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DISADVANTAGES ASHORE

Constraints on Achieving Integrated All-Domain Naval Power

Sam J. Tangredi

The naval triservice public document released in December 2020, *Advantage at Sea* (also keyworded on the web as the “TriServices Strategy”), is a logical and well-written general statement of the self-concept and future objectives of the Department of the Navy and the national-defense components of the U.S. Coast Guard.¹ Signed by the Secretary of the Navy (in the preface) and Chief of Naval Operations (CNO), Commandant of the Marine Corps (CMC), and Commandant of the Coast Guard (in the foreword), *Advantage at Sea* is identified as succeeding and superseding *A Cooperative Strategy for 21st Century Seapower (Revised)* of 2015.²

Yet, despite its virtues, the document faces a series of what may be called “disadvantages” in its voyage to shape the roles, missions, organization, and force structures of the naval services.³ Rather than *operational* disadvantages, these are

actually *political and internal* difficulties that, if not identified, examined, and addressed, could create shoals, eddies, and unfavorable winds that would force the strategy far off course. The reality is that these *shoreside* disadvantages in the sea of defense-policy decision-making very easily could turn into *material* disadvantages if the U.S. Navy were to face a competent enemy on the actual oceans.

At least six political-bureaucratic-doctrinal disadvantages can be identified: (1) American perceptions concerning maritime aspects of national security, (2) the present size of the U.S. fleet, (3) the ideology of jointness, (4) the

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dominance of combatant-commander requirements in defense policy, (5) current guiding principles of defense acquisition, and (6) the passionate belief in technological solutions to military competition. It is prudent for strategists and analysts to examine these disadvantages in any assessment of the value and likely effectiveness, longevity, and resilience of the recently issued triservices strategy.

CRITERIA FOR EVALUATION

This article does not attempt to assess all the detailed particulars of the strategy; rather, its intent is to focus on the stumbling blocks that might prevent translation of the written document into capabilities and actions at sea. The article's guiding premise is that such a strategy is effective if (1) its objectives are clear and understandable to the naval community and the American public, (2) it provides a core vision of the future to guide naval programs, and (3) it is capable of generating strong resource support from the Office of the Secretary of Defense (OSD), the presidential administration, and—most importantly—Congress.⁴ To do that, it must overcome the six identified disadvantages.

Of particular note for historical comparison, these disadvantages are contemporary, and they differ from the challenges faced by earlier naval strategic visions, such as the famed *Maritime Strategy* of the Cold War. The *Maritime Strategy* often is credited with having played a significant role in deterring war between the Soviet Union and the North Atlantic Treaty Organization (NATO), and it was the subject of much political and intellectual debate.⁵ In any event, it successfully met the three criteria of effectiveness identified above.

Even though the challenges that *Advantage at Sea* faces are different, it nevertheless is appropriate to compare it with the *Maritime Strategy* because both were drafted in eras of growing naval challenges from near-peer competitors. These competitions—involving continuous forms of deterrence—have stretched across times of “peace” as well as war. *Advantage at Sea* refers to the current challenge using a new joint-doctrine term, *competition continuum*; the *Maritime Strategy* referred to it as activities along a *spectrum of conflict*.⁶

YES, IT IS A STRATEGY. YES, ALL STRATEGIES FACE OPPOSITION.

For its efforts, the *Advantage at Sea* document certainly deserves to be described as a *strategy*, despite the pedantic argument that it is the Chairman of the Joint Chiefs (and thereby the Joint Staff) and joint combatant commanders (COCOMs) who actually define U.S. military strategy, whereas the armed services themselves merely provide the means to execute it.⁷ One might sidestep this argument by referring to the document as a *strategic vision* or, in the words of the late Professor Samuel P. Huntington, a *strategic concept*.⁸ Or one can take

on the debate directly by pointing out that the joint COCOMs are charged with war planning rather than long-term strategy, and that the Joint Staff–developed *National Military Strategy* is largely a compilation of service visions framed by the preferred terminology of the Chairman of the Joint Chiefs of Staff (CJCS).⁹ Additionally, as members of the Joints Chiefs of Staff, the CNO and CMC are required to provide their best professional advice on national strategy, and *Advantage at Sea* can be seen as the articulation of their advice.¹⁰

In any event, *Advantage at Sea* is certainly a *strategy* according to the definition promulgated by Professor Lawrence Freedman—who is credited with the most thorough recent examination of strategic theory—as an attempt “to think about actions in advance, in the light of our goals and our capacities.”¹¹ In *Advantage at Sea*, the U.S. Navy, U.S. Marine Corps, and U.S. Coast Guard identify their immediate and long-term missions as “shap[ing] the maritime balance of power for the rest of this century,” primarily against the efforts of Vladimir V. Putin’s Russian government and the Chinese Communist Party (CCP) to erode the “free and open, rules-based order” that largely has defined international relations since the conclusion of the Second World War, and most certainly since the end of the Cold War.¹² In identifying Putinized Russia and Xi’s CCP as the primary threats to the maritime security of other nations (as well as global security overall), *Advantage at Sea* also fulfills another requirement in Freedman’s construct: that “strategy comes into play where there is actual or potential conflict, when interests collide and forms of resolution are required.”¹³

Yet, as previously noted, the identification of the primary external military threats does not encompass fully all the potential conflicts and colliding interests that will create considerable friction during the voyage of the naval services toward the achievement of the strategy’s goals. The majority of these colliding interests actually reside within the Department of Defense (DoD), and the friction will be generated by the contentious decision-making process applicable to defense policy in a democratic nation.¹⁴

THEMES AGAINST THE CURRENTS

Advantage at Sea describes the naval services’ future actions in terms of five “themes” intended to connect “the Service Chiefs’ statutory roles” of “developing naval forces and providing best military advice for employing naval forces.” The document focuses almost exclusively on the latter role rather than the former, although its section titled “IV. Developing Naval Forces” does hint at the nature (if not the composition) of future naval-force structure and capabilities through developmental priorities. The two most significant of these are an “[e]mphasis on sea control relative to other naval missions” and acquiring “[g]reater numbers of distributable capabilities over fewer exquisite platforms.”¹⁵ These twin priorities

mark a growing shift in the philosophy of naval-force design since the March 2015 *Cooperative Strategy for 21st Century Seapower: Forward, Engaged, Ready*.

Advantage at Sea summarizes its identified themes or missions and this growing shift as the pursuit of “all-domain naval power.” The term *all-domain* actually predates the U.S. Army’s use of *multidomain warfare*, first entering the naval lexicon during Admiral Jonathan W. Greenert’s tour as CNO (2011–15).¹⁶

Of course, all strategies face opposition. As noted, the *Maritime Strategy* experienced considerable opposition as well as support. Presumably, the drafters of *Advantage at Sea* took such potential opposition into consideration. For any strategy, much of the underlying opposition actually does not involve its details. Certainly, there are those who might view the threats identified and the means to combat them as inaccurate, insufficient, or simply wrongheaded. But the bulk of opposition is generated by competing views in the debate about how defense resources are best spent. There is a significant amount of military and international-relations theory involved in this debate; however, much is tied up with the struggle among contending organizations—the military services and defense agencies. Joining in this competition is the OSD staff (which presumably enjoys an advantage because, in theory, its political appointees represent the perspective of the president and civilian authority) and the personnel of the Joint Staff (which presumably represents the collective views of the Joint Chiefs of Staff themselves in integrating the programs of the services, but is actually an autonomous participant).¹⁷ Overlying this internal bureaucratic struggle is the national political debate normal for any democracy incorporating a congressional system.

For any written strategy to have effect, its tenets much be translated into resources and action. That is where much of the opposition originates, abetted by the identified disadvantages.

CONTEXT OF THE DISADVANTAGES: WHAT THREAT? WHAT WORLD ORDER?

Importantly, these disadvantages did not exist, or were barely nascent, during much of the Cold War, the previous era of “great-power competition” (more properly “great-systems conflict”) in which the *Maritime Strategy* delineated the Navy’s strategic vision.¹⁸ President Ronald W. Reagan’s administration, in which that strategy primarily was resourced, promoted an across-the-board increase in defense spending—muting the natural intra-DoD competition.¹⁹ Meanwhile, the focus of the U.S. Army and U.S. Air Force (USAF) was funding and operationalizing the Air-Land Battle doctrine that served as the two services’ de facto strategic concept.²⁰ Since the *Maritime Strategy* promised to take the naval fight to Soviet territory (or at least its maritime periphery) to relieve the pressure

on the central front in Europe (toward which Air-Land Battle was optimized), the other services saw little with which to take offense, since their own resources were expanding.

