOM) whose maritime component is the Military Sealift Command (MSC). MSC operates 157 ships, including 28 prepositioning ships, 15 fleet oilers, 12 dry cargo and ammunition ships, and four dozen tenders, salvage vehicles, and ships designed for special missions, hospitals, command and control, ocean research, and ocean surveillance. The prepositioning ships, although aging and at varying levels of readiness, are all forward deployed, and all carry combat supplies and sustainment equipment to support the full range of military operations for war and peacetime. In addition, MSC maintains the U.S. Army's prepositioned stocks, contracts liner and charter shipping services, and operates an Expeditionary Sea Base ship that displaces 106k tons.[79]

[78] Carrasco, "A Manpower Comparison of Three U.S. Navies: The Current Fleet, a Projected 313 Ship Fleet, and a More Distributed Bimodal Alternative."

[79] In addition to providing the beans and bullets required to sustain a theatre war or a credible threat, the ocean surveillance ships employed by MSC also carry towed array sonar sensors that passively monitor for submarine activity up to 75nm from the ship. A series of sensors in an area can provide a common operating picture for U.S. submarines in any global theater. www.msc.navy.mil, accessed 4 May 2017.

Globally, only three other navies can sustain ships for more than a couple weeks at a time. In 2016, MSC employed 9700 people and transferred or transported 43 million ton of petroleum.[80] By comparison, British and French logistics support ships participated in three global exercises. During operational missions such as Odyssey Dawn (Libya, 2011), allied nations flew air strikes and fought side-by-side with the U.S., but allied forces relied almost entirely on U.S. logistics. Other than the U.S., British, French, and Japanese logistics support is also global. In addition to sustaining exercise operations off the coast of Hawaii, JMSDF ships participate in U.S.-led operational missions. During Operation Enduring Freedom, for example, Japanese oilers provided resupply to U.S. ships in the Pacific in order to enable U.S. oilers to resupply ships in the Middle East.[81] Adversary navies such as those of Russia and China have no global reach. Their influence, however pronounced it may be, remains regional.

The global naval influence required for a navy to command the sea is most clearly evidenced by its submarine force and global logistical reach. This chapter has shown that the United States submarine force outperforms all navies in the world and history, both in terms of propulsion and hull quieting, and in metrics of acoustic processing power. Moreover, no other nation in the world has even a fraction of the global military logistics capability of the United States—and at the present time, none appear to want it. But global naval influence is only half the battle of command.

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[80] US Military Sealift Command, *Annual Report 2017*, accessed 4 May 2017, http://www.msc.navy.mil/annualreport/2016/MSCAnnual16.pdf.

[81] John T. Kuehn. *A Military History of Japan: From the Age of the Samurai to the 21st Century* (Santa Barbara, CA: Praeger, 2014), 242-244.

CHAPTER 5

EVALUATING LOCAL SEA CONTROL

Having mustered a fleet capable of projecting naval power globally, the state that commands the sea must next maintain enough control at the local level to advance its interests. That is, in order to retain command of the sea, the United States must be able to quickly defend its interests in all of the world's sea commons as threats arise. Unfortunately, the global security picture is grim, and the home-court advantage of regional powers and local nonstate actors is both significant and increasing.

Global Security Picture

Unlike the local challenges weathered by any other navy in history, U.S. sea control is under fire in all eight naval theaters. Enterprising pirates, elicit traffickers, and transnational terrorist organizations, as well as navies and land-based weapons in China, Russia, Iran, and North Korea, challenge sea control in all corners of the globe. As a result, the United States mounts an array of sanctions, alliances, and diplomatic efforts to supplement its naval action in order to retain or regain control. For example, the U.S. successfully reduced pirate action in the Gulf of Aden, Indian Ocean, and Strait of Malacca by training local navies and leveraging naval alliances, and U.S. economic sanctions stemmed Iran's economic development, nuclear program, and naval provocations in the Strait of Hormuz.[82]

[82] On Somalia, Iran, and Malacca, see: Robert N Hein, "Terrorists on the Ocean: Sea Monsters of the 21st Century," Center for Maritime Security, 18 April 2016, accessed 5 May 2017, http://cimsec.org/terrorists-oceansea-monsters-21st-century/24269; Kenneth Katzman, *Iran Sanctions*, CRS Report RS20871 (Washington, DC: Library of Congress, Congressional Research Service, 21 April 2017), accessed 25 April 2017,

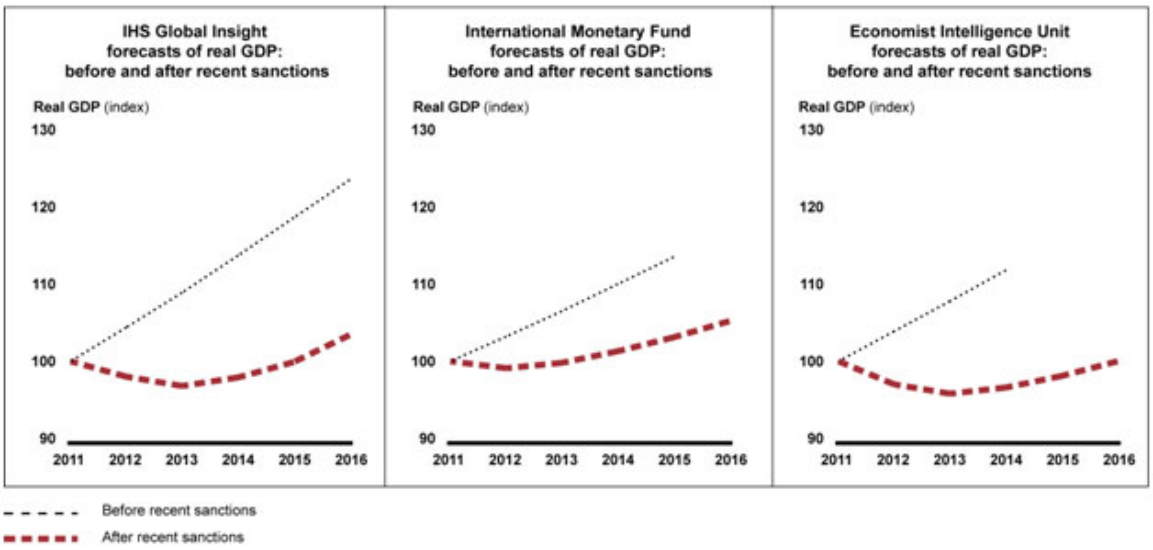

Figure 5. Economic Impact of Sanctions on Iran's Gross Domestic Product

Source: United States Government Accountability Office, *Iran: U.S. and International Sanctions Have Adversely Affected the Iranian Economy* (Washington, DC: Government Accountability Office, February 2013).

Yet threats continue to mutate, weapons continue to proliferate, the Arctic ice thaws the eighth naval theater a little more every day, and command of the sea remains primarily a naval enterprise.

The United States must prioritize naval assets to primary threats, and this chapter will prioritize the analysis accordingly. The disruption to local sea control in Mid-American and Southeast African waters is largely defeated, the Arctic challenge is in its infancy, and threats to U.S. interests in Northern European waters are minimal. Threats

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https://fas.org/sgp/crs/mideast/RS20871.pdf; ReCAAP 2016 Annual Report on Piracy and Armed Robbery against Ships in Asia, accessed 27 April 2017, http://www.recaap.org/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=464&PortalId=0&TabId=78.

are growing in the Indian waters and North Pacific waters, but India, Japan, and South Korea all possess capable navies that are highly motivated to fend off threats to shared interests while the U.S. musters its forces and regains sea control. Thus, today's most difficult challenges to U.S. sea control are in the Med/Arabian waters and the South Pacific.

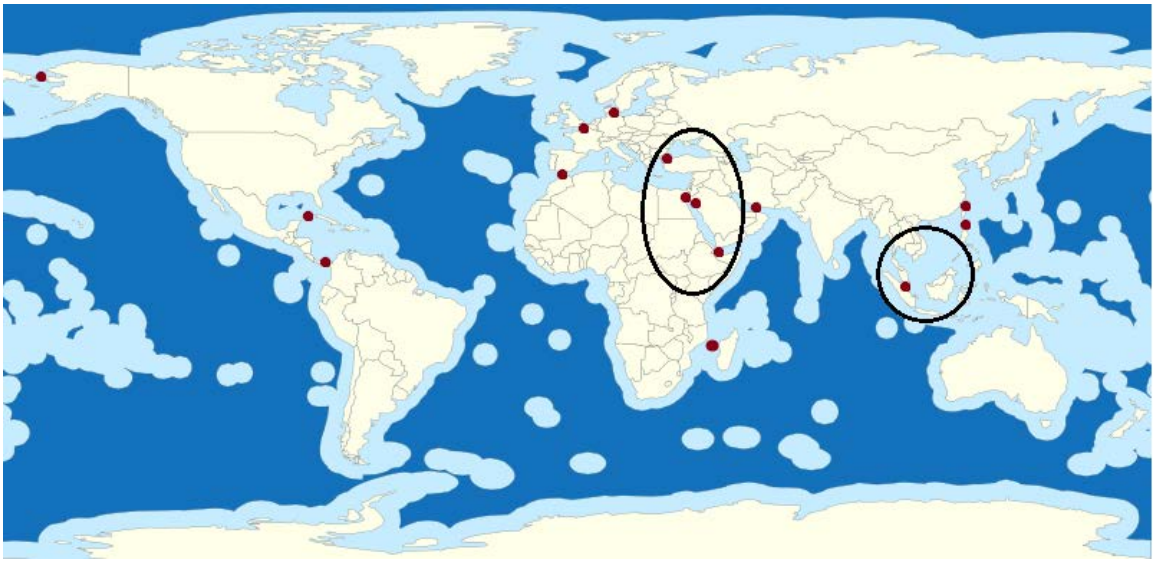

Figure 6. Key Local Sea Control Threats to U.S. Command of the Sea

Source: Original EEZ map from Wikimedia Commons, accessed 27 April 2017, https://en.wikipedia.org/wiki/International_waters#/media/File:International_waters.svg; chokepoint locations and range rings added by author.

Note: Figure 6 above and the author's Eight Naval Theaters delineated in Appendix A place the Strait of Hormuz outside the Med/Arabian waters. However, Iran is included in this section of analysis in order to fully address the naval threats in the region as the U.S. Navy currently defines it.

To compare sea control capabilities and threats, one must first consider the theater and then the players. Sea control analysis is most usefully accomplished at a theater level

because although other forms of power can be projected into multiple theaters simultaneously, naval power is physical in nature and the challenge or defense of sea control is limited by geography. To conduct local sea control analysis correctly, it is important to begin with an establishment of a theater's strategic value and an understanding of relevant geography, follow with a review of viable actors and capabilities, and then assess the result of likely conflict. Delineating accurately between theaters is thus crucially important; see Appendix A for a discussion of the Eight Naval Theaters, which are separate from the current U.S. Naval Fleets or Combatant Commands.

Med/Arabian Sea Control

The Med/Arabian theater waters stretch from southern Europe to northern Africa and west of India- including the Mediterranean Sea, Red Sea, Black Sea, Gulf of Aden, and the western edges of the Arabian Sea. This naval theater combines two fleets the U.S. currently separates: the Fifth Fleet in the Middle East and the Sixth Fleet in Europe. These fleets are connected both by the reach of modern land-based missiles and the ability of ships to traverse the Suez Canal to mass as needed in either the Mediterranean or west Arabian waters. Physical conformation is a region of high population density with shallow and acoustically complicated waters, half a dozen restricted sea lanes, and a history of intense resource conflict as well as a rising population of hostile nonstate actors.

The strategic value of secure Med/Arabian waters is difficult to overstate. They carry the world's oil supply and much of its dry cargo and foodstuffs; they represent the "backyard" of the world's nuclear powers; and they provide Russia and many of the

Baltic States their primary means of interacting with the global economy. The Med/Arabian waters involve more players and at higher stakes than any other waters on Earth, and for the United States, they are as important as secure coastlines. A coordinated attack on Med/Arabian sea control by all of the powerful navies in the region is highly unlikely and highly indefensible, but there are two likely scenarios requiring defense of sea control: a single state attack from Russia or Iran, or a coordinated asymmetric attack from nonstate actors.

A Russian attempt on Med/Arabian sea control would come in the form of submarine warfare and missiles launched from inside Russian territory as well as from naval vessels in the Black Sea and the Caspian Sea. The attack would likely begin from inside Russian territory and expand outward progressively as adjacent territories (and sea control) were overturned. Russia's KALIBR family of weapons includes a land attack cruise missile, an anti-ship cruise missile (commonly called the SIZZLER), and an anti-submarine missile, each of which has a nominal range of 1,000 nautical miles, can be salvo launched, and employs waypoint navigation. The U.S. Office of Naval Intelligence and U.S. Army Asymmetric Warfare Group assess that the KALIBR family of weapons and Russian Anti-Access/Aerial Denial capabilities would render U.S. air superiority in the region temporary and fleeting:

> Russia uses a very dense network of air defense systems that overlap in layers to increase their protective capabilities. Gaps in coverage can also be filled by new EW systems that confuse incoming missiles, overload ordnance guidance modules, or cause premature detonation of electronic fuses. Faced with this type of air defense network, U.S. formations will be, at best, able to achieve brief or momentary air superiority to support ground troops. Russian Air Defense

capabilities will also severely affect aerial resupply and medical evacuation (MEDEVAC).[83]

In addition, Russia maintains the world's largest and most diversified supplies of both torpedoes and mines, with torpedo speeds up to 50 knots and stealth mines capable of launching lightweight torpedoes while also defeating mine countermeasures.[84]

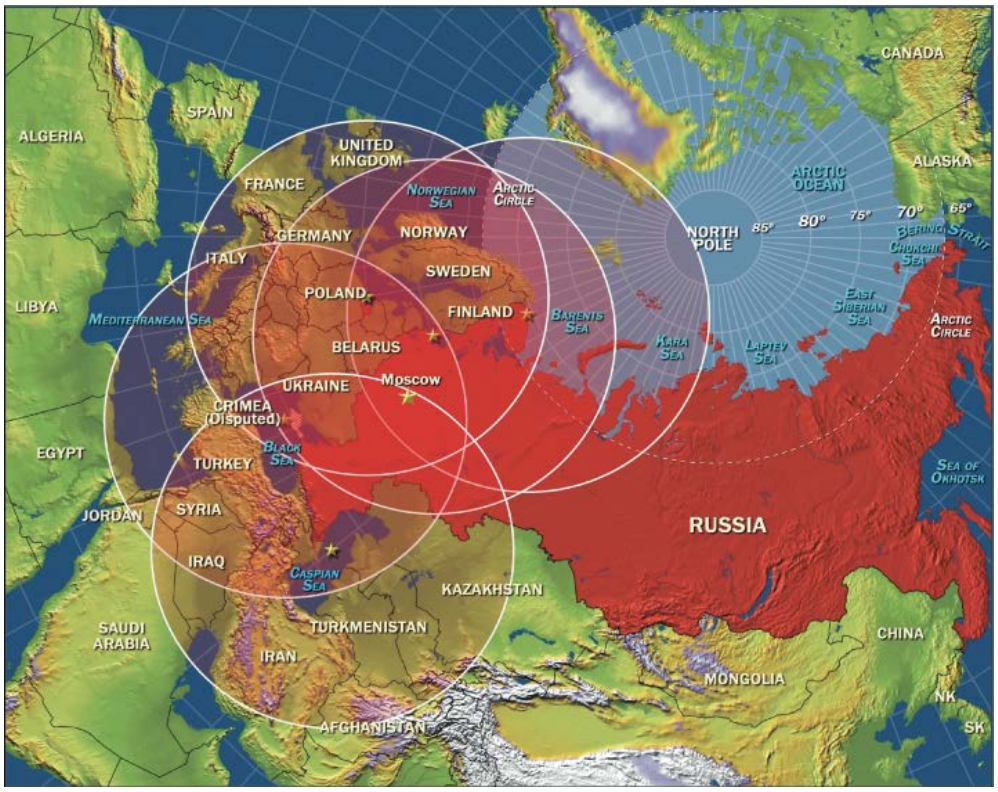

Figure 7. Russian KALIBR family of weapons, 1000nm nominal range rings

Source: Office of Naval Intelligence, "The Russian Navy: A Historic Transition," December 2015, accessed 10 May 2017, http://www.oni.navy.mil/Intelligence-Community/Russia/.