Obviously, that situation was much different from today's. The Cold War, with its unrelenting sense of threat, is thirty years in the past. The pressure of the looming potential for strategic nuclear war has dissipated, although fear of nuclear escalation has restrained actions by outside forces during Russia's invasion of Ukraine. Still, DoD is facing constrained, possibly reduced, financial resources. The United States has wound down its interventionist actions supporting the global war on terror (such as in Afghanistan and Iraq), and polls indicate that the American public is weary of such interventions.²¹ This is reflected in the debate concerning intervention in defense of Ukraine. It translates to a weariness regarding foreign relations in general, which may have been a major factor in the election of former president Donald J. Trump. The possibility of war with the People's Republic of China (PRC), particularly over the de facto independence of Taiwan, is acknowledged openly in U.S. defense strategies (including in *Advantage at Sea*), and the strength of the People's Liberation Army (PLA) is seen as the pacing threat.²² However, lingering ambiguity remains from the last three decades, during which the U.S. government was unsure whether the PRC was a strategic competitor, trade partner (and rival), or potential "responsible stakeholder."²³ International affairs—except when there is a photogenic overseas tragedy (a categorization that includes Russia's invasion of Ukraine)—have taken a back seat in an American national political debate that revolves around economic issues, income inequality, pandemics and health care, and culture and diversity.²⁴

Admittedly, Russia's invasion of Ukraine may change this perception. Putin's actions certainly have revitalized NATO in ways that no threat other than a direct attack on a member state would have inspired.²⁵ As of this writing, the conflict is ongoing and the outcome is uncertain. *Advantage at Sea* appears quite prescient in stating that "[i]n the event of conflict, China and Russia will likely attempt to seize territory before the United States and its allies can mount an effective response."²⁶ Nevertheless, dramatic Western public support for Ukraine and its resistance is not guaranteed to sustain an impression that Russia poses a direct threat to the United States, and the economic implications for global trade and the sober reality of Russian nuclear-weapon capabilities eventually may make "aggressive" strategic declarations impolitic. Public support for sanctions may waver once the long-term economic impact is felt in Western states (such as in gas supplies to Europe).²⁷

In any event, the current context is different from that of the Cold War. Those differences are laid out in more detail in the sections that follow.

Awareness of an Enemy

In assessing the contextual difference, Rear Admiral Michael McDevitt, USN (Ret.), points out that the successful reception of the *Maritime Strategy* in the 1980s hinged on the fact that Americans accepted the perception that the Soviet Union was an existential enemy, and they were uncomfortable with a defense posture that relied primarily on nuclear weapons (whether tactical or strategic). The *Maritime Strategy* held the promise that the U.S. Navy could help deter or defeat Soviet forces without resorting to a nuclear exchange. In contrast, McDevitt notes, since 1991 “there has been no widely agreed upon enemy that could generate a significant enough demand signal for a major navy buildup or naval strategic story like that of the early 1980s.” Although “[i]t appears that China may now be filling that gap today,” it remains very difficult to shape “a compelling ‘naval strategic story’” amid the many contending (and perhaps more-dramatic) arguments.²⁸

Within that different context, the need for an explicit naval strategy (or strategic concept or strategic vision) simply may not appear to be a pressing public concern.²⁹ Even as the American people routinely express their appreciation for military servicemembers and acknowledge the need for an effective national defense, the intricacy of naval strategy is certainly not a high-interest subject. The publication of *Advantage at Sea* would not (and did not) make headlines outside the defense press and professional military publications (and only briefly therein).³⁰ Unlike during the *Maritime Strategy* era, there is no cadre of civilian university professors determined to denounce it in the op-ed pages of prestigious journals—always a bellwether of serious interest among an elite audience.³¹ Whether they supported or hated the *Maritime Strategy*, readers of national media came to know that there was such a document and that its contents were controversial.

Lack of Interest

Perhaps the general lack of interest in naval strategy simply means that the nation has reverted to pre-Cold War (perhaps post-Cold War / pre-9/11) normalcy. Or perhaps it reflects a popular sense that—given that the Ukraine invasion was by a state (Russia) that supposedly was integrated to a considerable extent in the global economy—there is no existent “global order,” and thus no order to defend.³² *Advantage at Sea* very explicitly states that the “rules-based international order is once again under assault” and that “[f]orward deployed forces of . . . the Naval Service . . . have guaranteed the security of this system.”³³

Perhaps, too, the whole concept of defending a rules-based international order no longer can generate sustained public commitment. Who wants to risk potential war to defend an “order”? *Advantage at Sea* initially makes the obligatory use of the

term *rules-based international order*, but then fortunately it shifts its language to *naval power, defense of the nation, strategic competition, and national interests*.³⁴ The latter language is more in keeping with traditional views concerning the purposes of military forces.

Nevertheless, drafting such a strategy is still essential in justifying the appropriation of resources by Congress and influencing their apportionment within DoD. This is the premise from which the six political-bureaucratic-doctrinal disadvantages need to be examined.

What Maritime Nation? Advantage at Sea begins with the following statement: “The United States is a maritime nation.” But is it? More importantly, do Americans perceive it to be so? Does Congress perceive it to be?

The first question is one of perspective. In scholarly literature, Andrew Lambert—hardly an antinavalist—argues that the United States is really not a maritime nation, because the American economy is not completely dependent on overseas trade (and thereby the sea itself), as were those of Athens, Carthage, Venice, the Dutch Republic, and Great Britain, which he views as having been the true (historic) “seapower states.” Although the United States possesses sea power, it is also a continental military superpower, which Lambert argues indicates that “the sea is at best a marginal factor” in America’s identity.³⁵ By Lambert’s criteria, the United States as a whole does not possess a “maritime culture,” even if maritime trade was the dominant factor in the U.S. economy at least until 1820 and perhaps—one can argue—until 1860.

Of course, Lambert’s is the minority view. Other historians point out that many markets and materials that fuel the American economy lie beyond Canada and Mexico. The conflicts in which the United States has involved itself since 1865 have taken place across (or within) oceans, demonstrating that it must possess sea power to project its overall military forces through and over these oceans. If one accepts the definition of *sea power* (equated with *command of the sea*) preferred by Sir Julian S. Corbett—Lambert’s favorite strategist—the United States is *the* sea power.³⁶ Meanwhile, the size of American international trade is such that it cannot avoid being—at least in part—a maritime nation. The consumables available at “low prices every day” (a motto of Walmart) float most of the way here.

But even if history suggests that the United States is (or at least was) a maritime nation, it does not mean that the American public of the 2020s “has a clue.” *Sea blindness* is a term used in the United Kingdom and other island nations to indicate the lack of public awareness of their economic dependence on ocean transport.³⁷ Although there have been no recent polls concerning the awareness of Americans of the economic and security importance of the oceans that constitute the majority of their national borders, the fact that they share this

blindness seems apparent.³⁸ Arguably, members of the public were “less blind” in the *Maritime Strategy* era, when they were aware of Soviet submarines operating close to American shores and remembered the fortunate effects of a maritime embargo conducted against Soviet missiles headed to Cuba.

Few Eyes on the Sea. Until the recent pandemic-induced containership bottlenecks were publicized widely, the maritime aspects of international trade were discussed in public media only infrequently.³⁹ U.S. Navy (USN) documents can point to the fact that, whether measured by weight or volume, 90 percent of international trade travels by sea—but most of that weight and volume is in raw materials that few Americans encounter directly. Oceangoing trade still does carry the largest portion, by dollar value, of exports and imports—the durable goods that stock retail shelves.⁴⁰ However, as long as shelves remain stocked, the relationship between freedom of the seas and international trade is not apparent.

With oceangoing shipping confined to but a few hub ports, for the sake of efficiency, even Americans living in coastal areas rarely see a transoceanic vessel, and certainly few that fly the American flag. In 1950, there were 3,492 U.S.-flagged vessels.⁴¹ Owing to the much lower operating costs, regulatory burdens, and taxes under flags of convenience, today there are at most 120 U.S. merchant ships capable of foreign trade, including those chartered to the Military Sealift Command (MSC). This small number exists solely because of subsidies from the U.S. Maritime Administration designed to ensure that, when necessary, there will be at least 3,600 American merchant mariners to crew MSC ships.⁴² These subsidies were decreased significantly in 1995, causing the Maritime Administration to cease any significant efforts at promoting reflagging. The Jones Act of 1920, last modified in 2006, which permits only U.S.-flagged vessels to carry goods between U.S. ports, maintains maritime infrastructure, but most vessels in the domestic trade are not transoceanic.⁴³

Consider what outside observers could deduce from these numbers: 3,600 out of a population of 300 million citizens are seagoing mariners; and the number of U.S.-flagged merchant vessels is less than half that of ships in the USN fleet. Meanwhile, policy think tanks argue that the Jones Act should be repealed, allowing foreign nations to manage all U.S. seagoing transportation; for example, the libertarian Cato Foundation has mounted a never-ending and shrill campaign against the Jones Act.⁴⁴

Given these optics, a favorable American perception (or even an awareness) concerning maritime aspects of national security cannot be assumed. With the decades-long focus on the decidedly land-based threats of terrorism and instability, the role of naval forces (with the exception of U.S. Marine Corps operations in Iraq and Navy SEALs) has faded far from the national policy dialogue. To some extent, the U.S. Navy is a victim of its own success in dominating the world’s

oceans. During the *Maritime Strategy* era the U.S. Navy may have been dominant, but there was recognition that the Soviet navy could challenge the American navy for control of trade in particular regions.

Thus, the U.S. Navy's responsibility to ensure America's access to international trade—to prevent, in the words of Alfred Thayer Mahan, the country's trade from being a "fugitive" that must seek to avoid the control or restrictions of hostile powers—currently is undervalued.⁴⁵ In fact, many business leaders and even some scholars argue that it no longer matters, since opposing, perhaps even hostile, nations always will trade with each other—if there is money to be made.⁴⁶ Given the drastic sanctions regime presently directed at Russia, some proponents of that view may be reconsidering.⁴⁷ Notably, during the period of the *Maritime Strategy* the West (which did not include the Eastern European states) was not dependent on Soviet fuel exports, since the blocs' economies were not linked together. Thus, the *Maritime Strategy* did not have to take allied resource dependency into consideration.

Need for More-Intensive Explanations. Although general statements concerning the United States being a maritime nation may be valid and appropriate for *Advantage at Sea*, the naval services cannot assume that these statements have any positive effects on their arguments for gaining sufficient resources to implement the strategy. Likely those arguments constitute mere "boilerplate" in the minds of the audience. To be persuasive on the subject of American reliance on foreign trade and the potential impact of a maritime environment effectively controlled by others, what is needed is a discussion that is more detailed and backed by considerable quantitative evidence.

Advantage at Sea does include some quantitative analysis—for instance, it states that "[b]y value, 90 percent of global trade travels by sea, facilitating \$5.4 trillion of U.S. annual commerce and supporting 31 million American jobs. Undersea cables transmit 95 percent of international communications and roughly \$10 trillion in financial transactions each day."⁴⁸ Yet the inclusion of the undersea cables statistics actually drowns out the impact of the first sentence; no one envisions the naval services routinely standing guard over undersea cables (nor do they). (However, the statement could have an impact, with the addition of the historical detail that the Soviet navy cut transatlantic cables on at least three occasions in the 1960s, including once during a NATO exercise.⁴⁹ Technology today makes it easier for the Russian navy or the People's Liberation Army Navy [PLAN] to do the same.)

Perhaps a strategy document such as *Advantage at Sea* does not provide the most appropriate platform for such an extended discussion. More suitable may be a public "handbook" such as the U.S. Navy's 2015 *How We Fight: Handbook for the Naval Warfighter*, cited previously. In any case, a better supporting dialogue

needs to be generated if *Advantage at Sea* is to be validated on the “maritime nation” argument.

Low public awareness of the security requirements of maritime trade is a potential detriment to achieving support for the implementation of integrated, all-domain naval power—a detriment that is reflected in congressional priorities. In such a context, it is difficult to make objectives clear and understandable to the American public (criterion of effectiveness no. 1).

Present Size of the U.S. Fleet

It is very evident that the U.S. naval fleet is shrinking to its smallest size since 1916, in terms of ship numbers.⁵⁰ According to current Navy plans, twenty-four ships will be decommissioned in the next several years, while fewer than one-quarter of that number will be commissioned. At that rate, the 297 warships that are credited for 2020 will shrink to 280 by 2027.⁵¹

While the U.S. naval fleet is shrinking, the PLAN—to which DoD refers as the pacing (and most capable) threat—continues to expand rapidly.⁵² *Advantage at Sea* states that “China’s navy battle force has more than tripled in size in only two decades.”⁵³ The official estimate is that the PLAN currently is “numerically the largest navy in the world[,] with an overall battle force of approximately 355 ships and submarines.”⁵⁴ At the current rate of ship commissioning, the PLAN could have 375 battle-force ships by 2027.⁵⁵

If—as then—Commander, U.S. Pacific Command Admiral Philip S. Davidson, USN, stated in 2021—the PRC may try to take control of Taiwan in “the next six years” (i.e., by 2027), the comparative USN-to-PLAN ratio of 280 to 375 warships would appear worrisome.⁵⁶ Sources suggest that CCP leader Xi Jinping desires to “resolve the Taiwan situation” before the end of his tenure as PRC leader. Xi arranged for his continuation as party general secretary at the 2022 CCP Party Congress—an unprecedented move that violated the current CCP regulation and was eschewed by his predecessors since Mao.⁵⁷ However, speculation is that he will be unable to persuade senior party members to grant him a fourth term at the 2027 Congress; therefore, 2027 represents the time limit he has to “resolve the situation” by force.⁵⁸ Other sources downplay that possibility.⁵⁹

In any event, *Advantage at Sea* maintains that “China’s and Russia’s aggressive naval growth and modernization are eroding U.S. military advantages. *Unchecked, these trends will leave the Naval Service unprepared to ensure our advantage at sea and protect national interests within the next decade.*”⁶⁰ If such is the case, it is logical to ask how the Naval Service intends to “check” erosion of relative military capabilities and maintain “our advantage at sea” with a fleet that is shrinking nearly to half the size of its primary potential opponent.⁶¹

This question can be amplified by noting that U.S. naval forces operate worldwide in support of the regional joint COCOMs—a posture (and

responsibility) that makes it difficult, if not impossible, to concentrate the entirety of the U.S. fleet in the western Pacific as a significant form of deterrence. In contrast, PLAN out-of-area deployments are currently rare, and the bulk of its fleet operates exclusively in near seas. In the initial phases of a conflict, this would create an even more unbalanced ratio in terms of available maritime platforms. As *Advantage at Sea* notes, “Whereas U.S. naval forces are globally dispersed, supporting U.S. interests and deterring aggression from multiple threats, China’s numerically larger forces are primarily concentrated in the Western Pacific.”⁶²

“Numbers Don’t Matter.” One frequent answer has been that “fleet size doesn’t matter,” or, more cautiously, that “fleet size doesn’t always matter.” Even the CNO—perhaps to conform to the administration’s policy toward defense budgeting—has made that argument.⁶³ Less cautious was the then chairman of the House Armed Services Committee, Representative D. Adam Smith (D-WA), when asked in 2001 about a prospective increase in ship numbers: “If you have a 500-ship navy and you’re up against someone who has a five-ship navy, but they’re able to shut down your information systems so none of your 500 ships work, *they win*. . . . Okay? That’s what it comes down to.”⁶⁴

Representative Smith’s statement reflects the view that cyber and electronic warfare can disable a much larger fleet—yet to date there is no evidence that this is so. The pacing threat identified by U.S. strategy—the CCP, in the form of its PLAN—is a technological near peer with considerable cyber- and electronic-warfare capabilities.⁶⁵ Thus, the scenario of a smaller fleet “shutting down” a much larger fleet needs to be relegated to the category of hyperbole.

Nevertheless, the statement appears to reflect the political climate and general sense of the current Congress regarding the limited urgency to increase the size of the fleet. Despite the fact that it is official U.S. policy to accomplish the goal of building and maintaining a 355-ship Navy, there has been little attempt to ensure that the policy is followed—with the exception of the small minority of members of Congress who represent districts or states where there are shipyards, major concentrations of defense industry, or naval bases.⁶⁶ The Biden administration essentially codified the gradual reduction to 280 ships, prompting at least one commentator to suggest that the “new US Navy budget [is] illegal.”⁶⁷ Regardless of whether the fiscal year (FY) 2022 Navy budget can be considered illegal, much of Congress will provide only rhetorical support for larger naval services.⁶⁸ Presumably, *Advantage at Sea* was written to change that merely rhetorical support into real support for these greater resources.