[83] U.S. Army Asymmetric Warfare Group, *Russian New Generation Warfare Handbook*, January 2017.

[84] Office of Naval Intelligence, "The Russian Navy: A Historic Transition," December 2015, accessed 10 May 2017, http://www.oni.navy.mil/Intelligence-Community/Russia/.

To defeat a Russian attempt on Med/Arabian sea control, the United States would have to mass more ships than it has since WWII, and even then the conflict would likely not resolve without non-naval assets or the help of U.S. allies in the region. Any opportunity to defeat land-based KALIBR weapons would come from naval assets intercepting weapons in flight or conventional attacks to destroy launch sights, but the entire family can be mounted on mobile vehicles and vessels, which makes targeting especially complicated. In addition to its naval and missile assets, Russia would also employ a sophisticated range of cyber, sniper, and information operations as well as proxy forces. Because the conflict would take place in Russia's backyard, none of its forces would require the massive logistics support that U.S. forces in the region would need. And in a protracted conflict, the Russian threat would also not be the only source of challenge to Med/Arabian sea control.

Perhaps the most daunting scenario for U.S. war planners is the opportunity a major conflict with a near-peer state affords other states or transnational terrorist organizations to challenge sea control in areas of their local interests. Iran, for example, has shown a savvy awareness of global politics, and has the ability to blockade the world's most important maritime chokepoint while the U.S. fleet is embroiled in a conflict with Russia. The Strait of Hormuz collocates American naval assets and commercial interests with Iranian small boats, submarines, coastal cruise missiles, and mines, and Iran has threated to use them to close the Strait.[85] Some analysts believe the

[85] Iran most recently threated to close the strait in 2012 and 2016. For background see Kenneth Katzman, *Iran's Threat To the Strait of Hormuz*, CRS Report R42335 (Washington, DC: Library of Congress, January 2012), accessed 25 April 2017, https://fas.org/sgp/crs/mideast/R42335.pdf. For direct quotes on the 2016 threat see

Strait of Hormuz is not under any real threat beyond words, but few could say it is exceptionally secure; the import of the situation is that the threat of a capability, even if it is not used, suffices to destabilize both the region and global markets.[86] More to the point of the Med/Arabian strategic difficulty, the United States is also up against countless transnational terrorist organizations in the same region that morph and multiply over time, and at least one has close ties with Iran.[87]

While it is possible to conjure a perfect storm in which U.S. sea control of the Middle East straits is affronted by a well-coordinated transnational terrorist organization, conjuring the scenario requires some unlikely imagining, and even the best effort would likely not survive unless the U.S. were distracted with another major conflict. To challenge local sea control, terrorist groups would mount midget submarines, swarming remote-controlled patrol craft, and shoulder-mounted weapons at crucial chokepoints all at one time—creating a situation where military forces and merchant shipping are better off staying away from contested waters than risking expensive ships, expensive weapons,

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Hassan Rouhani, "Iran warns it could close Strait of Hormuz to US," *Al Jazeera*, accessed 21 April 2017, http://www.aljazeera.com/news/2016/05/iran-warns-close-strait-hormuz-160504090814909.html.

[86] Keith Johnson, "Iran's Hollow Threats to Close the Strait of Hormuz," *Foreign Policy*, 5 May 2015, accessed 21 April 2017, http://foreignpolicy.com/2016/05/05/irans-hollow-threats-to-close-the-strait-of-hormuz/.

[87] Jeremy Binne of Janes Defence Weekly reported that U.S. Director of National Intelligence Daniel Coats testified to the Senate Select Committee on 11 May 2017 that Iran is providing "explosive boat technology, unmanned aerial vehicles (UAVs), and missile support to Yemen's rebels," accessed 16 May 2017, http://janes.ihs.com/Janes/Display/1805356. See also Reuters, "Exclusive: Iran Steps up Support for Houthis in Yemen's War – Sources," 22 March 2017, accessed 21 April 2017, http://www.reuters.com/article/us-yemen-iran-houthis-idUSKBN16S22R.

and invaluable lives.[88] The pervasive threat of attack would produce results similar to the piracy around the Horn of Africa: small forces create a fleet-in-being effect where they are not in all areas at once but have created enough risk that they function as a larger force might.

Unless its intelligence assets, strategic decision makers, and ships and weapons were occupied elsewhere, the United States could fairly easily recover local sea control from a nonstate actor by massing its firepower and intelligence capability. U.S. response to a transnational attempt on sea control would be similar to its response to African piracy, effectively becoming a police force and firing on targets one by one until the small terrorist force is overwhelmed and confidence in freedom of navigation is restored. This tactic of regaining local sea control with precision firepower is not without cost, however, and could prove prohibitively expensive in the case of consistent or coordinated nonstate attacks on Med/Arabian sea control.

[88] Daesh reportedly purchased "naval capabilities such as 2-man submarines, high-powered speed boats, boats fitted with machine guns and rocket launchers, and mine planners," New Delhi Times, "ISIS Building Navy," 28 March 2016, accessed 23 April 2017, http://www.newdelhitimes.com/isis-building-navy123/.

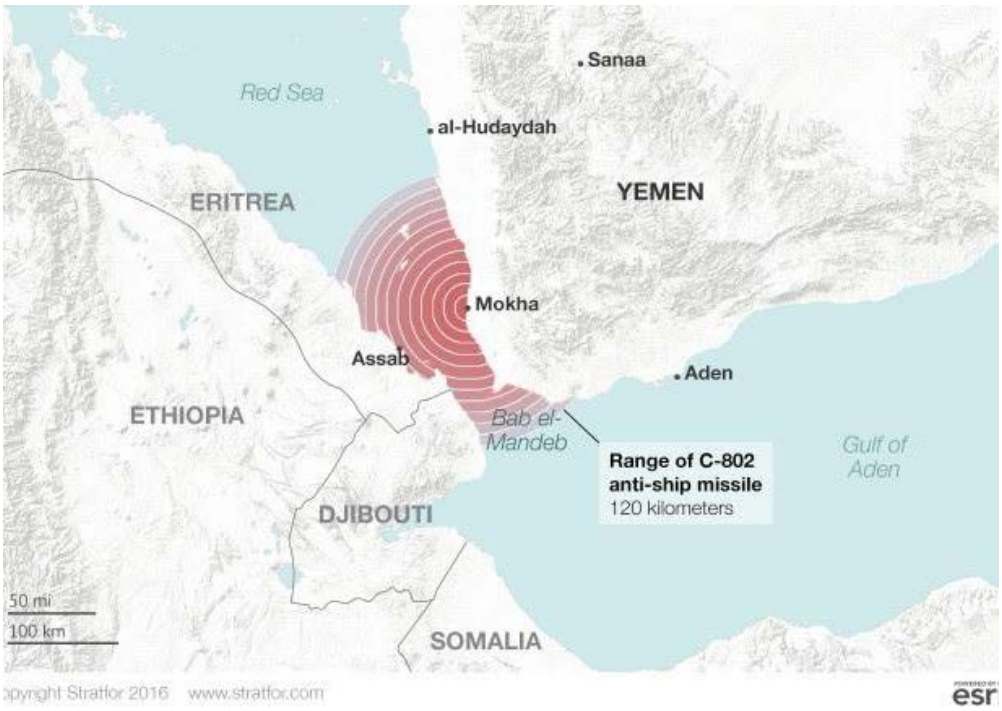

Figure 8. Nonstate actor influence in the Bab El Mandeb Strait

Source: StratFor, "Operation Golden Arrow Begins," accessed 4 May 2017, https://www.stratfor.com/analysis/operation-golden-arrow-begins.

The U.S. has already experienced the asymmetric cost problem resulting from inexpensive and evolving terrorist tactics. In October 2016, Houthi rebels off the coast of Yemen disabled an Emirati ship with a missile launch from the shore, prompting the U.S. to deploy two warships to the Red Sea in order to maintain freedom of shipping. Within days, land-based missiles were also launched at one of the destroyers, and the U.S. responded with a Tomahawk cruise missile strike on the radar sites where the missiles

originated.[89] Freedom of shipping and sea control were retained, but at a cost over $1 million apiece, Tomahawks are an expensive solution to small-scale threats like rocket-propelled grenades. In January 2017, rebels disabled a Saudi frigate by driving a small corvette into its hull, much like the 2000 attack on the USS Cole that resulted in a 240sqft hole. Unlike the suicide attack on the Cole, the 2017 bombing employed a remote-controlled corvette that required no terrorist martyr but did manage to kill two Saudi sailors.[90] As nonstate actors evolve tactics to take advantage of targets of opportunity at decreasing cost to their organizations, the U.S. can also expect they will take advantage of times when U.S. assets are embroiled in conflict with other regional powers.

The best way to lose to an adversary is to ascribe to it less guile than to oneself. Thus, the U.S. should assume that Russia, Iran, and transnational terrorist organizations would await ideal timing for one of the others to start a conflict, which would lead to at least a couple of the challenges manifesting simultaneously. As coastal civil war in the region destabilizes nations and their adjacent seas, sea control is increasingly under threat. And while the Med/Arabian waters are a hotbed of potential challenges on U.S. sea control, challenges in the South Pacific are already underway.

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[89] Al Jazeera, "Yemen: Houthis Claim Attack on UAE Military Vessel," 2 October 2016, accessed 25 April 2017, http://www.aljazeera.com/news/2016/10/yemen-houthis-claim-attack-uae-military-vessel-161001212236896.html.

[90] Christopher P. Cavas, "New Houthi Weapon Emerges: A Drone Boat," *Defense News*, 19 February 2017, accessed 4 April 2017, http://www.defensenews.com/articles/new-houthi-weapon-emerges-a-drone-boat. For background and U.S. response, see StratFor, "Operation Golden Arrow Begins," accessed 4 May 2017, https://www.stratfor.com/analysis/operation-golden-arrow-begins.

South Pacific Sea Control

The South Pacific theater waters are bounded by Malaysia, China, and the Philippines. The physical conformation includes long distances of open seas, one major choke point in the Strait of Malacca, and a history of regional conflict over territorial claims. As with the Med/Arabian waters, a coordinated attack by all powerful navies in the region is highly unlikely and highly indefensible. Moreover, although piracy is an ongoing problem in the Strait of Malacca, nonstate actors are less influential in the South Pacific than the Med/Arabian due to the lack of multiple littoral water chokepoints and the presence of stronger states in the region protecting them.[91] Thus, a Chinese attempt to overturn local sea control is the most likely scenario that would require U.S. defense of control.

The South Pacific is of vital strategic importance to China and the smaller nations of the region, and the commercial trade from and reverberating impacts to those economies are of vital strategic importance to the United States. Every day, nearly 16 million barrels of oil travel through the Strait of Malacca to China, Japan, and the Korean Peninsula. Every year, $1.2 trillion in U.S. commercial trade travels through the South China Sea. The region is thought to hold 11 billion barrels of oil and 190 trillion cubic

[91] Reference increased patrols and multinational cooperation to combat piracy in the Strait of Malacca. In 2006, Malaysia and Singapore joined with regional partners to establish the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP). The Agreement, which is one of many multinational cooperation examples but the first of its kind in Asia, now has 20 members, holds annual conferences, and maintains up-to-the-minute merchant incident reporting as part of its Information Sharing Centre. For recent news story see Danson Cheong, "Fewer Cases of Piracy, Robbery in Malacca Strait," *Straits Times*, 23 December 2015, accessed 17 April 2017, http://www.straitstimes.com/singapore/fewer-cases-of-piracy-robbery-in-malacca-strait.

feet of natural gas reserves and the South Pacific waters provide the primary source of protein to 4 billion Asians. China's export-based economy relies on the vast majority of its trade—over 90 percent by volume and 65 percent by value—crossing its home waters.[92] In an effort to safeguard its livelihood and growth, Beijing has expanded territorial claims in the South China Sea and developed the One Belt One Road Initiative, an expansive plan to connect China to the global economy through banking, infrastructure, and trade agreements. The Initiative has the potential to sustain China's economy, even in the event of U.S. interference in seaborne trade in the South China Sea. In addition to expanding its role in the global economy, Beijing has also modernized its military in order to deter or defeat U.S. influence in the South Pacific.

[92] U.S. Energy Information Administration, "South China Sea," Updated 7 February 2013, accessed 12 May 2017, https://www.eia.gov/beta/international/analysis_includes/regions_of_interest/South_China_Sea/south_china_sea.pdf.

Figure 9. Chinese One Belt, One Road Initiative

Source: US-China Economic and Security Review Commission, 2016 Report to Congress. The Report cited as this graphic's source: Galina Petrovskaya, "'Silk Road' in EU: Trans-Caspian Transit Bypassing Russia," Deutsche Welle, September 3, 2016.

A Chinese attempt on local sea control would utilize naval assets and defensive capabilities that analysts assess to be some of the most advanced in the world, and rapidly improving. China's naval assets are split between three fleets, the most capable of which is the North Sea Fleet based 1500 miles from the South Pacific. At a modest speed of 15kts, China could mass nearly all of its assets in the South Pacific within a few days of a conflict. At that point, Chinese submarines would outnumber U.S. 7th Fleet submarines nearly two to one, it would have its massive inventory of 50,000 mines to employ, and at least 400 additional ships from its maritime law enforcement force, maritime militia—as well as the largest fishing fleet in the world—would be available for interdiction,

distraction, and intelligence.[93] In addition, Chinese air and missile assets, cyber warfare capabilities, and electronic warfare modernization would be in play.

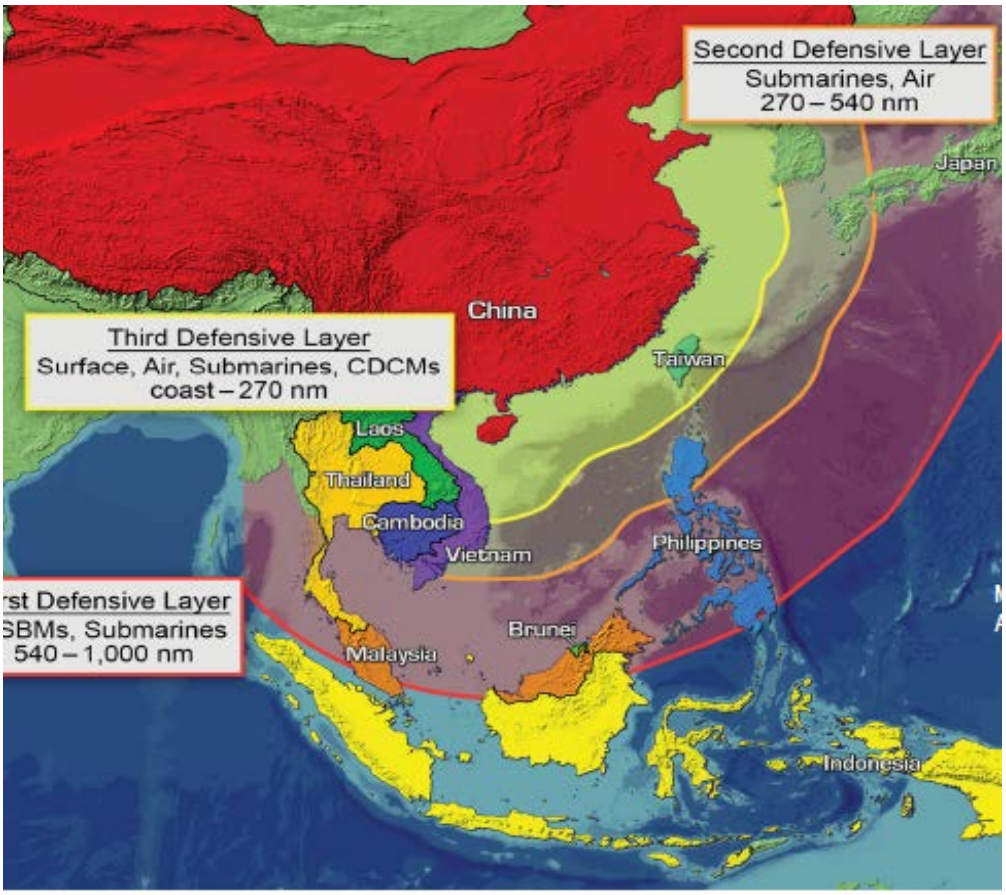

Figure 10. Chinese Defensive Layers

Source: 2015 Chinese Defensive Layers, Office of Naval Intelligence Report, *The PLA Navy: New Capabilities and Missions for the 21st Century*, May 2014, accessed 15 April 2017, http://www.oni.navy.mil/Intelligence-Community/China/.

[93] Conor M. Kennedy and Andrew S. Erickson, "China's Third Sea Force, The People's Armed Forces Maritime Militia: Tethered to the PLA" (China Maritime Report No.1, China Maritime Studies Institute, Newport, RI, March 2017).

To defeat a Chinese attempt on South Pacific sea control, the United States would need to commit a force greater than that required for Russia, and again resolving the conflict would likely require non-naval assets and regional allies. The greatest hindrance to U.S. success in a conflict over sea control this close to China is that the long tail of U.S. logistics is within reach of Chinese weapons. Its well-established land-based weapons, such as the DF-21, have a range of 800nm and simulated killing a carrier in 2013, while its newest weapons, such as the DF-26 seen at a parade in 2015, are thought to have a nominal range of over 2100nm, making U.S. air bases well within range. Significantly, while there is only one U.S. air base within 450 nautical miles from Taipei, Taiwan, there are 39 Chinese air bases in that same distance, giving China a significant air advantage in an air exchange over the contested territory.

Figure 11. Weapons Reach of Chinese DF-21 and DF-26

Source: Robert Haddick, "The Contested Commons: Trends and Responses" (presented at the Bush School Grand Strategy Conference, 29 November 2016).

Also, while the U.S. is only just now developing a surface-to-surface capable Tomahawk with extended range, U.S. warships and logistics ships are already at risk from the established YJ-18 cruise missile, which is similar to the Russian SIZZLR but has significantly greater range, is designed and built in China, and is launched from both submarines and surface vessels.[94] In addition to the physical limitations of a conflict near Chinese mainland, the U.S. could also experience significantly degraded satellite capability as GPS is disabled but China's BeiDou satellite system could still control its own radio communications and precision-guided weapons.[95] In a battle for sea control with China, the United States would need all its faculties and then some.

In order to retain or regain local sea control from the myriad threats in the sea commons today, the United States needs a naval fleet that can do it all. The navy that could overcome only the three challenges discussed in this chapter would be able to mass a fleet comparable in size and capability to those of modern Russia and China; defend against and defeat land-based weapons deep in their sovereign territory; affordably

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[94] Chinese capabilities from Eric Higgenbotham, et al, *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996–2017* (Santa Monica, CA: RAND Corporation, 2015); and Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities- Background and Issues for Congress*, CRS Report RL33153 (Washington, DC: Library of Congress, Congressional Research Service, 2017), accessed 23 April 2017, https://fas.org/sgp/crs/row/RL33153.pdf; Sam LaGrone, "West: U.S. Navy Anti-Ship Tomahawk Set for Surface Ships, Subs Starting in 2021," *USNI News*, 18 February 2016, accessed 3 May 2017, https://news.usni.org/2016/02/18/west-u-s-navy-anti-ship-tomahawk-set-for-surface-ships-subs-starting-in-2021.

[95] Jordan Wilson, "China's Alternative to GPS and its Implications for the United States" (US-China Economic and Security Review Commission Staff Research Report, 5 January 2017), accessed 5 June 2017, https://www.uscc.gov/Research/china%E2%80%99s-alternative-gps-and-its-implications-united-states.

counter inexpensive weapons from nonstate actors; and advance technology and acquisitions fast enough to keep up with the feverish pace of modernizing state and nonstate actors. It would need to accomplish it all 8,000 miles from home, in a degraded electronic environment, while sustaining ship maintenance, sailor training, and crew readiness. This is a tall order for any navy.

Simply put, there are not enough ships in the sea or hours in the day. The United States Navy is world-class: it is the most advanced, well-armed, capable fleet in history, operated by the most professional, well-trained sailors in the world. It possesses every capability required to defend sea control. But it numbers 274 ships split between two coasts and is responsible for protecting U.S. interests in eight distant theaters. Although its current offensive naval power is significant—its surface and submarine vertical and horizontal launch inventory is double that of Russia and China combined—the Navy assesses that it would need 355 ships to be able to defeat either state while deterring the other and still defending the homeland.[96] And this is to say nothing of the naval challenges posed in the Strait of Hormuz by Iran, the North Pacific by North Korea, the continual conflict brewing between India and Pakistan, the vast untapped resources in the Arctic, or the need for naval assets in Syria, Libya, South America, and Africa.

The U.S. could defend or eventually regain local sea control from Russia, from China, or from Iran or nonstate actors influencing strategic chokepoints, but it cannot

[96] Ship and weapon inventories from Ronald O'Rourke, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, CRS Report RL32665 (Washington, DC: Library of Congress, Congressional Research Service, 2017), accessed 21 April 2017, https://fas.org/sgp/crs/weapons/RL32665.pdf. See also table of comparative inventories in MITRE Corporation, *Navy Future Fleet Platform Architecture Study*, 1 July 2016.

quickly defend its interests in all of the world's sea commons as threats arise. It relies on luck or good fortune that several challenges on sea control don't arise at once—and when they do, it will need to rely on non-naval forms of national power to cope. While the United States is not a static player and is currently undergoing a modernization and restructuring of its own in order to ready for challenges on sea control, neither it nor any other navy on the planet could simultaneously defend all the threats to local sea control. The United States Navy is thus dethroned: its tenuous hold on local sea control unseats its command of the sea.

CHAPTER 6

CONCLUSIONS

> Command of the sea is one of those ringing phrases that dominates the imagination but confuses the intellect.
>
> — Sir Julian Corbett, 1918

> The American Navy acknowledges no superior in its ability to steam and to shoot. If nothing else was required of a fleet of ships in naval warfare we might rest securely in the belief that we are as well prepared for war as any possible antagonist.
>
> — LCDR Dudley Knox, 1915

The goal of this work was to develop and apply a metric in order to determine to what extent the U.S. commands the sea. The value of such a metric is that it stands the test of time and philosophy: it builds on history, helps standardize language, can be applied to other naval powers or revisited as circumstances change, and can serve as a model for analyzing conceptually different commons. It answers the basic question of U.S. command, but also offers insights for naval architecture and state policy.

No State Commands the Sea

Preserving the bones of historic naval strategy and applying to it the meat of modern life, the command metric emerges: command of the sea is a two-part condition made up of global naval influence and local sea control. Global naval influence in today's world means using global logistics and long-range stealth warfare to provide the credible threat of offensive naval power (and deterrence) anywhere in the world. Local sea control means using weapons—be they manned or unmanned, offensive or defensive, sophisticated or inexpensive, sea-based or land-based—to regulate access to a localized

area anywhere in the world. The combination of global influence and local control allows a state to move commerce and military forces across the oceans, overcome any worldwide challenges to its movement and interests, and block the movement and interests of its adversaries at any time and place of its choosing. While the means used to achieve global naval influence or local sea control may change over time, these two components are the indivisible metrics of command of the sea.

Analysis of the contemporary global picture reveals that the United States retains only part of command's necessary elements. The U.S. has an unrivaled ability to move, supply, and sustain commerce and armies across the oceans, and can marshal its highly capable fleet to block the movement and interests of most of its adversaries during conflict. It also retains the ability to perform the sine qua non of hemispheric homeland defense against seaborne invasion and the post-WWII requirement of strategic nuclear deterrence. However, U.S. movement and interests can be blocked overseas. As it nears the sovereign territory of other powerful states or the restrictive geography of maritime chokepoints, the U.S. is increasingly unable to overcome challenges to its movement and threats to its interests, or to influence those of its adversaries. Today, potential challengers and weapons proliferate the maritime commons such that even the exceptional might and global reach of the United States is insufficient to address all threats in all theaters. The challengers are too many, and their capability is too great. Because neither the U.S. nor any other navy in the world has the ships and manpower to

wrest sea control from regional powers and nonstate actors in all the sea commons, no single navy today commands the sea.[97]

This conclusion need not be histrionic. Indeed, the U.S. Navy itself has slowly, though not explicitly, acknowledged its inability to command the sea alone. The earliest hint of the idea came in 2005 at the 17th International Seapower Symposium when Chief of Naval Operations Admiral Mike Mullen introduced the 1000-ship Navy. His concept envisioned a maritime force made up of volunteer partner navies, a "self-organizing, self-governing, come-as-you-are cooperative global maritime security network that coordinated the activities of volunteer nations' navies, coast guards, and constabulary units."[98] In 2010, the idea that the U.S. does not command the sea made its gentle debut in naval doctrine: "Arguably, the vastness of the world's oceans makes it impossible for even a preeminent naval power to achieve global maritime superiority."[99] Four years later, the Secretary of the Navy acknowledged, "No single nation has the capacity to protect and defend the global system, keep the sea lanes open, and protect peaceful

[97] The U.S. Navy and the British Royal Navy are the only two in history to have ever commanded the sea globally—in WWII and at the end of the Cold War to the first decade of the 21st century.

[98] Peter D. Haynes, *Toward a New Maritime Strategy: American Naval Thinking in the Post-Cold War Era* (Annapolis, MD: Naval Institute Press, 2015), 197. The Global Maritime Partnership, as it would later be called, has yet to materialize. Although navies work together regularly, they are plagued with networking problems despite a decade of work together.

[99] U.S. Navy, *Naval Doctrine Publication 1*, 28.

commerce."[100] In these statements, naval leaders skipped the admission that the United States had lost command of the sea and attempted to advance a collective or corporate command of the sea. The trouble is that this leap is born of cognitive misunderstanding and strategic indifference—there is no indication that collective command is possible, and there is no clear impetus why or how the U.S. should strategically achieve it. As a result, the idea had little traction with worldwide partnerships, and in 2015 the U.S. Navy shifted its focus from command of the sea to its greatest weakness: local sea control.

Although its implications were not clearly understood by the Navy at large, the shift in rhetoric to sea control was swift and public. In 2015, Admiral Thomas Rowden, Commander of U.S. Naval Surface Forces, introduced a new operating concept called Distributed Lethality, which was deemed "the motive force behind offensive sea control."[101] In 2016, the topic of the training symposium attended by every surface warfare admiral in the U.S. Navy was "Return to Sea Control," and in 2017, Rowden said that while command of the sea is a useful term for historical analyses, it is "less useful in modern parlance."[102] Many contemporary naval thinkers have dispensed with the idea that the United States must command the sea to protect its interests, but the U.S. has

[100] "Twenty-First International Seapower Symposium Report on the Proceedings 16-19 September 2014," ed. John B. Hattendorf and John Kennedy (Newport, RI: US Naval War College, February 2015).

[101] Thomas Rowden, "Distributed Lethality," *Proceedings* 141, no. 1343 (January 2015).

[102] Thomas Rowden, "Commentary-Sea Control First," *Proceedings* 143, no, 1367 (January 2017).

never explained who will defend the global system in its place—or how failing to defend it is in anyone's interests.

A U.S. acknowledgment that it has lost command of the sea does not represent a cataclysmic shift in global politics, but the loss itself does have significant implications for navies and nations. The implications are perhaps greatest for the United States; as a result, the Navy should understand and correctly define command of the sea, actively determine its strategic goals in relation to it, and base its future acquisitions and ideas on those goals. In the 2005 quest to validate itself in the shadow of land wars in Iraq and Afghanistan, the Navy argued that global prosperity, maritime security, and the U.S. Navy were inextricably linked. The idea was subsequently reflected in the 2007 maritime strategy, "A Cooperative Strategy for 21st Century Seapower."[103] In dispensing with this notion by shrugging at its loss of command of the sea, the U.S. Navy may have relinquished part of its strategic concept of service—and this decision could have decades-long reverberations that are entirely unnecessary.[104]

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[103] United States Navy, *A Cooperative Strategy for 21st Century Seapower*, (Washington, DC: October 2007): 4.

[104] Samuel P. Huntington, "National Policy and the Transoceanic Navy," *Proceedings* 80, no. 5 (May 1954): 483. "The fundamental element of a military service is its purpose or role in implementing national policy. The statement of this role may be called the strategic concept of the service. Basically, this concept is a description of how, when, and where the military service expects to protect the nation against some threat to its security. If a military service does not possess such a concept, it becomes purpose-less, it wallows about amid a variety of conflicting and confusing goals, and ultimately it suffers both physical and moral degeneration."

Naval Doctrine

Even as many naval thinkers recognize that the U.S. does not command the sea, they have yet to agree on terms, perhaps because some have not acquiesced to the idea. As recently as January 2017, Admiral Rowden defined command of the sea as "a condition of naval superiority that could be regional," and wrote that potential adversaries are "working to deny us command of the seas."[105] The conflation of local sea control with the ambiguous idea of "regional command of the sea" serves to muddy the discussion, and the notion that command of the sea may be denied by an adversary implies that the U.S. still retains command. Moreover, denial of command of the sea is a misuse of terms; adversaries can deny access, movement, control, or influence, but they cannot deny an entire navy its largesse. This is not to say that naval leaders are confused, but that precision of language is important.

It is not pedantic to expect that leaders, policy, and the public all use the same terms to describe the same things—and the Navy should provide that language. The Navy has a habit of introducing new concepts and terms in either the U.S. Naval Institute's *Proceedings* magazine or the International Seapower Symposia hosted by the U.S. Naval War College. While these forums are readily accessible to the fleet and serve to provide a platform for feedback and discussion, they lack the permanence and severity of codified naval doctrine.[106] Further, the compelling, cogent maritime strategy designed for general

[105] Thomas Rowden, "Commentary – Sea Control First," 2.

[106] In his overview of U.S. Army doctrine, Walter Kretchik describes doctrine as a subcategory of military literature that is distinguished by two characteristics: its approval by an authority, typically the government; and its mandated use by that authority. "As an approved and prescribed publication, doctrine stands juxtaposed to 'informal practice,' which evolves from custom, tradition, and experience passed on through assorted

readership that these two forums produce has no room to spare for lengthy or philosophical discussions about the cornerstones of naval thought. And while doctrine can certainly be influenced by passionate leaders and the shifting ideas of the time, it is generally more resistant to "group-think" or short-lived ideas. When it fails to resist incomplete or flawed notions, doctrine can at least provide a narrative roadmap of how we got to where we are as an institution.

Because doctrine is the thread that connects one generation of force to the next, it is the ideal forum for historically based terms that may wax and wane in popularity or prominence as maritime strategy changes. As Robert Rubel has pointed out, the Navy stopped talking about sea control and its tactics following the Cold War, and the term "command of the sea" is not a part of the current lexicon. Though he stopped short of this thesis conclusion, he does clearly express the term's value:

> Command of the sea is not and maybe should not be a doctrinal term, but its utility as a tool for strategic analysis has reemerged. Some may be uncomfortable with its hegemonic overtones, but in a global system environment it is ever more suggestive of an informal partnership of nations, especially in view of the cooperative approach that the current American maritime strategy espouses. A current and sophisticated understanding of command of the sea contextualizes doctrinal concepts and terms such as "sea control," "sea denial," and others, which should improve programmatic analysis and tactical development. "Command of the sea" is an old term that, in a new form, can be usefully leveraged to enhance our understanding of the modern strategic maritime environment. [107]

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writings, circulated materials, and conversation. Historically, in peace and war, the Army concurrently adhered to both doctrine and informal practice…" Walter E. Kretchik, *U.S. Army Doctrine: From the American Revolution to the War on Terror* (Lawrence, KS: Kansas University Press, 2011), 5.