Criticism from Congressional Supporters. Yet even congressional supporters do not seem greatly enamored of recent Department of the Navy planning and decision-making.⁶⁹ Usual Navy supporters find the Navy’s FY23 thirty-year shipbuilding

plan, which provides three alternative force structures, to be confusing and insufficient. Former representative Elaine G. Luria (D-VA) summed up this view by asking, “Is it really a plan if you present three plans?”⁷⁰ Congresswoman Luria went even further in her criticism of USN leadership for perceived poor fleet-design and acquisition decisions over the past decades, stating that “the Navy owes the American public an apology. . . . For two decades, they’ve been building failed classes of ships. . . . [T]hey like the highest tech, biggest and newest thing.”⁷¹

Such statements by members of Congress normally predisposed to support an increase in the size of the U.S. fleet are in stark contrast to those of their predecessors during the *Maritime Strategy* era of the 1980s; in fact, they seem more like the statements of those who *opposed* the *Maritime Strategy* and its underpinning fleet buildup. The conceptual contrast between the two eras is striking; for implementing *Advantage at Sea*, key decision makers describe fleet size as “not mattering,” whereas the *Maritime Strategy* was premised on developing a “600-ship Navy.”

Since Congress is a primary audience toward which the logic of *Advantage at Sea* is directed, the document thus far can be judged to be ineffective as an argument for resources. It would appear that *Advantage at Sea* neither attracts general attention from the overall Congress nor persuades supportive members that the Navy has an effective strategy that guides its force-design and acquisition decisions. Until the Department of the Navy and, in particular, the U.S. Navy can regain the trust of their most committed congressional supporters, support for both the strategy and shipbuilding plans will remain tepid.

This lack of trust, combined with shipbuilding plans that do not appear to correspond to the *Advantage at Sea* admonition that “[o]ur actions in this decade will shape the maritime balance of power for the rest of this century,” creates a vicious cycle in which the size of the current fleet is insufficient to implement the goals of *Advantage at Sea*, yet the document itself is unable to persuade Congress to increase the size of the fleet. Meanwhile, CNO Admiral Michael M. Gilday has stated that the Navy needs five hundred ships to accomplish its assigned tasks in the 2022 National Defense Strategy as well as *Advantage at Sea*, yet he appears resigned to accepting a much smaller fleet.⁷² These contradictions make it difficult to achieve criteria of effectiveness nos. 2 and 3.

Effects of Joint Ideology

Originally one of the most significant improvements in operational war fighting, the concept of *jointness* has cemented into an ideology centered on the belief that all services should have an equal “share” in operations, defense policies, joint doctrine, and, inevitably, the DoD budget.⁷³ In the case of contingencies or operations, every service (and perhaps defense agencies as well) should participate

in some way, even if the contribution is small or shoehorned into an awkward fit.⁷⁴ No one gets left on the bench. Everyone gets a chance at obtaining similar resources. To remain relevant, every service somehow must present itself as a contributor to every national capability described by joint doctrine. And each needs to do this with full regard for the “rights” of other services.

This ideology, evident in the functioning of the Joint Staff, also is fueled by the continuous desire of the COCOMs for almost any resource that conceivably could be useful for deterrence or operations within their own theaters. Service force development is to serve the needs of the COCOMs. Thus, services that present strategic visions proposing (or assuming) a more global or less regionally directed architecture for their force development (such as *Advantage at Sea*) are not perceived as supporting a “joint approach” to strategy.

This is yet another contrast with the environment in which the *Maritime Strategy* was written and perceived. Several differences apply. First, of course, is that the *Maritime Strategy* was drafted before the passage of the Goldwater-Nichols Department of Defense Reorganization Act of 1986, even though the public version of the *Strategy* did not appear until that year. The Goldwater-Nichols Act made changes that greatly reduced the power of the services and their chiefs of staff to influence policy while making the CJCS—and not the collective Joint Chiefs—the primary military adviser on all matters to the Secretary of Defense (SECDEF) and the president. This intervening change presumably makes current service strategies less important than they were in the *Maritime Strategy* era.

Second, the naval services argued that the *Maritime Strategy* was indeed a joint plan, since its purpose was to shift Soviet attention away (at least in part) from the central front in Europe toward which most U.S. Army and U.S. Air Force tactical assets were directed.⁷⁵ Indeed, the U.S. Air Force had a role in implementing the *Strategy*. Threatening the Soviet Union from the north and in the Pacific (which naval forces could do, while land forces could not) was certainly part of a global war plan that was joint in its essence.

Third, as noted, the *Maritime Strategy* was implemented in a period in which defense resources were increasing for all services. Although the debate over what portion of the budget each service would receive was (and is) never ending, the intensity of such a debate often is muted when the entire pie to be divided is expanding. A reduction in this intensity often is interpreted as an increase in jointness.

Tepid Independence. In any event, the *Maritime Strategy* was able to radiate a sense of bold independence and generate an underlying argument for a major increase in naval resources that simply would not be countenanced under today’s joint ideology. It attempted to place the naval services in the forefront of the global aspects of U.S. grand strategy.⁷⁶

Advantage at Sea does attempt to re-create this sense of independence—at least in spirit. Unlike previous naval-strategy documents since 1990, it does not insist repeatedly that it constitutes a joint approach (beyond the three sea services), nor does it appear to seek some degree of joint (staff) approval. It does mention the integration of the expected future Naval Tactical Grid with Joint All-Domain Command and Control systems (referred to as JADC2), also under development. But this is addressed in terms of “expand[ing] our maritime ISR [intelligence, surveillance, and reconnaissance] framework” rather than as a joint tasking.⁷⁷

Perhaps by now jointness is so ingrained in all service planning that it is assumed and therefore needs to be mentioned only briefly—almost by courtesy—in *Advantage at Sea*.⁷⁸ The document simply states in one mention that “[t]he Naval Service does not compete, deter, or fight alone. We are an integral part of the Joint Force and work closely with allies, partners, and other government agencies.”⁷⁹

Or perhaps it is perceived that since the Joint Staff is responsible for all joint-force concept development, there is no room for individual service staffs to offer other (potentially conflicting) views on how jointness should be implemented. The sublimation of the bold combined U.S. Navy–U.S. Air Force effort (2009–13) at developing an Air-Sea Battle concept to defeat PLA/PLAN antiaccess systems into the weak “joint concept” of Joint Access and Maneuver in the Global Commons (referred to as JAM-GC) demonstrated the power of the Joint Staff (at the prompting of the U.S. Army) to shut down biservice collaboration conducted outside the “joint system.” This bureaucratic maneuvering succeeded despite praise by SECDEF Robert M. Gates for the original Air-Sea Battle effort.⁸⁰ If a USN-USAF collaborative program directed at coordinating their capabilities and resources to defeat the enemy’s antiaccess/area-denial efforts in a region and scenario dominated by the “maritime domain” is not considered “joint enough” (and therefore must be discarded), there is little if any space for service strategies to influence joint programs.

Therein lies the dilemma for developing a mono- or biservice strategic vision that can be effective at justifying an increase in the resources necessary for its own implementation, particularly to an administration reluctant to make any increase in defense spending. Justifying a greater share of the overall pot requires making a persuasive argument on why the particular service or combination of services has a greater potential for solving a strategic or operational problem or dealing with a perceived threat than do other elements of the joint force. However, making such an argument violates joint ideology.

Advantage at Sea does make a bold statement that could be the basis for an argument for an increased share of overall defense resources: “The Naval

Service—forward deployed and capable of both rapid response and sustained operations globally—remains America’s most persistent and versatile instrument of military influence.” This is language in the spirit of the *Maritime Strategy*, and it was embedded in preceding post–Cold War naval-strategy documents. However, in *Advantage at Sea* it appears solely on the reverse of the front cover (no page number)—a location in which many readers likely will miss it entirely. Perhaps an avoidance of joint rivalry did not motivate the placement, but it has that effect. A weaker characterization—“our Nation’s most persistent and versatile maneuver force”—does appear in the conclusion.⁸¹ However, the term *maneuver force* incorporates a significantly softened modifier.

Admittedly, *Advantage at Sea* does take a gentle swipe at land-based forces, referring to the fact that “[n]aval forces’ unique attributes generate options and decision space for national leadership, providing credible deterrence and prompt crisis response worldwide, regardless of access to overseas bases.”⁸² But what joint capability does not “generate options and decision space”?

Effects of JPME. In addition to the pressure for equal resource allocation, critics charge that the template for joint doctrine is “a product almost wholly derived from existing Army doctrine.” In adopting the concept of joint operational art, the Navy accepted a method of planning based on “the scheme of maneuver for large field armies.” All services are expected to teach *joint* professional military education (JPME), so critics also perceive the methodology taught to be tailored toward land warfare. The result, in the words of Jeffrey R. Cares and Anthony Cowden, is that “[t]oday, a ‘joint sailor’ is not someone who thinks like a sailor at all but one who thinks almost entirely like a 1980s-vintage Army planner.”⁸³ Under these conditions, there is little room for service strategies that emphasize service uniqueness and argue that any single service offers the optimal capabilities for any specific threat, scenario, or region.