[107] Rubel, "Command of the Sea," 32.

In addition to improving understanding, programs, and tactics, doctrinal terms can vitally inform strategy. In the absence of a sophisticated understanding of command of the sea, naval leaders and the public at large are left grasping for terms to express their plans for the Navy—or worse, they invent new terms for old ideas and make plans that are not based on historic experience or current reality.[108] To say that command of the sea may be cooperative or collective, for example, or that sea control may be either real or assumed, is to counter more than 100 years of naval history and thought. According to Mahan, Corbett, Brodie, and Kennedy, command of the sea is a singular endeavor and sea control is an active expression. Of course, ideas can evolve.[109]

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[108] For examples of new terms, consider the naval superiority/naval supremacy debate, or Paul Kennedy's decision to introduce the term naval mastery to describe what Mahan had already defined in command of the sea. Even NDP 1 uses the term "regional" maritime superiority as opposed to "local" maritime superiority. B.J. Armstrong makes this point compellingly in his article, "The Shadow of Air-Sea Battle and the Sinking of A2/AD," accessed 6 October 2016, https://warontherocks.com/2016/10/the-shadow-of-air-sea-battle-and-the-sinking-of-a2ad/.

[109] Historically informed creative thinking can result in revolutionary understanding. As an example, the Navy could purposefully redefine command of the sea to accommodate rising navies and still distinguish between those that have compelling seapower and those that do not. Specifically, command of the sea could be thought of in the same way as command of a language is conceptualized. A language is commanded when it is used properly; command in this sense would mean that a person knows and understands a language, and then uses it for her needs and to her great benefit. Those that do not know language cannot command it, just as those navies that do not know the sea cannot command it. Command of the sea can still in this discussion mean that navies have achieved Mahan's largesse, but it would be a term applicable to *any* navy that had attained that level of understanding of the sea. It would remain a singular endeavor—but the modern adjustment of understanding would mean that "command" of the sea is not sufficient to enforce interests, and Admiral Rowden's point that "sea control is first" would remain true. The idea of command as a language is not far off from Kennedy's naval mastery term; one who has mastered a language is said to be in command of a language. The importance of retaining the term command of the sea—rather than replacing it with a new term like naval mastery—is that it represents an evolution of the term's meaning, not an entirely distinct idea.

If modern naval thinkers determine that ignoring or advancing previous thinking on command of the sea is necessary, they have the opportunity to codify why. Detailing those lines of thought in naval doctrine (in addition to magazines and symposiums) would bring collective understanding forward to match that of the greatest naval thinkers of our time. Putting the same discussion in joint doctrine would further widen the field of those "in the know." Without an understanding of what "command of the sea" is, both naval and political thinkers and leaders are wont to understand what they have lost—and whether they should want it back.

Beyond public talking points and the value of codified doctrine, the Navy might also need to reenergize the strategic, theoretical, and doctrinal education of its future leaders. To enable a generation of officers to navigate the myriad challenges and technicalities of modern naval conflict, the Navy must save them the time and blood of relearning basic naval strategy, theory, and terminology. As others have pointed out, Mahan's ideas remain important and central to modern navies—but the curriculum at the Naval War College features only a cursory exposition of his ideas, and education elsewhere is even worse.[110] According to Vice Admiral P. Gardner Howe III, the 55th President of the Naval War College, naval educators are in the process of shifting curriculum from thinking about the Navy as a joint enabler with assumed maritime superiority to thinking about it as a force that can and knows how to fight classic naval

[110] James R. Holmes and Kevin J. Delamer, "Mahan Rules," *Proceedings* 143, no. 1371 (May 2017): 40. See also Benjamin F. Armstrong, *21st Century Mahan: Sound Military Conclusions for the Modern Era* (Annapolis, MD: Naval Institute Press, 2013), 2-3; and John T. Kuehn, "Is Mahan Dead?" *Historically Speaking* 12, no. 1 (January 2011): 30-32.

battle.[111] This transition must be urgent and thorough, and it must focus on enabling strategic thinking. An appropriate curriculum develops the brain trust of the Navy at large, providing everyone involved a common expectation. Those who will wage war, those who will debate financial implications, and those who will develop strategy and tactics, are of one mind and one fight.

Maritime Strategy

Good strategy, like good doctrine, stands the test of time. Yet the American tendency to see technical solutions to nontechnical problems often results in an inversion of the proper relationship between strategy and acquisitions whereby technological limitations drive shortsighted strategy. The U.S. then decides what it wants to accomplish strategically based on what it can accomplish technically.[112] In a world with the United States as the sole superpower in possession of astounding economic and military overmatch, this way of war worked. But in today's world, where future enemies will not be "passive recipients of U.S. military prowess," strategy must be informed more by history and goals than by capabilities.[113] Once the Navy frames the discussion with

[111] VADM P. Gardner Howe III, remarks to Navy Element (U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 12 May 2017).

[112] It is acknowledged that many believe an unsourced strategy is not a strategy at all, but rather just an idea. However, the Navy's last major shift in strategy was made possible by Admiral Mullen's refusal to talk resourcing in the early idea stages of fielding the Navy's post-cold war strategy. Haynes, *Toward a New Maritime Strategy: American Naval Thinking in the Post-Cold War Era*, 217.

[113] H. R. McMaster remarks to Art of War Scholars (U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 1 February 2017). The idea of "passive recipients of military prowess" was originally published by MG Robert "Bo" Dyess.

agreed upon doctrinal terms, it can use them to create a strategy that meets intentional objectives which are driven neither by technological developments nor current limitations.

First and foremost, the U.S. must decide whether command of the sea is a useful tool or a strategic objective—that is, whether it views command of the sea as a means or as an end—and whether command of the sea is desirable. If viewed as an end, regaining and retaining command of the sea would require a means to exert global influence and local control. Viewed as a means, command of the sea could restore to the United States the ability to advance all its own interests on the sea and block those of its adversaries at will. Command of the sea could be a means or an end at different levels of war—both a strategic objective and an operational means, in which case strategy must accommodate both how to regain the means to command of the sea, and how to use it. The value of answering the question of command of the sea's desirability first is that we do not allow technological limitations like weapon ranges or ship inventories to drive strategic goals like seeking ad hoc local sea control rather than seeking command of the sea.

If the current strategic focus on sea control is a result of inverting the strategy/capability relationship, it will not stand the test of time because it will not meet as yet unstated U.S. objectives. If the United States seeks to defend the global system or protect the maritime commons, for example, no amount of local sea control will accomplish that end without the simultaneous maintenance of global logistical reach. Strategy must be based on time-tested maritime realities, and so any strategy designed to defend the global system via command of the sea must also enable command of the sea by addressing the aging fleet of MSC vessels. While the 2015 National Maritime Strategy

(commonly called CS-21R) acknowledged this connection in one sentence, the word logistics appears only twice in the 12,000-word document.[114]

The United States is overdue for historically informed and linguistically accurate strategic conversations. Whether they ever happen at the level of national policy or in the halls of academia, the U.S. Navy at a minimum must intellectually acknowledge that it has lost command of the sea, and then help the nation answer the strategic questions that follow. Many of these are answered by a comprehensive understanding of command of the sea and the global commons. Does the U.S. want to regain command the sea? Probably not; it is prohibitively expensive and largely unnecessary if one sees that current U.S. interests are achieved without it. Can it or does the U.S. want to lead a partnership that functions with the same largesse as a single state commanding the seas? Again, collective command is likely impossible, and even if possible, it would be extremely complicated and cost inefficient. Other solutions to the problems of the commons might be possible—and that requires strategists to look outside the naval paradigm for ideas. Should the U.S. position itself to prevent any other state from gaining command of the sea? Absolutely—and it is currently well-positioned to do just that. Do naval leaders think the sea resists command and local sea control is the only way to protect U.S. interests? It appears they do, and so naval leaders must use the loss of sea command to help national leaders understand which naval theaters to prioritize and why. Knowing the components of command of the sea and deciding whether they are desirable, navies can

[114] *A Cooperative Strategy for 21st Century Seapower* (March 2015), 24.

build a strategy around intentional objectives, and then choose whether or to what extent they need capabilities in service of the strategy.

Naval Acquisitions and Ideas

In addition to answering national policy questions, a strategy provides invaluable freedom and direction to the world-class brain trust that is the U.S. research and development community. Today, it seems understood that because the cost in dollars and time to build a navy that could simultaneously defend against all threats is too great, command of the sea as an end is not justified by the means necessary to attain it. The Navy has attempted to outsource the cost by collectivizing command with the Global Maritime Partnership in 2007, or to avoid the cost with the prioritization of sea control in 2015. But if it instead accepted lost command and unleashed the research and development community's creative and intellectual capacity, the Navy might discover that global influence and local control will not always require 1,000 boats floating on the water.

The Navy's recent commission of three independent studies to assess fleet architecture was a step in the right direction.[115] The Navy has in these three reports a sober assessment of its largesse, a justification to look outside ships and missiles for answers, and the clear lesson that networked ships can be a complicated force multiplier. Some thinkers outside these studies have even determined that aircraft carriers are

[115] Office of the Chief of Naval Operations (N8), *Alternative Future Fleet Platform Architecture Study*, July 2016. MITRE Corporation, *Navy Future Fleet Platform Architecture Study*, 1 July 2016. Center for Strategic and Budgetary Assessments, *Alternative Future Fleet Architecture Study*, September 2016.

obsolete—a conclusion that, if true and if the Navy were brave enough to admit, could free up billions of dollars and hundreds of thousands of sailors for equipment and missions directly tied to strategic objectives.[116] The current discourse and fleet architecture studies represent a refreshing willingness on the part of naval leadership to move away from an obsolete model of American sea power. Yet the Navy could go even further.

Rather than ask how many and what types of ships it should build, the Navy could ask its leading thinkers what other means it might use to achieve global influence or exert local control. Just as the threat of sanctions can influence state behavior, the threat of weapons other than ships and missiles could do the same. Imagine scenarios like electrifying a localized area, where every ship in those waters could be electrocuted at once, or specific ships without electrical protection could be targeted. Imagine over the horizon weapons controlled by defensible satellites. Imagine SOSUS arrays armed with automatic missiles designed to target specific acoustic signatures. Or imagine an offense designed entirely on defense: what if U.S. and allied ships could have acoustic or electronic protection that made them impervious to torpedo homing? What if maritime strategy revealed a way to command the sea with nothing more than strategic deception and denial? While naval leaders are bound to solutions that are possible to field, they also know that unstated ends garner no attention, support, or research monies. By removing the impetus to answer questions with ships or other exquisite technologies, the Navy can leverage acquisitions for true solutions rather than superficial changes.

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[116] Jeff Vandengel, "Too Big to Sink," *Proceedings* 143, no. 1371 (May 2017): 18.

On the other hand, if the Navy or its political masters determine that the U.S. is not interested in commanding the sea, acquisitions and think tanks could instead farm ideas and field technologies that make it easier to network with partner navies piecemeal as threats arise. The problems of networking with partner navies and even the joint force are well documented, but as yet unresolved. Between disparate technologies and hardware systems, unsecure communications at risk of exploit, and overly classified information, the United States is—despite its exceptional power and desire to share it—only marginally able to effectively leverage the ships and sailors of partner navies.[117] From a fiscal standpoint, removing just one aircraft carrier from the Navy's shipbuilding plans and diverting that cash to networking solutions could address the problem holistically. Far from a drastic decision divorced from the growing threats of the seas, this solution might enable one version of U.S. strategy resulting from a sophisticated understanding of command of the sea.

That the U.S. no longer commands the sea and no navy in the world can take its place has implications for the United States Navy and the global system alike. As we return to a historic maritime paradigm, perhaps that of the early 20th century when Corbett asserted that the sea resists possession, the Navy must address its strategy in order to regain command of the sea or to accept the loss. In either case, it must also arm itself with usable language codified in doctrine to discuss that decision, and it must align its acquisitions with the chosen strategy. In the process, thinking beyond technical

[117] Stephanie Hszieh, Geoge Galdorisi, Terry McKearney, and Darren Sutton, "Networking the Global Maritime Partnership," *Naval War College Review* 65, no. 2 (Autumn 2012): 11. See also Center for Strategic and Budgetary Assessments, *Alternative Future Fleet Architecture Study*, September 2016.

solutions to strategic problems can keep the United States from becoming a prisoner of its own overly technological way of war, instead allowing U.S. values and creativity to drive U.S. choices.

CHAPTER 7

IMPLICATIONS AND FUTURE STUDY

In addition to influencing maritime strategy, naval acquisitions, and distant idea fielding, U.S. loss of command of the sea should inform academic and political discourse in the United States. Specifically, once it is understood, the uncommanded sea should help in evaluating to what the extent the U.S. may command other commons and the resulting impact on U.S. national power and grand strategy.

The Flawed Model of National Power

Because very few policymakers have time to read about Mahan, Corbett, and the distinction between sea control and command of the sea, there is in academia a conflation of national power with command of the sea. The logic is that from national power (specifically military and economic power) flows sea power, and from predominant sea power comes command of the sea.[118] This mental model seems logical on its surface and makes for drawing simple conclusions: the most resilient, diverse economy in the world funds the biggest, baddest military in the world, and the resulting Navy is in charge of the oceans. So long as the U.S. is the sole superpower, its Navy retains the ability to go where it needs to go and do what it wants to do.

[118] For the most convincing rendering of the significant U.S. lead in comparative national power, see William Wohlforth, "The Stability of a Unipolar World," *International Security* 24, no. 1 (Summer 1999): 5-41; and Stephen Brooks and William C. Wohlforth, *America Abroad: The United States' Global Role in the 21st Century*, (Oxford, England: Oxford University Press, 2016), 14-47.

Command of the sea then flows from exceptional national power and, by enabling freedom of movement in the pursuit of national interests, also reinforces it. However, as this analysis has shown, there is an entire portion of logic missing from the mental model in Figure 12. Having the most resilient economy in the modern world and the most powerful Navy in history result in significant sea power—but they do not automatically confer on the United States command of the sea.

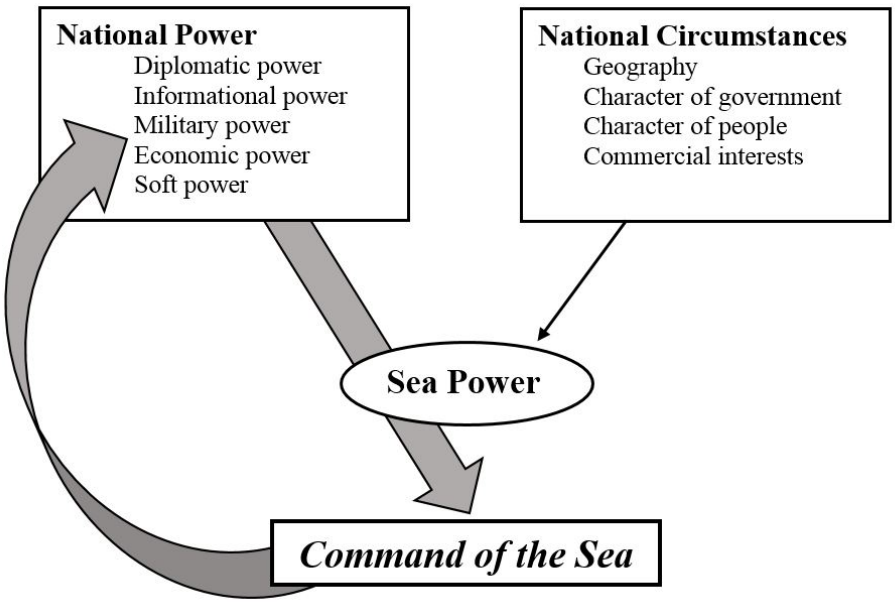

Figure 12. Flawed Model: Conflation of National Power and Command of the Sea

Source: Created by author.

While command of the sea does require the predominant sea power derived principally through a strong naval fleet, it does not follow linearly because the effects of that sea power ebb and flow depending upon the other factors in the field. Command of

the sea results from the combination of global naval influence—which the U.S. has—and from the ability to exert local sea control in all the sea commons—which it does not. Inserting these two factors into the model, one sees how even preeminent and exquisite military and economic power cannot guarantee command of the sea.

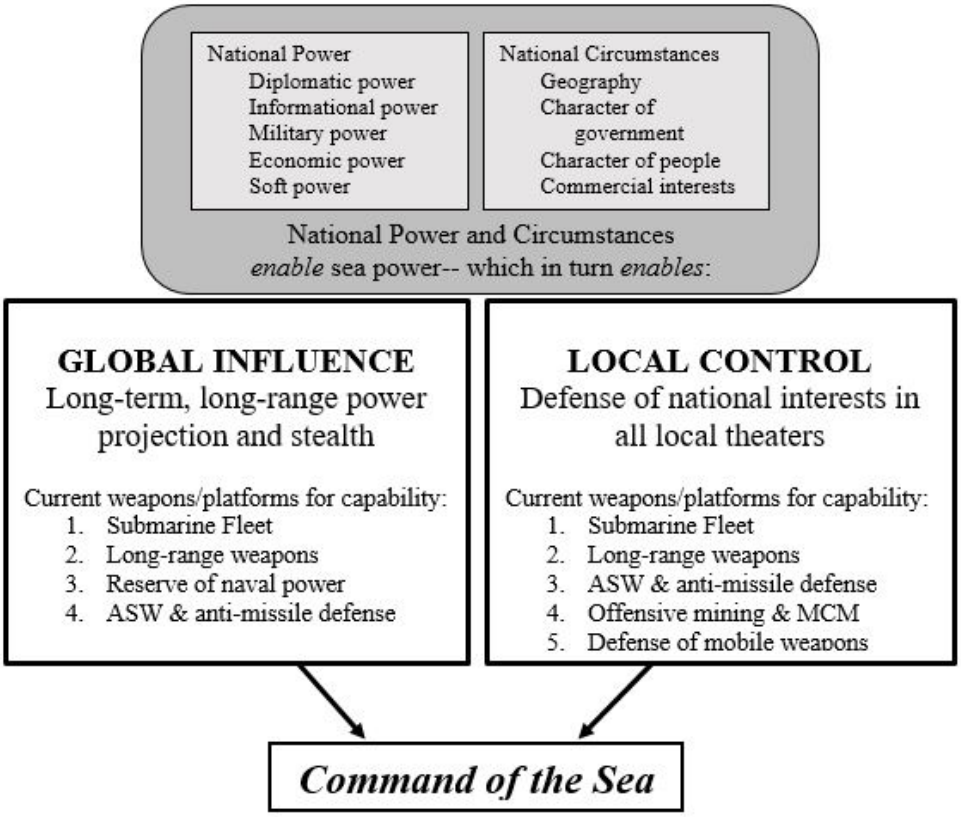

Figure 13. Mental Model for Academics and Political Leaders

Source: Created by author.

It is not necessary that policymakers understand the full depth, breadth, and subtle nuances of command of the sea, but it is important that they adopt a mental model that disconnects power from command. Indeed, divorcing power from command is important

even outside the scope of the sea and facilitates a deeper understanding of the U.S. position in the world.[119] Recall Joseph Nye's idea that power is multidimensional and depends on context. The three-dimensional chess game model of power underlies the cause of the disconnection between national power and command of the sea. On the bottom chessboard, which is both the realm of transnational (nonstate) relations and the board that many of the most important security challenges arise, power is widely dispersed, and "it makes no sense to speak of unipolarity, multipolarity, or hegemony."[120] On the bottom board, power does not equate to command.

Just as the world is too complex to think in terms of one or two superpowers holding dominion over the entire planet's landmasses, it is too complex for any one state to attain command of the sea. And if U.S. military preeminence and overwhelming sea power do not provide expected results such as military omnipotence and command of the sea, then command of the other commons seems even less likely.

Command of the Commons

The sea is the commons with the most concrete reality, the longest history, and the most actors in play. On the other hand, shared spaces in the air, space, and cyberspace are collectively more esoteric, contemporary, and anonymous. Each commons is distinguished by its circumstances, and thus they must be viewed differently, but the sea illuminates lessons for all.

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[119] International economists and other researches focus on the ability of a state to covert its resources to human capital, and argue that the best measures of national wealth and power is not Gross Domestic Product, but Human Development Index.

[120] Nye, "Recovering American Leadership," 55.

Several scholars have posited that command of the sea supports or enables command of other commons, in particular the command of the air. Barry Posen said that the sea and air are indivisible, and the military's recent AirSea Battle concept extends this theory to operational reality. (The AirSea Battle concept was later revamped and renamed the Joint Concept for Access and Maneuver in the Global Commons, or JAM-GC).[121] If the U.S. does not retain command of the sea, it is very unlikely to command the air near any body of water, and vice-versa. In either case, a comprehensive analysis of command of the air (which the Air Force alternately calls air superiority and air supremacy) is needed to inform coherent doctrine, strategy, and acquisitions.[122] This includes an assessment of precisely where are the air commons, what defines or contributes to air power, and what are the capabilities, weapons, and platforms that enable it in today's world. Of course, if command of the air is impossible, local air control may be more important, and the Air Force, like the Navy, need not fear losing a job by admitting the impossibility.

Command of space and cyberspace need a similar comprehensive understanding, but they suffer from a prevailing lack of basic knowledge. Where the general public and many political leaders are simply ill-informed in historical and technical matters relating

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[121] Michael E. Hutchens, William D. Dries, Jason C. Perdew, Vincent D. Bryant, and Kerry E. Moores, "Joint Concept for Access and Maneuver in the Global Commons: A New Joint Operational Concept," *Joint Force Quarterly* 84 (27 January 2017): 135. For a naval thinker's take on the evolution of AirSea Battle and Anti-Access/Area-Denial concepts into JAM-GC, see B.J. Armstrong, "The Shadow of Air-Sea Battle and the Sinking of A2/AD."

[122] United States Air Force, *Air Force Doctrine Document 1,* 17 November 2003: 36, 42.

to sea and air, they are nearly entirely ignorant when it comes to space and cyberspace. The expertise in these fields is limited to a comparatively tiny group of people—who alone bear the burden. Just a few dozen people are responsible for the urgent and important work of educating U.S. thinkers and political leaders in both the basics of language and the proper way to strategically conceptualize space and cyberspace.[123]

In addition to a separate analysis of each commons and its potential for command or control, further study is needed on the feasibility of approaching the commons in ways other than command, and collectively as a whole.[124] In the couple years after Under Secretary of Defense Michèle Flournoy published her article "The Contested Commons," several academics offered analyses of the commons and some of their challenges.[125] Nearly all asserted that the U.S. must retain its role in the commons, but only two offered an alternative to command or control. One favored management instead, stating, "The status quo—in which the United States is the sole guarantor of the openness of the global

[123] For one renowned expert's view on space, see Dr. Joan Johnson-Frese, *Heavenly Ambitions: America's Quest to Dominate Space* (University of Pennsylvania Press, 2009), *Space as a Strategic Asset* (Columbia University Press, 2007), and *Space: The Dormant Frontier, Changing the Space Paradigm for the 21st Century*, (Praeger Publishers, 1997).

[124] The JAM-GC Office is the logical military place for this thought; it should make contacts with the leading thinkers at the International Association for the Study of the Commons. More importantly, these conversations and understandings should take place above and outside the military instrument of power.

[125] Thilo Schroter, Mathew Solenberger, and Bastian Verink, "Challenging U.S. Command of the Commons," *The Bologna Center Journal of International Affairs* 13, no. 1 (April 1, 2010): 41-55. See also Tara Murphy, "Security Challenges in the 21st Century Global Commons," *Yale Journal of International Affairs* (Spring/Summer 2010): 28-43.

commons while other states free ride—is unsustainable."[126] The other encouraged Americans to accept the growth of other states' ability to influence the commons, advocating U.S. policies for commons security rather than control.[127] Both of these approaches could be feasible, but neither seems to have gained political or operational traction. In the absence of clear political guidance, the U.S. military does what it does best with the military instrument of national power: it prepares to fight.

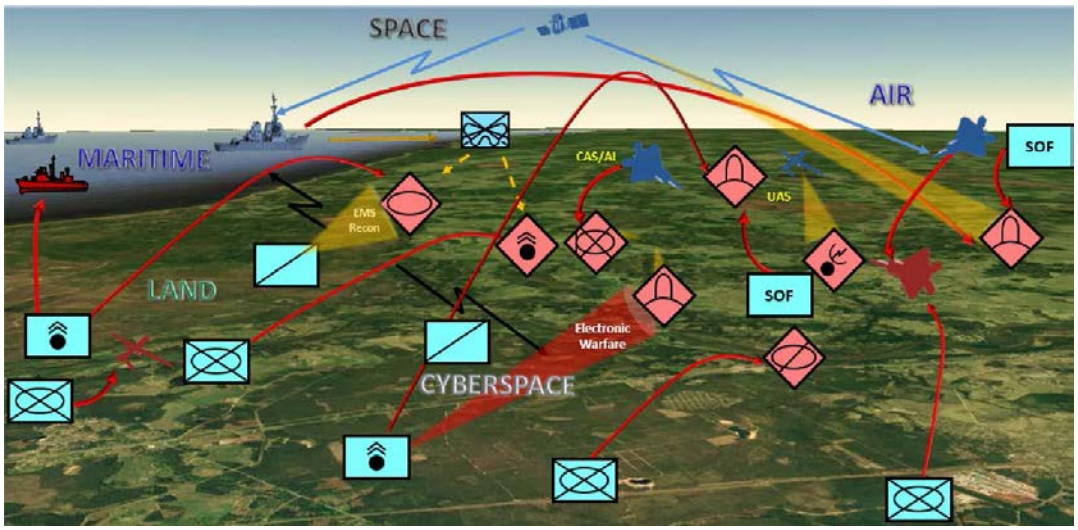

Figure 14. Multi-Domain Battle Concept

Source: U.S. Army White Paper, "Multi-Domain Battle: Combined Arms for the 21st Century," 24 February 2017, accessed 9 May 2017, http://www.tradoc.army.mil/MultiDomainBattle/docs/MDB_WhitePaper.pdf.

[126] Abraham M. Denmark, "Managing the Global Commons," *The Washington Quarterly* 33, no. 3 (July 2010): 165-182.

[127] Sameer Lalwani and Joshua Shifrinson, "Whither Command of the Commons? Choosing Security Over Control," *New America Foundation* (September 2011): 1-31.

In an attempt to grapple with this question of common space and the way it all interacts, the U.S. Army published a white paper entitled Multi-Domain Battle: Combined Arms for the 21st Century. (The Joint Services often refer to the different arenas of the commons as domains—a term that is useful in military language because it does not imply that all arenas are shared space. That is, the military, and in particular invasion land forces, may operate in land, sea, air, space, or cyberspace that is not shared because it belongs to an adversary, and so the term commons is less applicable than domains.) Rather than understanding or solving the problems of the commons, this white paper was intended to "promote thought and discussion concerning the methods and capabilities required to address (adversary) developments."[128]

The trouble with the U.S. relying on its military to answer strategic commons questions is that it may be less likely to consider avenues other than command and control—and even when it does, like the Navy's Global Maritime Partnership, it will be limited in its ability to operationalize the concepts. International leadership, for example, is not something for which the U.S. military is typically used or equipped. Although military members are exceptionally qualified to do more than win wars, the American public is resistant to the idea.[129] Because of unintended myopia, or because they are engaged in defending national interests, the services individually and the military at large cannot conceive of all potential solutions to all the world's commons problems.

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[128] U.S. Army White Paper, "Multi-Domain Battle: Combined Arms for the 21st Century," 24 February 2017, accessed 9 May 2017, http://www.tradoc.army.mil/MultiDomainBattle/docs/MDB_WhitePaper.pdf.

[129] Nadia Schadlow, *War and the Art of Governance* (Washington, DC: Georgetown University Press, 2017), 2.

Recall Elinor Ostrom's idea that the commons present a problem rather than a tragedy—one that can be solved, but that may require local solutions to local problems. In the case of the sea, what works for an anti-piracy agreement off the Horn of Africa might not work in the Mediterranean—and that is acceptable as long as the Navy is institutionally prepared for it. But Ostrom's lesson that commons problems are not always best solved by external government flies in the face of the way the U.S. military ministers solutions. In short, the U.S. needs a grand strategy that offers a whole-of-government approach to the uncommanded commons.

Leadership Eclipses Hegemony

International relations scholars debate voraciously about the important topic of U.S. grand strategy—and rightfully so. As many have pointed out, U.S. global impact and potential are unprecedented, and the responsibility of the sole superpower to guide the world is implicit in its stature. Yet arguments are centered on the wrong detail, and opinions on both sides of the debate continue to assume U.S. command of the commons.[130] As Barry Posen has pointed out, "Without command of the commons, there is no hegemonic strategy of any kind that is possible."[131]

Because power dynamics and commons realities have changed the geopolitical landscape, strategy—like command of the sea—no longer flows linearly from power. While the U.S. has allowed its conventional military competency and sophisticated

[130] See books and articles published in the last two years by the scholars most often cited on this topic, in particular Barry R. Posen and William Wohlforth.

[131] Posen, Texas A&M Bush School Grand Strategy Conference, 30 November 2016.

strategic thinking to atrophy, both Russia and China have evolved their strategies in addition to their militaries.[132] Instead of focus on the question of relative U.S. power and the hegemonic or other strategies possible from it, both debate and strategy should center on the more important question of how global players interact in the commons—and how the United States may best position itself accordingly. Whether the multipolar world is upon us or not, the U.S. must adjust its thinking now because whatever world is coming will be upon us by the time the necessary doctrine and strategy is written and instituted. Whereas U.S. military hegemony was once based on command of the commons, effective U.S. grand strategy will be based on the leadership of the commons.

This does not mean the United States is in decline and must demure to growing powers or nonstate actors. Rather, it means that effective grand strategy must consider the agency of other actors in the field and how best to prevail in their presence. As the Director of the Institute for National Strategic Studies has written, "There should never be doubt that when core interests are engaged, the United States will bring the full weight of its power to bear and will persist until success is achieved."[133] In a world in which no one state commands the sea or other commons, the full weight of American power has much more to do with exercising leadership and narrowly defining core interests than it

[132] China, in particular, has worked to craft a strategy that is both aware of the modern world and deferent to traditional Chinese concepts such as "shi," the constant search for strategic advantage. Timothy L Thomas, "China's Concept of Military Strategy," *Parameters* 44, no. 4 (Winter 2014-2015): 40.

[133] Dr. Richard D. Hooker Jr., *The Grand Strategy of the United States: INSS Strategic Monograph* (Washington, DC: National Defense University Press, October 2014), 26.

has to do with exerting influence everywhere at all times. In this role, the U.S. will likely find more money, more friends, and more options.

Future Study

Peer review and development would greatly enhance this work and the entire discipline of the commons. Future research unlimited by time, space, and scope would delve into a comprehensive assessment of the sea, air, space, and cyberspace commons, as well as a consideration of grand strategy through the lens of the commons.

The United States and its Navy would benefit most from a rigorous handling of the modern world as it relates to command of the sea, sea power, and maritime strategy vis-à-vis Mahan. It would include a comparison of all the facets of a globally influential navy—Submarines, Weapons, Reserves, and Defense—and all the non-military means of influencing the sea. It would conceptualize the best way to maneuver in a world of multiple powers with a variety of strengths.