That is not to say that senior DoD leadership may not recognize such optimal capabilities. As CJCS, Army general Mark A. Milley in 2020 acknowledged the following: “Look, I’m an Army guy. . . . And I love the Army . . . but the fundamental defense of the United States and the ability to project power forward will always be for America naval and air and space power.” General Milley predicted a shift in Pentagon resources to fund a larger fleet, going so far as to state (prior to the promulgation of *Advantage at Sea*) that “we’re a maritime nation . . . and the defense of the United States depends on air power and sea power primarily. People can say what they want and argue what they want, but that’s a reality.”⁸⁴ Yet despite CJCS public support and the publication of *Advantage at Sea*, such a shift in resources thus far has not occurred.

The inability—or perhaps the unwillingness—to break from joint ideology puts criterion no. 3 in doubt.

Regional versus Global Planning

Contrasting with the political-bureaucratic-doctrinal environment in which *Advantage at Sea* was drafted, the *Maritime Strategy* was crafted in an era when naval planners were versed in naval-centric concepts and professional military education (PME), not a land-centric JPME variant. But that does not mean that the original drafters did not have a solid knowledge of joint doctrine. A number of them had served on the Joint Staff or in billets on the staffs of regional or specified COCOMs (the contemporary term was *CINCs*, for *commanders in chief* of joint commands), thus gaining JPME-like knowledge through practical experience. Some were graduates of the National War College or other joint institutions at what is now National Defense University. A few were graduates of other-service war colleges. However, their approach to building the *Maritime Strategy*—which was primarily a classified force-employment strategy—could be described as uniquely naval, with an emphasis on global operations rather than region-specific planning. Naval-centric PME is necessarily global in its focus.

However, the global focus was tough to sustain without a global enemy. More than the Goldwater-Nichols Act alone—as Steven T. Wills notes—“[t]he apparent success of joint approaches in fighting the Gulf War [1991], in particular in regard to Army and Air Force operations, demanded that the Navy’s follow-on strategy parallel that of the other services.” Under joint planning, “planners drew ‘lines in the water’ that linked naval forces with land-based commanders.” The result “fundamentally altered the Navy’s strategy from a global focus in support of general U.S. interests to one delimited by maintenance of the newly imposed joint force structure within designated regional boundaries.”⁸⁵

Effects of COCOM Dominance. In reality, COCOM dominance over defense planning makes considerable sense if there is no global threat, and if successive presidential administrations seek to pursue an activist foreign policy leading to interventions in “regions of crisis.” The details of each crisis are different, presumably shaped by regional cultures and geography. Thus each “crisis action plan” drafted by the COCOM involved must be tailored to the region. In turn, the joint force (including assigned naval forces) must be tailored to the plans. Moreover, each COCOM seeks to *deter* potential crises by having a dedicated force on hand to provide the credible deterrent. This means that the six regional COCOMs make constant and simultaneous demands for forces. Six separate and simultaneous regional demand signals easily drown out any comprehensive global perspective.

This poses significant problems for naval forces. First, although the standard unit deployed to service COCOM demands is a strike group (an aircraft carrier and four or five other combatants) or an expeditionary strike group (centered on an amphibious assault ship—i.e., LHA—considered by some a “light carrier”),

naval forces operate most effectively and provide deterrence against major conflicts as fleets or marine expeditionary forces of *multiple combined* strike or expeditionary warfare groups.⁸⁶ There are in fact assigned fleet headquarters for four of the regional COCOMs, two fleets being dual hatted for two COCOMs.⁸⁷ However, those naval-component commanders control very few permanently assigned warships or fleet Marines; instead, naval-component commanders and COCOMs essentially recycle the same strike groups, warships, and Marines over and over. The same ships and aircraft (and embarked Marines) are “chopped” (from “change of operational command”) sequentially to multiple COCOMs, all of whom prefer to have exclusive use of them for as long as possible to satisfy their own *regional* requirements.

Again, a shrinking fleet cannot satisfy multiple continuing demands. It certainly cannot do so without a globally envisioned deployment plan. *Advantage at Sea* maintains that “[w]e cannot operate everywhere, at all times, with equal effectiveness.”⁸⁸ Yet any voiced desire for such a global plan inevitably generates criticism from COCOMs, who seem to consider their importance slighted if they do not get the assets that their own plans require. The effect of this criticism frequently prompts DoD leadership to question the naval services’ globally envisioned asset-deployment scheduling, especially when ship maintenance is backlogged owing to funding shortfalls. As former SECDEF Mark T. Esper told the House Armed Services Committee in 2020, “The OFRP [the Navy’s Optimized Fleet Response Plan] hasn’t worked for years, so why should we assume it will work in the future[?]”⁸⁹

An alternative option—namely, assigning specific strike and expeditionary groups or individual ships to specific COCOMs—cannot be sustained at the current fleet size. Even those ships that are forward-homeported overseas within the regions of particular COCOMs “chop” to others by necessity.⁹⁰

Maintenance, Training, and Readiness. The tensions that arise from attempting to satisfy the competing demand signals from multiple COCOMs for forward-presence deployments is made evident by a prioritization identified in *Advantage at Sea*. The document states that the naval services will seek “[f]uture warfighting readiness over near-term demand.” Yet the document also maintains that routinely “[o]perating forward deters coercive behavior and conventional aggression . . . and build[s] trust . . . with our maritime allies and partners,” which cannot be done “from a distance. Nor can we contest malign activities without being present.”⁹¹

Influential critics of the U.S. Navy’s past focus on forward presence maintain that forward presence reduces war-fighting readiness.⁹² From this perspective, forward-presence missions need to be curtailed to provide for the training activities necessary to achieve the readiness posture for a potential war with the

PRC. Some—but not all—critics concede that COCOM demand has become a post-Goldwater-Nichols Act driver of forward-presence requirements. Those who do acknowledge such, such as Robert O. Work, recommend that the Navy make “deliberate efforts to convince the Secretary of Defense and regional CoComs that Navy warfighting and material readiness should no longer be sacrificed on the altar of forward presence.”⁹³ Robert C. Rubel (along with Work and others) has proposed methods by which COCOM demand can be regulated.⁹⁴ *Advantage at Sea* necessarily hedges on this subject; and although, as previously noted, its text refers to this tension, it does not recommend particular DoD actions.

In contrast, the *Maritime Strategy* implied that forward presence constituted combat readiness. An argument can be made that even today, owing to the training inherent in preparing to conduct forward-presence missions, naval ships and aircraft squadrons are at their highest state of combat readiness about two-thirds of the way through a forward deployment—that is, at a higher level than those conducting fleet exercises near home ports. Of course, the size of the U.S. Navy during the *Maritime Strategy* era and the funding available provided the resources for extensive ship and aircraft maintenance, including operating repair ships, destroyer tenders, and submarine tenders alongside the combatants on forward deployments.⁹⁵

Advantage at Sea does attempt to apply a global focus, describing the Naval Service as “forward deployed and capable of both rapid response and sustained operations globally.” But because force employment today is governed by the regional crisis-action (war) plans of the COCOMs, *Advantage at Sea* can contain only the “aspirational” elements of what could be a global campaign—particularly if the PLAN can deploy its larger numbers of battle-force ships successfully beyond the western Pacific.⁹⁶ Nevertheless, the impact on OSD seems minimal. In handling the forward-presence-versus-readiness issue, *Advantage at Sea* appears to miss the three criteria of effectiveness.

Ironically enough, it has been a COCOM—the joint Commander, Special Operations Command (SOCOM)—that best has maintained a global perspective throughout the global war on terror. Having essentially its own budget, SOCOM has been able to operate in a manner similar to the services; but unlike the services, it routinely is forgiven for violating defense-acquisition regulations.

Current Guiding Principles of Defense Acquisition

The process of defense acquisition always has been politically and publicly contentious, with routine denunciations of cost overruns and production-schedule delays. At least since the 1960s tenure of SECDEF Robert S. McNamara, U.S. defense leadership has insisted that defense acquisition be “run like a (commercial) business.” Unfortunately, the gap between the objectives and practices of profit-seeking corporations operating in the civilian commercial

(nondefense) sector and DoD acquisition procedures is vast. Even profit-seeking businesses in the defense sector face restrictions and must conduct business planning in ways much different from those in nondefense industries. As a noted defense-acquisition official describes, the defense industrial base “produces high-cost, complex, specialized, even unique products in low volumes to one principal customer in a highly regulated business environment.”⁹⁷

Beyond bookkeeping and “back office” procedures, the adoption of commercial business-investment practices remains an awkward fit for the naval services, and indeed for all DoD. Successful missions derive no financial profits; therefore, the results of acquisition programs cannot be measured by commercial standards, except for cost and schedule. Acquisition-program managers—who may or may not have participated in product design—are judged effective if their programs are completed at or below expected cost and on schedule. However, whether the acquired system meets operational expectations and contributes to achieving strategic objectives (in a cost-effective manner, as compared with alternatives) becomes apparent only when the system actually is operated in the fleet.