In addition, further naval study is needed in preparation for the next strategically vital maritime chokepoint in the Arctic. Today, the United States possesses just four operational icebreakers over 10,000 horsepower, the largest of which was built in 1976 and refit in 2013, while Russia operates 46 (including the world's only nuclear-powered icebreakers), with another 15 either planned or in construction. The combined icebreaker fleets of Canada, Sweden, and Finland total 28 vessels.[134] National economies vary in their reliance on icebreaking capability, but the projected value of resources under the

[134] U.S. Coast Guard Mobility and Ice Operations Division, Major Icebreakers of the World Chart, updated 1 May 2017, accessed 16 May 2017, http://www.uscg.mil/hq/cg5/cg552/ice.asp.

Arctic ice should have the attention of the United States. Also, since transit through the Northwest Passage will drastically reduce shipping times and costs, it would behoove the United States to understand how it might prevent other states or nonstate actors from exerting local sea control there, or how it might function if a vital strategic chokepoint were controlled by another power.

Air, space, and cyberspace must also be brought up to speed, first in an inquiry of this length for public consumption, and then in an even more rigorous way for those in the field. As with command of the sea, it is not important that policy makers understand the dozens of volumes of theory and history, but a succinct presentation of prominent thinkers and thought, coalesced into the key takeaways that define command of each commons and offer a metric for their assessment, would be invaluable.

Finally, U.S. grand strategy considered as a function of commons interactions rather than a function of power would be revolutionary. Grand strategy and international relations theory trace their histories to the mid-1900s; both are based on states as the only players, but this framework need not limit future study. Once strategists and theorists have mastered the underpinnings of international relations theory and commons theory, they should set their minds loose on a new way to conceptualize the globe and the U.S. role in it.[135]

[135] The conceptualization would include the time-tested practices of other middle and great powers, such as strategic denial and deception, which enhance power projection with minimal resources.

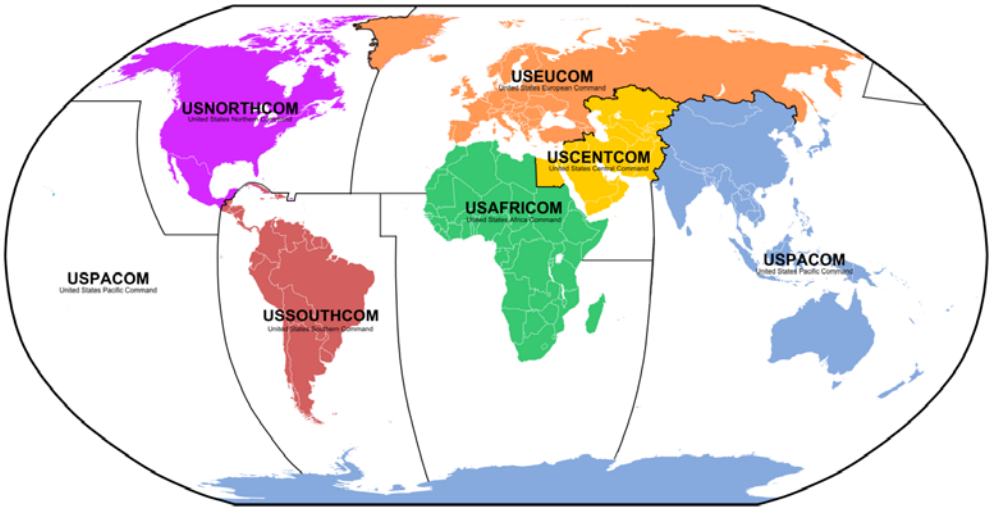
Closing Remarks

The United States does not need to panic to regain or protect command of the sea, or even attempt to control all domains at once either globally or locally. Rather, it should focus on a clear, common sense strategy limited only to national security objectives. Much in the way Britain released its hold on Europe in the face of French local influence in the Mediterranean following WWII, the U.S. should release its hold on hegemony before it is forced to do so. As other navies and nations convert resources to power and earn a seat at the table, the U.S. can relinquish its obsession with omnipotence and technical solutions; view the world as a field of players rather than adversaries; and become the expert in commons problems and solutions.

To that end, national and naval leaders should acquaint themselves with the growing volume of commons work in disparate fields—from forestry to social programs to seabed resources—and avail themselves to the conclusions of that study. In doing so, the U.S. can evolve its grand strategy as a paradigm of leadership rather than an endless quest to outmaneuver the proliferation of ever-more powerful enemies. Like the advent of the nuclear age, this is a moment in history that requires leaders with the gumption and intellectual forbearance to face issues well outside any of our previous understanding. The history is there; we need only find a way to apply it. In terms of friends, foes, and the shared space we all inhabit, the U.S. will remain for some time the world's most capable ally and its most dangerous game—and that, at least, is a position to protect.

APPENDIX A

EIGHT NAVAL THEATERS



The theaters for daily operations and war planning as they are currently drawn are based on the Unified Command Plan that parses the world into six geographic theaters, each under a separate Combatant Commander. Those lines are particularly troublesome for the Navy because naval theaters are different from land theaters, and even current U.S. land theaters are not optimized for modern-day threats.[136]

Land theaters are commonly separated by water boundaries, but sea commons on those boundaries are influenced twice over. Naval theaters that are too large could never realistically be controlled and would unduly advantage challengers, while theaters that are too small would generate too many competing resource interests. Moreover, boundaries that are distorted in order to actively separate or simplify threats, adjust troop and ship allocation, or to avoid missile ranges, may advantage one belligerent over another, and are not a true assessment of comparative power.

Naval Theater delineations should purposefully encompass the busy waters of potentially disputed EEZs or choke points. They should take into account maximum land-based weapon ranges. And they should be divided into areas of connected or contiguous waters over which it is possible to exert or defend control given modern ships and technology. Current U.S. capabilities can project power to control areas comprised of approximately five million square miles, and centering a circle of that area on potentially contested sea commons yields approximately eight water areas in familiar parts of the globe.

The following figures identify eight different Naval Theaters based on chapter 2 analysis that are useful both for daily operations and theater threat assessment.

[136] For one alternative to the Unified Command Plan map, see Defense News, accessed 16 May 2017, http://intercepts.defensenews.com/2013/08/more-cocom-consolidation-options.

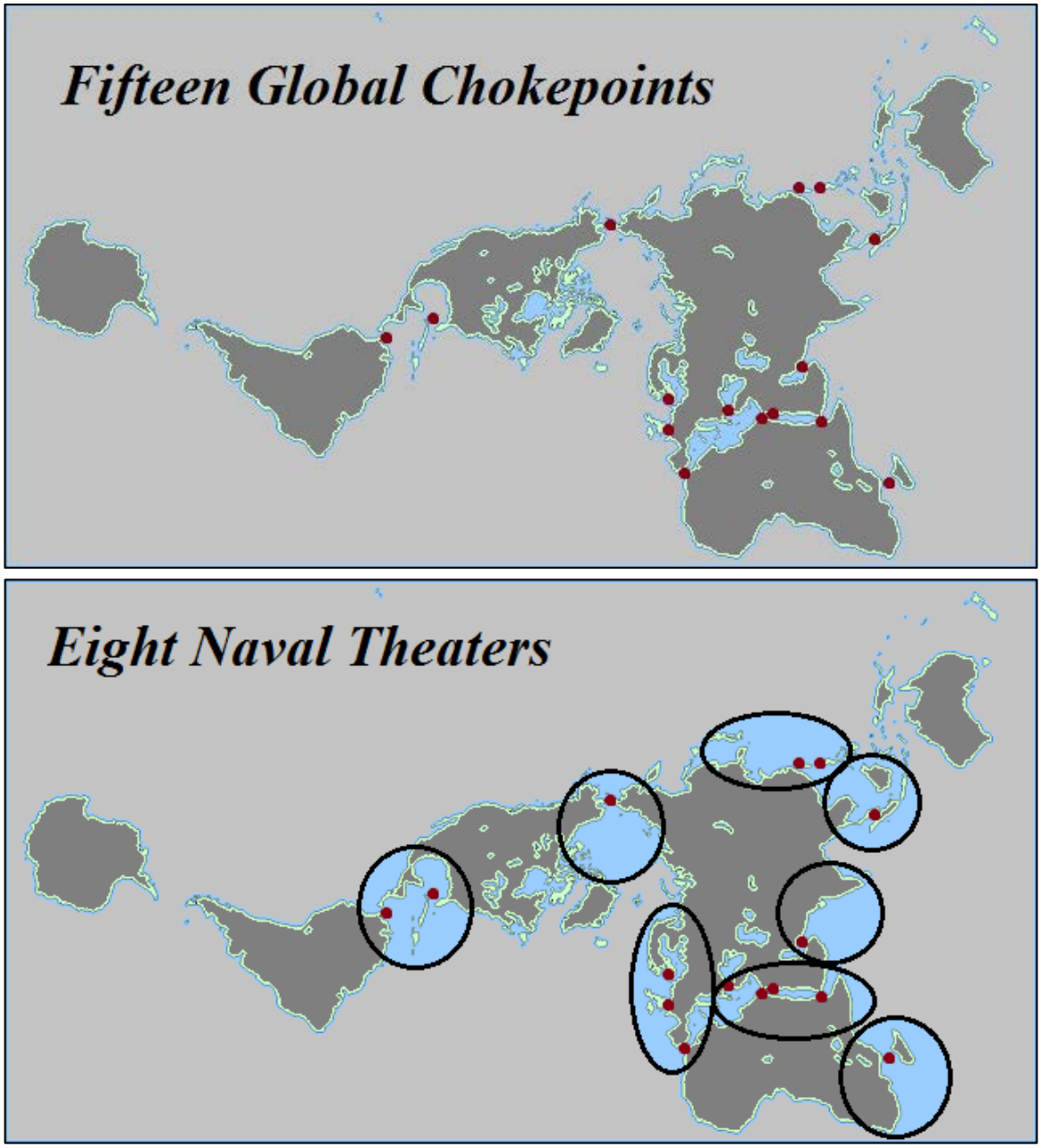


Figure 15. Depiction of Fifteen Global Chokepoints and Eight Naval Theaters

Source: Created by author.

Mediterranean/Arabian waters (Turkish Straits, Suez Canal, Strait of Tiran, Bab el Mandeb Strait); **Northern European waters** (Danish Straits, Strait of Dover, Strait of Gibraltar); **North Pacific waters** (Luzon Straits, Taiwan Straits); **Mid-American waters** (Panama Canal, Caribbean/Gulf of Mexico); **South Pacific waters** (Strait of Malacca); **Southeast African waters** (Mozambique Channel); **Indian Ocean** (Strait of Hormuz); and the **Arctic Ocean** (Bering Strait/Northwest Passage).

APPENDIX B

SELECTED UNCLOS ARTICLES

While the professional naval officer or concerned citizen ought to read the entirety of the current United Nations Convention on the Law of the Sea (completed at the third Law of the Sea Conference, ending in 1982, often called UNCLOS III), this appendix is provided as a means of quick reference for the reader less familiar with naval matters.[137] As of 2017, the United States had not yet ratified the Convention due to concerns over U.S. sovereignty rights and access to deep seabed mining—a position first established by President Reagan in 1983.[138] Other parties recommend ratification for reasons such as international protection of communications infrastructure.[139]

PART II
TERRITORIAL SEA AND CONTIGUOUS ZONE

SECTION 1. GENERAL PROVISIONS

Article 16

Legal status of the territorial sea, of the air space over the territorial sea and of its bed and subsoil

1. The sovereignty of a coastal State extends, beyond its land territory and internal waters and, in the case of an archipelagic State, its archipelagic waters, to an adjacent belt of sea, described as the territorial sea.
2. This sovereignty extends to the air space over the territorial sea as well as to its bed and subsoil.
3. The sovereignty over the territorial sea is exercised subject to this Convention and to other rules of international law.

SECTION 3. INNOCENT PASSAGE IN THE TERRITORIAL SEA

[137] Accessed 30 April 2017, http://www.un.org/Depts/los/convention_agreements/texts/unclos/UNCLOS-TOC.htm.

[138] Ronald Reagan, "Statement on United States Oceans Policy," 10 March 1983, accessed 10 May 2017, https://www.state.gov/documents/organization/143224.pdf.

[139] U.S. Department of State, accessed 18 May 2017, https://www.state.gov/e/oes/lawofthesea/statements/index.htm. See for example AT&T's memo to the Obama-Biden Transition Project, "U.S. Accession to the Law of the Sea Convention is Necessary to Strengthen Critical Protections for U.S. Undersea Communications Infrastructure," accessed 26 April 2017, www.otrans.3cdn.net › 2713b4431ee04d87de_91m6iv9li.pdf.

SUBSECTION A. RULES APPLICABLE TO ALL SHIPS

Article 17

Right of innocent passage

Subject to this Convention, ships of all States, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea.

Article 18

Meaning of passage

1. Passage means navigation through the territorial sea for the purpose of:
(a) traversing that sea without entering internal waters or calling at a roadstead or port facility outside internal waters; or
(b) proceeding to or from internal waters or a call at such roadstead or port facility.
2. Passage shall be continuous and expeditious. However, passage includes stopping and anchoring, but only in so far as the same are incidental to ordinary navigation or are rendered necessary by *force majeure* or distress or for the purpose of rendering assistance to persons, ships or aircraft in danger or distress.

Article 19

Meaning of innocent passage

1. Passage is innocent so long as it is not prejudicial to the peace, good order or security of the coastal State. Such passage shall take place in conformity with this Convention and with other rules of international law.
2. Passage of a foreign ship shall be considered to be prejudicial to the peace, good order or security of the coastal State if in the territorial sea it engages in any of the following activities:
(a) any threat or use of force against the sovereignty, territorial integrity or political independence of the coastal State, or in any other manner in violation of the principles of international law embodied in the Charter of the United Nations;
(b) any exercise or practice with weapons of any kind;
(c) any act aimed at collecting information to the prejudice of the defence or security of the coastal State;
(d) any act of propaganda aimed at affecting the defence or security of the coastal State;
(e) the launching, landing or taking on board of any aircraft;
(f) the launching, landing or taking on board of any military device;
(g) the loading or unloading of any commodity, currency or person contrary to the customs, fiscal, immigration or sanitary laws and regulations of the coastal State;
(h) any act of wilful and serious pollution contrary to this Convention;
(i) any fishing activities;
(j) the carrying out of research or survey activities;
(k) any act aimed at interfering with any systems of communication or any other facilities or installations of the coastal State;
(l) any other activity not having a direct bearing on passage.

Article 20

Submarines and other underwater vehicles

In the territorial sea, submarines and other underwater vehicles are required to navigate on the surface and to show their flag.

Article 21

Laws and regulations of the coastal State relating to innocent passage

1. The coastal State may adopt laws and regulations, in conformity with the provisions of this Convention and other rules of international law, relating to innocent passage through the territorial sea, in respect of all or any of the following:
(a) the safety of navigation and the regulation of maritime traffic;
(b) the protection of navigational aids and facilities and other facilities or installations;
(c) the protection of cables and pipelines;
(d) the conservation of the living resources of the sea;
(e) the prevention of infringement of the fisheries laws and regulations of the coastal State;
(f) the preservation of the environment of the coastal State and the prevention, reduction and control of pollution thereof;
(g) marine scientific research and hydrographic surveys;
(h) the prevention of infringement of the customs, fiscal, immigration or sanitary laws and regulations of the coastal State.
2. Such laws and regulations shall not apply to the design, construction, manning or equipment of foreign ships unless they are giving effect to generally accepted international rules or standards.
3. The coastal State shall give due publicity to all such laws and regulations.
4. Foreign ships exercising the right of innocent passage through the territorial sea shall comply with all such laws and regulations and all generally accepted international regulations relating to the prevention of collisions at sea.

Article 22

Sea lanes and traffic separation schemes in the territorial sea

1. The coastal State may, where necessary having regard to the safety of navigation, require foreign ships exercising the right of innocent passage through its territorial sea to use such sea lanes and traffic separation schemes as it may designate or prescribe for the regulation of the passage of ships.
2. In particular, tankers, nuclear-powered ships and ships carrying nuclear or other inherently dangerous or noxious substances or materials may be required to confine their passage to such sea lanes.
3. In the designation of sea lanes and the prescription of traffic separation schemes under this article, the coastal State shall take into account:
(a) the recommendations of the competent international organization;
(b) any channels customarily used for international navigation;
(c) the special characteristics of particular ships and channels; and
(d) the density of traffic.
4. The coastal State shall clearly indicate such sea lanes and traffic separation schemes on charts to which due publicity shall be given.

SECTION 4. CONTIGUOUS ZONE

Article 33

Contiguous zone

1. In a zone contiguous to its territorial sea, described as the contiguous zone, the coastal State may exercise the control necessary to:
(a) prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea;
(b) punish infringement of the above laws and regulations committed within its territory or territorial sea.

2. The contiguous zone may not extend beyond 24 nautical miles from the baselines from which the breadth of the territorial sea is measured.

PART III
STRAITS USED FOR INTERNATIONAL NAVIGATION

SECTION 1. GENERAL PROVISIONS

Article 34

Legal status of waters forming straits used for international navigation

1. The regime of passage through straits used for international navigation established in this Part shall not in other respects affect the legal status of the waters forming such straits or the exercise by the States bordering the straits of their sovereignty or jurisdiction over such waters and their air space, bed and subsoil.
2. The sovereignty or jurisdiction of the States bordering the straits is exercised subject to this Part and to other rules of international law.

Article 35

Scope of this Part

Nothing in this Part affects:
(a) any areas of internal waters within a strait, except where the establishment of a straight baseline in accordance with the method set forth in article 7 has the effect of enclosing as internal waters areas which had not previously been considered as such;
(b) the legal status of the waters beyond the territorial seas of States bordering straits as exclusive economic zones or high seas; or
(c) the legal regime in straits in which passage is regulated in whole or in part by long-standing international conventions in force specifically relating to such straits.

Article 36

High seas routes or routes through exclusive economic zones through straits used for international navigation

This Part does not apply to a strait used for international navigation if there exists through the strait a route through the high seas or through an exclusive economic zone of similar convenience with respect to navigational and hydrographical characteristics; in such routes, the other relevant Parts of this Convention, including the provisions regarding the freedoms of navigation and overflight, apply.

SECTION 2. TRANSIT PASSAGE

Article 37

Scope of this section

This section applies to straits which are used for international navigation between one part of the high seas or an exclusive economic zone and another part of the high seas or an exclusive economic zone.

Article 38

Right of transit passage

1. In straits referred to in article 37, all ships and aircraft enjoy the right of transit passage, which shall not be impeded; except that, if the strait is formed by an island of a State bordering the strait and its mainland, transit passage shall not apply if there exists seaward of the island a route through the high seas or through an exclusive economic zone of similar convenience with respect to navigational and hydrographical characteristics.

2. Transit passage means the exercise in accordance with this Part of the freedom of navigation and overflight solely for the purpose of continuous and expeditious transit of the strait between one part of the high seas or an exclusive economic zone and another part of the high seas or an exclusive economic zone. However, the requirement of continuous and expeditious transit does not preclude passage through the strait for the purpose of entering, leaving or returning from a State bordering the strait, subject to the conditions of entry to that State.
3. Any activity which is not an exercise of the right of transit passage through a strait remains subject to the other applicable provisions of this Convention.

Article 41

Sea lanes and traffic separation schemes in straits used for international navigation

1. In conformity with this Part, States bordering straits may designate sea lanes and prescribe traffic separation schemes for navigation in straits where necessary to promote the safe passage of ships.
2. Such States may, when circumstances require, and after giving due publicity thereto, substitute other sea lanes or traffic separation schemes for any sea lanes or traffic separation schemes previously designated or prescribed by them.
3. Such sea lanes and traffic separation schemes shall conform to generally accepted international regulations.
4. Before designating or substituting sea lanes or prescribing or substituting traffic separation schemes, States bordering straits shall refer proposals to the competent international organization with a view to their adoption. The organization may adopt only such sea lanes and traffic separation schemes as may be agreed with the States bordering the straits, after which the States may designate, prescribe or substitute them.
5. In respect of a strait where sea lanes or traffic separation schemes through the waters of two or more States bordering the strait are being proposed, the States concerned shall cooperate in formulating proposals in consultation with the competent international organization.
6. States bordering straits shall clearly indicate all sea lanes and traffic separation schemes designated or prescribed by them on charts to which due publicity shall be given.
7. Ships in transit passage shall respect applicable sea lanes and traffic separation schemes established in accordance with this article.

SECTION 3. INNOCENT PASSAGE

Article 45

Innocent passage

1. The regime of innocent passage, in accordance with Part II, section 3, shall apply in straits used for international navigation:
(a) excluded from the application of the regime of transit passage under article 38, paragraph 1; or
(b) between a part of the high seas or an exclusive economic zone and the territorial sea of a foreign State.
2. There shall be no suspension of innocent passage through such straits.

PART V
EXCLUSIVE ECONOMIC ZONE

Article 55

Specific legal regime of the exclusive economic zone

The exclusive economic zone is an area beyond and adjacent to the territorial sea, subject to the specific legal regime established in this Part, under which the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by the relevant provisions of this Convention.

Article 56

Rights, jurisdiction and duties of the coastal State in the exclusive economic zone

1. In the exclusive economic zone, the coastal State has:
(a) sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds;
(b) jurisdiction as provided for in the relevant provisions of this Convention with regard to:
(i) the establishment and use of artificial islands, installations and structures;
(ii) marine scientific research;
(iii) the protection and preservation of the marine environment;
(c) other rights and duties provided for in this Convention.
2. In exercising its rights and performing its duties under this Convention in the exclusive economic zone, the coastal State shall have due regard to the rights and duties of other States and shall act in a manner compatible with the provisions of this Convention.
3. The rights set out in this article with respect to the seabed and subsoil shall be exercised in accordance with Part VI.

Article 57

Breadth of the exclusive economic zone

The exclusive economic zone shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured.

Article 58

Rights and duties of other States in the exclusive economic zone

1. In the exclusive economic zone, all States, whether coastal or land-locked, enjoy, subject to the relevant provisions of this Convention, the freedoms referred to in article 87 of navigation and overflight and of the laying of submarine cables and pipelines, and other internationally lawful uses of the sea related to these freedoms, such as those associated with the operation of ships, aircraft and submarine cables and pipelines, and compatible with the other provisions of this Convention.
2. Articles 88 to 115 and other pertinent rules of international law apply to the exclusive economic zone in so far as they are not incompatible with this Part.
3. In exercising their rights and performing their duties under this Convention in the exclusive economic zone, States shall have due regard to the rights and duties of the coastal State and shall comply with the laws and regulations adopted by the coastal State in accordance with the provisions of this Convention and other rules of international law in so far as they are not incompatible with this Part.

PART VII
HIGH SEAS

SECTION 1. GENERAL PROVISIONS

Article 86

Application of the provisions of this Part

The provisions of this Part apply to all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State. This article does not entail any abridgement of the freedoms enjoyed by all States in the exclusive economic zone in accordance with article 58.

Article 87

Freedom of the high seas

1. The high seas are open to all States, whether coastal or land-locked. Freedom of the high seas is exercised under the conditions laid down by this Convention and by other rules of international law. It comprises, *inter alia*, both for coastal and land-locked States:
(a) freedom of navigation;
(b) freedom of overflight;
(c) freedom to lay submarine cables and pipelines, subject to Part VI;
(d) freedom to construct artificial islands and other installations permitted under international law, subject to Part VI;
(e) freedom of fishing, subject to the conditions laid down in section 2;
(f) freedom of scientific research, subject to Parts VI and XIII.
2. These freedoms shall be exercised by all States with due regard for the interests of other States in their exercise of the freedom of the high seas, and also with due regard for the rights under this Convention with respect to activities in the Area.

Article 88

Reservation of the high seas for peaceful purposes

The high seas shall be reserved for peaceful purposes.

Article 89

Invalidity of claims of sovereignty over the high seas

No State may validly purport to subject any part of the high seas to its sovereignty.

Article 90

Right of navigation

Every State, whether coastal or land-locked, has the right to sail ships flying its flag on the high seas.

Article 91

Nationality of ships

1. Every State shall fix the conditions for the grant of its nationality to ships, for the registration of ships in its territory, and for the right to fly its flag. Ships have the nationality of the State whose flag they are entitled to fly. There must exist a genuine link between the State and the ship.
2. Every State shall issue to ships to which it has granted the right to fly its flag documents to that effect.

Article 95

Immunity of warships on the high seas

Warships on the high seas have complete immunity from the jurisdiction of any State other than the flag State.

Article 96

Immunity of ships used only on government non-commercial service

Ships owned or operated by a State and used only on government non-commercial service shall, on the high seas, have complete immunity from the jurisdiction of any State other than the flag State.

Article 101

Definition of piracy

Piracy consists of any of the following acts:

(a) any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed:

(i) on the high seas, against another ship or aircraft, or against persons or property on board such ship or aircraft;

(ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State;

(b) any act of voluntary participation in the operation of a ship or of an aircraft with knowledge of facts making it a pirate ship or aircraft;

(c) any act of inciting or of intentionally facilitating an act described in subparagraph (a) or (b).

Article 102

Piracy by a warship, government ship or government aircraft whose crew has mutinied

The acts of piracy, as defined in article 101, committed by a warship, government ship or government aircraft whose crew has mutinied and taken control of the ship or aircraft are assimilated to acts committed by a private ship or aircraft.

Article 103

Definition of a pirate ship or aircraft

A ship or aircraft is considered a pirate ship or aircraft if it is intended by the persons in dominant control to be used for the purpose of committing one of the acts referred to in article 101. The same applies if the ship or aircraft has been used to commit any such act, so long as it remains under the control of the persons guilty of that act.

Article 104

Retention or loss of the nationality of a pirate ship or aircraft

A ship or aircraft may retain its nationality although it has become a pirate ship or aircraft. The retention or loss of nationality is determined by the law of the State from which such nationality was derived.

Article 105

Seizure of a pirate ship or aircraft

On the high seas, or in any other place outside the jurisdiction of any State, every State may seize a pirate ship or aircraft, or a ship or aircraft taken by piracy and under the control of pirates, and arrest the persons and seize the property on board. The courts of the State which carried out the seizure may decide upon the penalties to be imposed, and may also determine the action to be taken with regard to the ships, aircraft or property, subject to the rights of third parties acting in good faith.

Article 106

Liability for seizure without adequate grounds

Where the seizure of a ship or aircraft on suspicion of piracy has been effected without adequate grounds, the State making the seizure shall be liable to the State the nationality of which is possessed by the ship or aircraft for any loss or damage caused by the seizure.

Article 107

Ships and aircraft which are entitled to seize on account of piracy

A seizure on account of piracy may be carried out only by warships or military aircraft, or other ships or aircraft clearly marked and identifiable as being on government service and authorized to that effect.

Article 108

Illicit traffic in narcotic drugs or psychotropic substances

1. All States shall cooperate in the suppression of illicit traffic in narcotic drugs and psychotropic substances engaged in by ships on the high seas contrary to international conventions.
2. Any State which has reasonable grounds for believing that a ship flying its flag is engaged in illicit traffic in narcotic drugs or psychotropic substances may request the cooperation of other States to suppress such traffic.

Article 111

Right of hot pursuit

1. The hot pursuit of a foreign ship may be undertaken when the competent authorities of the coastal State have good reason to believe that the ship has violated the laws and regulations of that State. Such pursuit must be commenced when the foreign ship or one of its boats is within the internal waters, the archipelagic waters, the territorial sea or the contiguous zone of the pursuing State, and may only be continued outside the territorial sea or the contiguous zone if the pursuit has not been interrupted. It is not necessary that, at the time when the foreign ship within the territorial sea or the contiguous zone receives the order to stop, the ship giving the order should likewise be within the territorial sea or the contiguous zone. If the foreign ship is within a contiguous zone, as defined in article 33, the pursuit may only be undertaken if there has been a violation of the rights for the protection of which the zone was established.
2. The right of hot pursuit shall apply *mutatis mutandis* to violations in the exclusive economic zone or on the continental shelf, including safety zones around continental shelf installations, of the laws and regulations of the coastal State applicable in accordance with this Convention to the exclusive economic zone or the continental shelf, including such safety zones.
3. The right of hot pursuit ceases as soon as the ship pursued enters the territorial sea of its own State or of a third State.
4. Hot pursuit is not deemed to have begun unless the pursuing ship has satisfied itself by such practicable means as may be available that the ship pursued or one of its boats or other craft working as a team and using the ship pursued as a mother ship is within the limits of the territorial sea, or, as the case may be, within the contiguous zone or the exclusive economic zone or above the continental shelf. The pursuit may only be commenced after a visual or auditory signal to stop has been given at a distance which enables it to be seen or heard by the foreign ship.
5. The right of hot pursuit may be exercised only by warships or military aircraft, or other ships or aircraft clearly marked and identifiable as being on government service and authorized to that effect.
6. Where hot pursuit is effected by an aircraft:
(a) the provisions of paragraphs 1 to 4 shall apply *mutatis mutandis*;
(b) the aircraft giving the order to stop must itself actively pursue the ship until a ship or another aircraft of the coastal State, summoned by the aircraft, arrives to take over the pursuit, unless the aircraft is itself able to arrest the ship. It does not suffice to justify an arrest outside the territorial sea that the ship was merely sighted by the aircraft as an offender or suspected offender, if it was not both ordered to stop and pursued by the aircraft itself or other aircraft or ships which continue the pursuit without interruption.

7. The release of a ship arrested within the jurisdiction of a State and escorted to a port of that State for the purposes of an inquiry before the competent authorities may not be claimed solely on the ground that the ship, in the course of its voyage, was escorted across a portion of the exclusive economic zone or the high seas, if the circumstances rendered this necessary.
8. Where a ship has been stopped or arrested outside the territorial sea in circumstances which do not justify the exercise of the right of hot pursuit, it shall be compensated for any loss or damage that may have been thereby sustained.

Article 112

Right to lay submarine cables and pipelines

1. All States are entitled to lay submarine cables and pipelines on the bed of the high seas beyond the continental shelf.
2. Article 79, paragraph 5, applies to such cables and pipelines.

Article 113

Breaking or injury of a submarine cable or pipeline

Every State shall adopt the laws and regulations necessary to provide that the breaking or injury by a ship flying its flag or by a person subject to its jurisdiction of a submarine cable beneath the high seas done wilfully or through culpable negligence, in such a manner as to be liable to interrupt or obstruct telegraphic or telephonic communications, and similarly the breaking or injury of a submarine pipeline or high-voltage power cable, shall be a punishable offence. This provision shall apply also to conduct calculated or likely to result in such breaking or injury. However, it shall not apply to any break or injury caused by persons who acted merely with the legitimate object of saving their lives or their ships, after having taken all necessary precautions to avoid such break or injury.

APPENDIX C

COMPARATIVE NAVAL CAPABILITIES

Selected Submarine Fleets

The table below is adapted from Jane's World Navies.[140] Excluded vessels considered auxiliaries, salvage, survey, tender, or rescue, and nuclear-powered vessels are bolded. Excludes autonomous underwater vehicles, of which Japan has 5 and United Kingdom has 16. "Russian Federation" changed to "Russia." Multiple lines of the same vessel, such as "patrol" or "attack" represent multiples classes of that vessel, distinguished by their age or capabilities in the full database.