The U.S. Navy and U.S. Marine Corps of the 1920s and 1930s are lauded by scholars and analysts as organizations that were successful at introducing “disruptive innovation” into the fleet as part of an ongoing “revolution in military affairs.”⁹⁸ They also are identified as a “complex adaptive system” characterized by continual learning and improvement.⁹⁹ It should be noted that during that period the naval services were willing to build one-of-a-kind platforms that were integrated into fleet experimentation and operations to determine whether they would constitute a successful program, worthy of being continued.¹⁰⁰ Improving fleet capabilities, not meeting cost and schedule, was the determinant of acquisition success. One-of-a-kind operational platforms frequently exceeded planned costs and schedules without being judged problematic. Failure of a platform design to fit the evolving operational environment was anticipated—which is why new platforms were not put immediately into mass production.

Among the commercial principles adopted by the modern DoD for resource-allocation and acquisition programs, two stand out as practices different from those of the earlier “disruptive innovation” period: (1) prioritizing economies of scale and (2) concurrent production.

Economies of Scale. *Economy of scale* can be defined as “cost advantages companies experience when production becomes efficient, as costs can be spread over a larger amount of goods.”¹⁰¹ It is a well-respected and invariably used principle of commercial business. However, in defense acquisition, efficiencies cannot be determined by monetary cost-benefit analysis, because there is no profit to use as a measure. Thus, a reduction in the per-unit price achieved by purchasing multiple units is itself seen as efficiency—even when the initial product ultimately does

not match operational requirements. The prioritization of economies of scale incentivizes multiunit purchases even before the first units become operational—essentially a gamble.¹⁰²

Since *Advantage at Sea* identifies “[g]reater numbers of distributable capabilities over fewer exquisite platforms” as a goal, prioritizing economy of scale will create considerable pressure within both the naval services and DoD to bring such “distributable capabilities” into multiunit, multiyear production runs—even before the capabilities have been validated by actual use in fleet operation.¹⁰³ Doing otherwise would seem “inefficient.”

Presumably the procurement of multiple littoral combat ships (LCSs) constituted “efficient” acquisition. Unfortunately, the LCS has failed to prove its worth in a great-systems-conflict environment (and has suffered design and engineering problems as well) and early units already are beginning to be decommissioned before half their expected lifespan has expired. Ironically—owing to the prioritization of economy of scale—LCS platforms still are being built and commissioned at the same time that LCS-class decommissionings are being conducted.¹⁰⁴ This is one of the aforementioned complaints of former congresswoman Luria and the other normally supportive legislators.¹⁰⁵ For the goals of *Advantage at Sea* to be achieved, acquisition of “[g]reater numbers of distributable capabilities” must be conducted in a way that prioritization of economy of scale does not become its primary measure of success.

Although by all standards the USS *Arleigh Burke* guided-missile destroyer (DDG) class was a successful program, in 1990 the General Accounting Office (GAO; renamed Government Accountability Office in 2004) assessed it in a way that illustrates the economy-of-scale gamble:

[I]n January 1990 we reported that the DDG-51 contractor has experienced problems in designing and constructing the lead ship. Because of these problems and because the Navy has changed the contract’s requirements, costs have increased substantially, and the expected delivery schedule has slipped about 17 months from the original estimate.

Although the first follow-on ship is only 1 percent complete, the estimated cost to complete it is already over the ceiling price by 11 percent, according to the contractor, and by 22 percent, according to the Navy. In our report on the DDG-51 program we recommended that the Secretary of Defense delay the contract award for follow-on ships until he could provide assurance as to the development and affordability of the program.

In February, 1990, the Navy awarded contracts for 5 follow-on ships and now has a total of 12 follow-on ships under contract. Furthermore, the Navy *could have as many as 17 ships under construction or awarded before the lead ship has finished testing and has been delivered in February 1991.*¹⁰⁶

In the case of the DDG-51 class, the economy-of-scale gamble eventually paid off. In the case of more-recent programs, such as the LCS, it did not.

Concurrency. Another practice that may be inimical to the changes in force design that *Advantage at Sea* promotes is concurrency. *Concurrency* can be defined broadly as “the overlap between the development and production phases of an acquisition program.” Perhaps the best description comes from congressional testimony by a GAO official. “[I]t means that for a given weapon system, some parts or subsystems are being developed while others are being produced. It also means that some parts or subsystems are being developed and produced at the same time. When subsystems in development are especially important to the overall effectiveness of a weapon system, or are technologically complex, the risks associated with concurrency increase.”¹⁰⁷

Concurrency has been praised by some as resulting in faster acquisition, since ship construction is not held up by the development of the command, control, and computer and weapon systems designated for installation. Once these systems are fully developed, they can be installed on the already-under-construction hulls, thereby allowing for faster ship-class construction.

DoD has been practicing concurrency for decades, but it appears to be most effective during periods of an increasing defense budget, when initial cost overruns may not appear to have an effect on the availability of resources. However, it has had disastrous effects—with very evident congressional concern—during other periods. Ironically, a defense analyst’s 2015 paean to the virtues of concurrency used the LCS as an example:

Another program that has benefitted in many ways from concurrency is the Littoral Combat Ship. The LCS suffered from numerous early teething problems, virtually all of which have been overcome. IOC [initial operational capability] for the three mission modules (anti-surface warfare, anti-submarine warfare and mine countermeasures) is expected next year. Early deployment of the first LCSs allowed the Navy to acquire extremely important operational experience that it translated into changes in design, equipment, operational concepts and sustainment. Early entry into production allowed the two builders, Marinette Marine and General Dynamics[,] to improve their production processes to the point that both could significantly lower the price of each ship, enabling the Navy to procure both variants. Marinette Marine was able to invest in a near-total redesign of its facility that literally took miles out of the production line.

It is not clear, as critics of concurrency have asserted, that this approach adds costs to a program.¹⁰⁸

However, in 2017 an academic study at Indiana State University came to a dramatically different conclusion: that “the utilization of concurrency as it was implemented in the programs under study was shown to have no effect

on cost performance, and that performance to development schedule, one of the purported benefits of concurrency, was actually shown to deteriorate with increases in concurrency.”¹⁰⁹

Combined Complexity. Both concurrency and economy of scale in defense acquisition have been challenged by “commonsense” arguments. The following example concerns the USS *Gerald R. Ford*-class aircraft carrier.

The idea that a weapons manufacturer, aided by computer modeling, modern material science and other fragmented improvements in design and construction techniques realized over the last 20 years, can design something so complex yet so perfect on the first try, that testing it is more of a formality than a necessity, is totally strange. This bizarre notion literally goes against every historical trend when it comes to weapons procurement, including many hard learned and expensive lessons of the past. Furthermore, it goes against basic logic. Why purchase something en masse, especially something very expensive, extremely complex, and something that has huge national defense implications, without even verifying its effectiveness first? . . .

A great business strategy but a horrific defense strategy.¹¹⁰

The ever-growing dependency of weapon systems on software is perhaps the best illustration of these kinds of risks. The risks are compounded by a “thirst for technology.” The USS *Zumwalt*-class program, in which thirty-two hulls were planned, was touted for incorporating eight unproven emerging technologies that would be developed concurrently. The result was a DDG-1000 program that Congress truncated at three ships because of construction and technical-component problems (as well as mission change). Six years after the commissioning of USS *Zumwalt*, the three constructed ships still await some of the anticipated technologies.

The stumbling blocks that these current guiding principles of defense acquisition put in the way of successful implementation of the objectives of *Advantage at Sea*, as well as support from Congress during a time of resource limitations, are larger than the naval-services leadership has recognized. In contrast, the *Maritime Strategy* was released publicly following a period of increasing defense resources. Thus, accompanying acquisition “sins” were less recognized and did not have as much of a negative impact on the 1980s strategic vision.

Thirsting after Technology

Advantage at Sea states the following: “New and converging technologies will have profound impacts on the security environment. Artificial intelligence, autonomy, additive manufacturing, quantum computing, and new communications and energy technologies could each, individually, generate enormous disruptive change.”¹¹¹ These particular technologies included in *Advantage at Sea* likely were chosen without a close examination of whether they actually would have *direct* effects on maritime operations. The listing is indicative of a mantra-like approach

to citing technologies. None of those technologies is mature enough to have “profound impacts on the security environment” during the current decade, and perhaps not for several decades. If perfected, they are likely to have evolutionary effects, not “enormous disruptive change” on naval war fighting, owing both to long development times and to the fact that they are largely improvements on existing capabilities.

This raises the question whether the drafters of *Advantage at Sea* view “disruptive technologies” as necessary for the implementation of the strategy or simply as serving to describe part of the environment in which the strategy will be implemented. Or perhaps the reference is made obligatory by the prevalence of the view that technological advances can “solve” such strategic challenges as conducting combat operations against a substantially larger enemy fleet.

Artificial Intelligence. If *artificial intelligence* (AI) is defined as machines capable of imitating human decision-making, then it already exists in the current U.S. fleet. When operated in “automatic” or “autonomous” mode, the Aegis combat system and close-in weapon systems (referred to as CIWS) effectively constitute AI.¹¹² Such systems rarely are included in the popular listing of “AI breakthroughs” (in contrast to defeats of chess or Go masters), but that is largely because they were developed prior to the explosion of public interest in AI and do not have commercial applications such as optimizing Internet advertising. Nevertheless, under the general definition, AI is not a new naval technology.

Alternatively, if *artificial intelligence* is defined as “the set of statistical techniques that teaches software to make decisions on past data,” there is considerable opportunity for the naval services to upgrade analytical functions, such as target detection from sonar data.¹¹³ This more specific definition lowers the expectation that AI will “generate enormous disruptive change” in naval warfare. Rather, the application of AI in tactical equipment, in the collection of ISR information, and in the analysis of maintenance data should improve the speed and perhaps the accuracy of current processes—resulting in a metaphorical sharpening of tools already in the tool kit.¹¹⁴

Of course, the term *AI* is very flexible, so the expectations also can be very flexible. One naval analyst has remarked—with only slight facetiousness—that “AI is whatever we have not done with computers already.”¹¹⁵ Alternatively, “AI describes a human emotional response to new automation and is not a description of how that automation works.”¹¹⁶ Under these depictions, almost every system, digital or physical, that increases the speed of decision or reduces the number of humans involved in decision-making can be considered AI, and inevitably all these systems will “disrupt” existing procedures to some extent.¹¹⁷ To the individuals directly involved in their implementation, such changes can seem “enormous”; however, this does not mean that continuing progress in

(primarily commercial) AI will “disrupt” naval operations as practiced over the next several decades.

Additive Manufacturing. Touted as a capability that would enhance ship maintenance and repair at sea by eliminating the need to embark extensive stocks of repair parts, additive manufacturing has good prospects for increased use at shore-based facilities or aboard submarine tenders but limited prospect of fulfilling that requirement at sea in combatant ships in the near term.¹¹⁸ Additive manufacturing is particularly difficult to accomplish using metal alloys, and it requires an extensive and expensive software library (with yet-to-be-developed applications) as well as a ready onboard supply of appropriate materials.¹¹⁹ Being able to “print” repair parts ashore, where an abundant supply of bulk raw material can be kept readily available, does not mean that the same can be done at sea.¹²⁰

Moreover, there is no firm evidence that the cost of additive manufacturing of ship and naval-weapon-systems replacement parts will be less than the cost of the current practice of maintaining onboard spare-parts inventories. For example, potential experimental installations on submarines are expected to print parts of only six to ten different types.¹²¹ The easiest parts to print are those that are also easiest to maintain as spares, being small and relatively low cost.

Theoretically, additive manufacturing will have a substantial impact on equipment repair on a commercial basis, but that is dependent on the willingness of parts manufacturers to accept potentially lower profits by selling their intellectual capital rather than the actual parts.¹²² In any event, the degree of “disruption” that additive manufacturing will cause in supply-chain logistics is uncertain.

Quantum Computing. Quantum computing, which currently requires temperatures approaching absolute zero (-273°C), appears to have the potential to create cryptographic products that are more difficult to decode and to make current cryptography easier to break.¹²³ It already has demonstrated the capability to do complex calculations faster than existing supercomputers. Avoiding the terms *qubits*, *superposition*, and *entanglement* used in most explanations, we can say that the advantage of quantum computing over current methods is that it is not limited exclusively to binary calculations (using 1s and 0s) but can use values that temporarily can be both.¹²⁴ Perhaps an easier way to understand the advantage is that quantum computing adds negative 1 to the existing positive 1s and 0s (as displayed along x and y axes).¹²⁵

Although this constitutes a breakthrough for computer science, quantum computing in itself does not have a direct effect on core naval functions. Perhaps it will increase the speed of decision, but only a few spaces—for instance, maritime operations centers—can be cooled to near absolute zero to employ independent

quantum computers. (Some limited-function prototypes—with the emphasis on *limited*—that could be operated at room temperature are being developed in the laboratory.)¹²⁶ When quantum computers are used at a centralized location, their transmitted information can be intercepted or jammed, just like all electronic communications.

New Communications and Energy Technologies. Exactly which “new communications and energy technologies” will “generate enormous disruptive change” is left unclear in *Advantage at Sea*. Rarely acknowledged by the media (and not by *Advantage at Sea*) is the fact that today’s commercial cellular communication was developed from 1960s–1970s military and NASA research, including the Navy’s Demand Assigned Multiple Access (DAMA) program.¹²⁷ In that sense, the fundamental disruptive changes in communications have occurred already, and evolving commercial developments largely are refinements (primarily increasing speed and bandwidth), not new functions. (The main “disruptive” change in the past several decades has been the civilian commercialization of what was exclusive military technology, along with continuing improvements once a profit base was established.) Additionally, a greater dependence on long-haul communications with high bandwidth creates greater force vulnerability when operating against a technological near peer with extensive electromagnetic-warfare capabilities.

The U.S. Navy already has access to the most reliable, although most unpopular, energy source: nuclear power. Again, the disruptive change has occurred already. The size of nuclear reactors may be reduced, but until cold fusion has been demonstrated (after many false claims), revolutionary power sources—as opposed to evolving improvements in existing power generation—are still theoretical. The expectation (repeatedly hyped) that naval use of biofuels in a “great green fleet” would help expand the biofuels industry, thereby diversifying energy sources, has proved chimerical.¹²⁸

Autonomy. Autonomy is not in itself a technology; rather, it is a mode of operation that requires a complex combination of multiple technologies—some of which are slow to perfect. The term *autonomy* frequently is conflated with the control of unmanned vehicles that are operated remotely. Unmanned aircraft such as Triton or Fire Scout are flown (controlled) by pilots who are not in the aircraft.¹²⁹ Unmanned vehicles often are equipped with autopilot features similar to those installed in manned aircraft and vessels. That does not constitute autonomy, since human supervision is retained. Nevertheless, the subject of autonomy is worthy of discussion in any new naval-strategy document, since statements by naval leadership and in the 2022 thirty-year shipbuilding plan suggest that the future fleet will be up to 50 percent unmanned or uncrewed.¹³⁰

Yet fulfillment of the prospect of naval autonomous units operating under battle conditions or conducting combat operations against a capable enemy may fall beyond the scope of the thirty-year plan. An expert consensus is that truly autonomous/self-driving (Level 5) cars—the popular image of autonomy—are unlikely to be functional prior to 2050.¹³¹ There is no reason to expect fully autonomous warships to precede them.

For warships, the obvious issue is survivability. Such ongoing programs as Sea Hunter, Ghost Fleet Overlord, and Echo Voyager have demonstrated the capability to carry out independent navigation in the open ocean and to operate as sensor platforms—under benign conditions.¹³² Conducting operations under threat of attack, however, would require sensing and maneuvering capabilities that are not yet attainable and involve many millions of lines of code—dwarfing by many times that required for self-driving cars.

Sea Hunter has been designed initially as a trail vessel, intended to track and follow opposing submarines—an operation that should be achievable under peacetime or prewar conditions.¹³³ If conflict were to occur suddenly, Sea Hunter could provide initial targeting data. Obviously, the critical components are self-directed antisubmarine warfare (ASW) sensors, along with the autonomous programming needed to perform navigation and to match submarine target maneuvers. If armed with ASW weapons, Sea Hunter might be able to conduct a successful attack on a submerged vessel. However, then–Deputy SECDEF Robert Work insisted in 2016 that Sea Hunter would deploy weapons only under direct human control.¹³⁴ This suggests that the vessel will be unmanned/uncrewed but will operate with only partial or occasional autonomy.