Country	Class	Role	Total	Commissioned
Australia	Collins	Patrol	6	1996
Brazil	Tupi (Type 209/1400)	Patrol	4	1989
Brazil	Tikuna (Type 209/1450)	Patrol	1	2005
China	**Xia (Type 092)**	**Ballistic missile**	**1**	**1987**
China	**Jin (Type 094)**	**Ballistic missile**	**4**	**2007**
China	Han (Type 091/091G)	Attack	2	1980
China	Shang (type 093)	Attack	2	2006
China	Yuan (Type 039A)	Patrol	12	2006
China	Song (Type 039/039G)	Patrol	13	1999
China	Kilo (Project 877EKM/636)	Patrol	12	1995
China	Ming (Type 035)	Patrol	16	1971
France	Rubis Améthyste	Attack	6	1983
France	**Le Triomphant**	**Strategic missile**	**4**	**1997**
Germany	Type 212A	Attack	6	2005
India	Akula	Attack	1	2012
India	Sindhughosh (Kilo) Type 877	Attack	9	1986
India	Shishumar (Type 209/1500)	Attack	4	1986
India	CE2F/FX100	Swimmer delivery vehicle	11	1991
Iran	Kilo	Attack	3	1992
Iran	Ghadir	Midget	10	2004
Iran	Nahang	Midget	1	2006
Iran	Gahjae	Semisubmersible craft	3	2002
Iran	Kajami	Semisubmersible craft	3	2002
Iran	Zolfaqar	Semisubmersible craft	4	2015
Japan	Souryu	Attack	8	2009

[140] IHS Jane's World Navies, accessed 16 May 2017, https://janes.ihs.com/SecurityCountryRisk/Display/1322795.

Japan	Oyashio	Attack	11	1998
Japan	Harushio	Attack	2	1990
North Korea	Romeo	Attack	20	n/a
North Korea	K-300 (Sang-o II)	Attack and reconnaissance	5	2005
North Korea	Sang-O	Attack and reconnaissance	38	n/a
North Korea	Yugo / P-4	Attack	10	n/a
North Korea	Yono	Attack	12	n/a
South Korea	KSS-2 (Type 214)	Attack	4	2007
South Korea	Chang Bogo (Type 209/1200)	Attack	9	1993
South Korea	KSS-1 Dolgorae	Midget	2	1983
South Korea	Dolphin (Cosmos)	Midget	9	n/a
United Kingdom	Vanguard	Strategic missile	4	1993
United Kingdom	Trafalgar	Attack	4	1983
United Kingdom	Astute	Attack	3	2010
United States	**Los Angeles**	**Attack**	**36**	**1976**
United States	**Seawolf**	**Attack**	**3**	**1997**
United States	**Virginia**	**Attack**	**13**	**2004**
United States	**Ohio**	**Cruise Missile**	**4**	**1981**
United States	**Ohio**	**Strategic Missile**	**14**	**1984**

Selected Surface Fleets

Unlike the selected submarine fleets above, the table below is entirely unedited for the reader's sake. It demonstrates the vast differences between international navies—in composition, age, and even in naming convention—that are a result of the vastly different needs of nations. This list does not include all of the support, supply, tender, auxiliary, and rescue ships that most of the navies represented here also operate.

World Navy Surface Fleets			
Country	**Role**	**In Service**	**Comm**
Australia	Frigate	8	1996
Australia	Frigate	3	1980
Australia	Landing helicopter dock	2	2014
Australia	Landing ship dock	1	2011
Australia	Landing Craft	12	2014
Australia	Patrol craft	13	2005
Australia	Minehunter - coastal	4	1999
Brazil	Aircraft carrier	1	1963
Brazil	Frigate	2	1979
Brazil	Frigate	6	1976
Brazil	Corvette	2	1989
Brazil	Corvette	1	1955

Brazil	Corvette/coastal patrol ship	1	2009
Brazil	Offshore patrol vessel	3	2012
Brazil	Patrol boat - offshore	2	2009
Brazil	Patrol craft - large	12	1993
Brazil	Patrol craft - riverine	2	1973
Brazil	Patrol craft - riverine	4	2013
Brazil	Patrol ship - riverine	3	1975
Brazil	Patrol craft - riverine	6	1970
Brazil	Patrol craft - coastal	6	2005
Brazil	Patrol craft - riverine	4	1985
Brazil	River monitor	1	1938
Brazil	Minesweepers - coastal	4	1971
Brazil	Landing Ship - dock	1	2016
Brazil	Landing Ship - dock	1	1956
Brazil	Landing craft - tank	6	n/k
Brazil	Landing craft - tank	1	1970
Brazil	Landing craft - mechanical	10	1994
Brazil	Landing craft - tank	1	1989
Brazil	Landing craft - mechanical	2	1982
Brazil	Landing craft - utility	3	1978
Brazil	Landing craft - logistic	1	1987
Brazil	Landing ship - logistic	1	1967
China	Aircraft carrier	1	2012
China	Destroyer	5	2014
China	Destroyer	4	2004
China	Destroyer	2	2004
China	Destroyer	2	2006
China	Destroyer	4	1999
China	Destroyer	2	1994
China	Destroyer	4	1991
China	Destroyer	1	1999
China	Frigate	2	2005
China	Frigate	23	2008
China	Frigate	12	1974
China	Frigate	1	1986
China	Frigate	4	1991
China	Frigate	10	1998
China	Corvette	31	2012
China	Fast attack craft - missile	60	2004
China	Fast attack craft - missile	6	1991
China	Fast attack craft - missile	20	1991
China	Fast attack craft - patrol	27	1963

China	Fast attack craft - patrol	22	1992
China	Patrol craft - large	2	n/a
China	Patrol craft - harbour	4	1997
China	Patrol craft - coastal	40	1992
China	Minesweeper - ocean	15	1966
China	Minesweeper - coastal	14	1988
China	Minesweeper - drone	6	2010
China	Minelayer	1	1988
China	Mine countermeasures	4	n/a
China	Mine countermeasures	6	2010
China	Mine countermeasures	5	2005
China	Landing ship tank	10	1992
China	Landing ship tank	10	2003
China	Landing ship tank	3	1980
China	Landing ship tank	9	n/a
China	Landing ship medium	7	1980
China	Landing ship medium	1	1994
China	Landing ship medium	10	2004
China	Landing ship medium	12	1995
China	Landing craft utility	10	2004
China	Landing craft utility	120	1968
China	Landing craft utility	20	1962
China	Landing craft utility	25	1970
China	Amphibious assault ship	4	2008
China	Hovercraft	10	1979
China	Hovercraft	n/a	2008
China	Hovercraft	2	2013
France	Aircraft carrier	1	2001
France	Destroyer - air defence	2	2010
France	Destroyer - air defence	2	1988
France	Destroyer - anti-submarine	3	1986
France	Destroyer - anti-submarine	2	1979
France	Frigate	3	2012
France	Frigate	5	1996
France	Frigate - surveillance	6	1992
France	Corvette	9	1980
France	Patrol vessel - offshore	1	2012
France	Patrol craft	3	1997
France	Patrol craft	1	1991
France	Patrol craft	4	1986
France	Patrol craft	1	1967
France	Patrol craft	1	1988

France	Patrol craft - offshore	1	1997
France	Amphibious assault ship	3	2006
France	Landing craft mechanical (material)	10	1982
France	Landing craft tank (catamaran)	4	2011
France	Light transport/landing ship	2	1983
France	Offshore patrol ship	1	2016
France	Minehunter	11	1984
Germany	Frigate	3	1982
Germany	Frigate	4	1994
Germany	Frigate	3	2004
Germany	Corvette	5	2008
Germany	Minesweeper - coastal	2	1989
Germany	Minehunter - coastal	8	1993
Iran	Frigate	2	2010
Iran	Frigate	3	1971
Iran	Corvette	2	1964
Iran	Fast attack craft - missile	15	1977
Iran	Fast attack craft	1	2010
Iran	Patrol craft	10	2006
Iran	Patrol craft - large	3	n/a
Iran	Patrol craft - large	3	1967
Iran	Patrol craft - coastal	13	1975
Iran	Patrol craft - coastal	10	2002
Iran	Patrol craft - coastal	10	1977
Iran	Patrol craft - inshore	3	1953
Iran	Patrol craft - inshore	2	2002
Iran	Patrol craft - inshore	1	2003
Iran	Patrol craft - inshore	15	2005
Iran	Patrol craft - inshore	15	n/a
Iran	Patrol craft	9	n/a
Iran	Landing ship tank	2	2006
Iran	Landing ship logistic	4	1974
Iran	Landing ship logistic	6	1998
Iran	Landing craft	1	2008
Iran	Hovercraft	2	1970
Iran	Hovercraft	4	1974
Iran	Hovercraft	1	2000
Iran	Fast attack craft - missile	10	1994
Iran	Patrol craft - coastal, missile	25	n/a
Iran	Patrol craft - coastal	15	2002
Iran	Patrol craft - coastal	10	n/a
Iran	Patrol craft - coastal	20	n/a

Iran	Patrol craft - inshore	20	n/a
Iran	Patrol craft - inshore	20	n/a
Iran	Patrol craft	20	1984
Iran	Landing ship tank	2	1985
Iran	Landing ship tank	3	1985
Japan	Helicopter carrier	2	2009
Japan	Helicopter carrier	2	2015
Japan	Destroyer - guided missile (Aegis)	4	1993
Japan	Destroyer - guided missile	4	2012
Japan	Destroyer - guided missile	5	2003
Japan	Destroyer - guided missile	8	1988
Japan	Destroyer - guided missile	3	1982
Japan	Destroyer - guided missile	9	1996
Japan	Destroyer (Aegis)	2	2007
Japan	Destroyer	2	1986
Japan	Destroyer	2	1980
Japan	Frigate	6	1989
Japan	Patrol craft - fast	6	2002
Japan	Landing platform - dock	3	1998
Japan	Landing craft	7	1980
Japan	Landing craft - utility	2	1981
Japan	Landing craft - utility	2	1988
Japan	Landing craft - mechanised	2	2003
Japan	Landing craft - mechanised	10	1992
Japan	Landing craft air cushion	6	1997
Japan	Minesweeper - ocean	2	2012
Japan	Minesweeper - ocean	1	1993
Japan	Minesweeper - ocean	1	2017
Japan	Minesweeper - coastal	3	2008
Japan	Minesweeper - coastal	5	1983
Japan	Minesweeper - coastal	12	1999
Japan	Drone control ship	2	1986
Japan	Minesweeper - drone	6	1998
Japan	Autonomous underwater vehicle	4	2012
Japan	Autonomous underwater vehicle	1	2012
North Korea	Frigate	2	2014
North Korea	Frigate	2	1973
North Korea	Corvette	4	n/a
North Korea	Corvette	1	n/a
North Korea	Fast attack craft - missile	10	n/a
North Korea	Fast attack craft - missile	8	1968
North Korea	Fast attack craft - missile	4	1980

North Korea	Fast attack craft - missile	12	n/a
North Korea	Fast attack craft - missile	6	1980
North Korea	Fast attack craft - torpedo	33	n/a
North Korea	Fast attack craft - torpedo	13	n/a
North Korea	Fast attack craft - torpedo	142	n/a
North Korea	Fast attack craft - gun	13	n/a
North Korea	Fast attack craft - gun	59	n/a
North Korea	Fast attack craft - gun	54	n/a
North Korea	Fast attack craft - gun	2	2009
North Korea	Patrol craft - large	6	1975
North Korea	Patrol craft - large	18	n/a
North Korea	Patrol craft - large	7	n/a
North Korea	Patrol craft - large	5	n/a
North Korea	Patrol craft - large	6	n/a
North Korea	Patrol craft - very slender vessel	n/a	n/a
North Korea	Patrol craft - very slender vessel	n/a	n/a
North Korea	Minesweeper - coastal	19	n/a
North Korea	Minesweeper - coastal	5	n/a
North Korea	Landing craft - personnel	96	1975
North Korea	Landing craft - mechanised	7	n/a
North Korea	Landing craft - mechanised	18	n/a
North Korea	Landing craft - mechanised	10	n/a
North Korea	Landing craft - tank	5	n/a
North Korea	Landing craft - tank	5	n/a
North Korea	Hovercraft	57	n/a
North Korea	Hovercraft	78	n/a
Russia	Aircraft Carrier	1	1990
Russia	Battle Cruiser	2	1998
Russia	Cruiser	3	1982
Russia	Cruiser	1	1974
Russia	Destroyer	8	1982
Russia	Destroyer	1	1999
Russia	Destroyer	5	1988
Russia	Destroyer	1	1969
Russia	Frigate	2	2002
Russia	Frigate	2	2016
Russia	Frigate	2	1993
Russia	Frigate	2	1980
Russia	Frigate	3	1968
Russia	Corvette	20	2007
Russia	Corvette	4	2007
Russia	Corvette	6	1986

Russia	Corvette	7	1976
Russia	Corvette	11	1976
Russia	Corvette	1	1987
Russia	Corvette	26	1979
Russia	Corvette	5	2014
Russia	Air Cushion Missile Ship	2	1997
Russia	Fast Attack Craft - Missile Hydrofoil	3	1997
Russia	Small ASW Ship	1	1987
Russia	Gunboat	3	2005
Russia	Counter-sabotage	8	2009
Russia	Minesweeper - Ocean	32	1970
Russia	Minesweeper / hunter - Coastal	18	1972
Russia	Minesweeper - coastal	1	2015
Russia	Minehunter - Ocean	2	1988
Russia	Minehunter - Coastal	8	1989
Russia	Minehunter - Coastal	3	1992
Russia	Large Landing Ship	4	1966
Russia	Landing Ship - Tank	14	1974
Russia	Landing Ship - Tank	3	1970
Russia	Landing Craft - Utility	1	n/a
Russia	Landing Craft - Utility	16	1994
Russia	Landing Craft - Mechanised	17	1971
Russia	Air Cushion Vehicle	2	1986
Russia	Air Cushion Vehicle	1	1970
Russia	Air Cushion Vehicle	4	1969
Russia	Air Cushion Vehicle	1	1975
South Korea	Destroyer	3	1998
South Korea	Destroyer	6	2003
South Korea	Destroyer	3	2008
South Korea	Frigate	8	1981
South Korea	Frigate	6	2013
South Korea	Corvette	20	1984
South Korea	Corvette	4	1982
South Korea	Fast attack craft - patrol	69	n/a
South Korea	Patrol craft - guided missile	15	2008
South Korea	Minehunter	6	1986
South Korea	Minelayer	1	1997
South Korea	Minesweeper - coastal	3	1999
South Korea	Landing platform dock	1	2007
South Korea	Landing ship - tank	2	1945
South Korea	Landing ship - tank	4	1993
South Korea	Landing craft - mechanised	10	n/a

South Korea	Landing craft - utility	2	2012
South Korea	Landing craft air cushion	3	2005
South Korea	Landing craft air cushion	2	2007
United States	Aircraft Carrier	10	1975
United States	Command Ship	2	1970
United States	Cruiser - Guided Missile (Aegis)	22	1983
United States	Destroyer - Guided Missile (Aegis)	34	2000
United States	Destroyer - Guided Missile (Aegis)	28	1991
United States	Destroyer	1	2016
United States	Littoral Combat Ship	4	2008
United States	Littoral Combat Ship	5	2010
United States	Mine Countermeasures	11	1987
United States	Patrol Craft - Coastal	13	1993
United States	Patrol Boat	4	2014
United States	Amphibious Assault Ship	1	2014
United States	Amphibious Assault Ship	8	1989
United States	Amphibious Transport Dock	10	2006
United States	Landing Ship - Dock	8	1985
United States	Landing Ship - Dock	4	1995

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Suggested Resources for Future Study

Center for Strategic and International Studies, Russia and Eurasia. https://www.csis.org/regions/russia-and-eurasia/russia.

China Maritime Studies Institute. https://www.usnwc.edu/Publications/Publications.aspx.

Inclusive Wealth Index. www.inclusivewealthindex.org.

International Journal of the Commons. https://www.thecommonsjournal.org.

World Trade Organization. www.wto.org.

United Nations Conference on Trade and Development. www.unctad.org.

United Nations Convention on the Law of the Sea. http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm.

United Nations Human Development Index. http://hdr.undp.org/en/content/human-development-index-hdi.

University of South Carolina US-China Institute. http://china.usc.edu/prc-white-papers, http://china.usc.edu/congressional-research-service-reports.