A Ghost Fleet Overlord vessel—described as designed to be capable of conducting offensive operations—participated in the 2021 Exercise DAWN BLITZ—albeit with a safety crew aboard. It also was operated by remote control during critical evolutions.¹³⁵

The large undersea vehicle *Echo Voyager* (and subsequent *Orca*) is reported as operating completely autonomously; however, it too has a limited range of missions, albeit with a 7,500-nautical-mile range.¹³⁶ Again, it has the potential to serve as a loitering weapons platform, although presumably under human control.

Public-media reports on these operations and exercises are indicative of public confusion between the concepts of *unmanned vehicles* and *autonomy*.¹³⁷ The terms almost always are used interchangeably. This inevitably clouds the discussion of options for future naval fleets by implying that the introduction of large-scale autonomous platforms is imminent. As the service gradually introduces additional unmanned/uncrewed vehicles into naval operations, there likely will be a gradual evolution in such vehicles toward increasing autonomy. By existing policy, however, the decision to employ lethal force must remain in

the hands of humans. Thus—and despite questions whether human control is possible in a contested electromagnetic environment—autonomy always will remain limited.¹³⁸

Given that the specific technologies listed in *Advantage at Sea* actually will have limited effect on force development and shipbuilding for decades—with the possible exception of autonomy, which is not a technology—one can ask why a strategy document specifically mentions them rather than other less “disruptive” but more-attainable technical developments. A broader question is: Why does it include a list of technologies at all?

A retort could be: What is the problem with listing them? What is so bad about including a few “innocent” words on “disruptive” technologies in *Advantage at Sea*? The answer, in short, is that it creates overexpectations that such technologies will change profoundly the nature of the force structure necessary for carrying out the strategy. This provides a justification (perhaps an excuse) for not resourcing an expansion of the fleet to match the strategy, on the premise that waiting for a disruptive technology to develop represents a more farsighted and economical approach. But this premise, though often repeated, has little supporting evidence. The *Maritime Strategy* did not posit a need for or expectation of future technologies.

Arguably, the expectation that technology will bring “disruptive change” already has resulted in the failure of hyped, overreaching, and truncated naval-acquisition programs, including the LCS (modularity and technology-based crew reduction), the *Zumwalt* class (incorporating eight unproven technologies), and the rail gun (reducing the cost of combat engagements). Such are the programs for which Congresswoman Luria suggested that “the Navy owes the American public an apology.”

Establishing a balance between “breakthrough,” “disruptive” technologies—those considered to be innovative—and moderate, “incremental” technological enhancements is not a potential naval line of effort represented in *Advantage at Sea*. Yet in its evaluations of defense programs the GAO frequently has identified as critical the need for such balance.¹³⁹ The credibility of (a rewritten) *Advantage at Sea* would be enhanced by incorporating a discussion of this balance rather than a listing of media-popular “disruptive” technologies, and doing so might regenerate support from skeptical members of Congress.

Perhaps the disconnect between expectations for and the developmental reality of “emergent” technologies is captured best by a comment made in 2022 by Deputy SECDEF Kathleen H. Hicks during an examination of autonomous vehicle (AV) development in Silicon Valley. “Commenting on the maturity of the AV industry generally, Hicks said progress has taken ‘longer than I ever imagined.’”¹⁴⁰

Making “disruptive” technologies a significant premise of *Advantage at Sea* represents hope, not strategy. To echo Hicks’s remark, the application of “disruptive” technology—particularly autonomy—to the U.S. fleet will take longer and cost more than today’s naval leadership might imagine. Given current fiscal restraints, it is unlikely that the Department of the Navy can fund these applications without a further reduction in the fleet—making the implementation of *Advantage at Sea* even more difficult.¹⁴¹

An additional observation is that acknowledgment by the naval services of the difficulties created by past acquisition programs might contribute to the strategy’s credibility. As long as the more-supportive members of Congress believe that the naval services are “building failed classes of ships [because] they like the highest tech, biggest and newest thing,” *Advantage at Sea* (or any similar document) is unlikely to have a favorable impact on the allocation of defense resources—which, as previously noted, presumably is one of its goals.¹⁴²

THE COMPARATIVE IMPACT OF *ADVANTAGE AT SEA*

Two years after its publication, *Advantage at Sea* has not had a public impact comparable to that of the *Maritime Strategy*. In fact—and although this may seem a harsh assessment—it thus far appears to have had no public impact at all. It has not been mentioned in prestige civilian media, which limits the awareness of most Americans. It appears to have failed to impress members of Congress. Whether it has had direct effects on naval resource allocation is uncertain. It rarely (perhaps not at all) has been cited or recognized by senior defense officials outside the Department of the Navy. It is unlikely to have affected the Joint Staff’s development of concepts, with the exception of the premise of *integrated all-domain naval power* (formerly *integrated all-domain access*), although even within the overall defense dialogue it has to contend with the U.S. Army’s preferred term of *multi-domain*.

Part of that problem derives from a lack of clarity. Although *Advantage at Sea* identifies *integrated all-domain naval power* as one of its five themes, there is no firm definition of the term.¹⁴³ Three questions can be asked: (1) What will make the naval services more integrated than previously experienced—particularly during the 1990s . . . *From the Sea* era? (2) How can U.S. naval power “prevail” or “ensure our advantage at sea and protect national interests” with a shrinking fleet and an expanding pacing threat? (3) How can the naval services describe themselves as “all-domain” when joint ideology appears to assign specific domains to individual services and, in the case of cyber and special operations, to COCOMs that are budgeted individually?¹⁴⁴ The weak answers that *Advantage at Sea* provides seem to crash bow on into the disadvantages that this article listed at the outset, without clear plans (or fallback plans) to neutralize or overcome them.

Another part of the lack of clarity concerns the lack of solid explanations for the use of the doctrinal terms *distributed maritime operations* (DMO), *littoral operations in a contested environment* (LOCE), and *expeditionary advanced base operations* (EABO). These significant concepts are mentioned briefly but not explained in the body of the text, yet members of the naval-services leadership employ them constantly both internally and in public when describing their vision of the future force. Each of these terms appears more often in defense literature than does *integrated all-domain naval power*. They are used to plan future force architecture. They do appear in the *Advantage at Sea* glossary, but there they are described in an ambiguous fashion that emphasizes the integration of platforms and services, without providing substantive detail.¹⁴⁵ It is impossible to determine their significance. This is a major disconnect in the *Advantage at Sea* strategy document. Careful readers are likely to view the largely unexplained terms as mere buzzwords, raising such questions as: Why are the forces not integrated already? How distributed is DMO? What is the relationship between LOCE and EABO, and why does the Marine Corps need two doctrinal terms?

This ambiguity contrasts noticeably with the impression of clarity that the *Maritime Strategy* provided. It must be noted, however, that the *Maritime Strategy* had a major advantage compared with attempts to implement the concepts of *Advantage at Sea*: in effect, it already was implemented. By the time the public version of the *Maritime Strategy* was released, the U.S. Navy for almost a decade already had conducted significant exercises and experiments in support of the concepts, and a classified version of the document had been circulated years before. In contrast, the concepts outlined in *Advantage at Sea* are still under refinement, and experimentation has begun only recently. In this view, the *Maritime Strategy* actually represented continuity, whereas *Advantage at Sea* represents aspirations.

An additional problem—which is compounded most distinctly by the ideology of jointness (disadvantage 3 above) and desires of the COCOMs for immediate resources for the prospective “fight tonight” (disadvantage 4)—is that the document’s attempt to distinguish the naval services (and the unique advantages they provide) from other forms of military power lacks the bold, direct arguments that existing congressional supporters can use within Congress to obtain additional resources. Again, this contrasts with the *Maritime Strategy*. The *Maritime Strategy* can be criticized for its own flaws, and it is hardly holy writ, but it cannot be faulted for a lack of bold argument.

Navies and armies are fundamentally different instruments of power.¹⁴⁶ Their employments in war and peace are unique to themselves. The primary purpose of an *army* is to defeat an enemy’s military forces, conquer its territory, and garrison its state in preparation for the postwar denouement. The purpose of *navies*—whose definition includes amphibious/littoral forces, the major components of

air forces, and space and cyber forces (in other words, “all-domain naval power”)—is to control (and, in wartime, to dominate) the fluid mediums that human beings use for global transportation, communications, and trade and finance, but that they normally do not inhabit. In peacetime, navies are geoeconomic instruments. In wartime, by dominating the global commons (such as by maintaining sea control) naval forces can deliver access to the enemy’s territory to enable land forces to wage a decisive campaign. Navies also provide kinetic and nonkinetic fires against the opposing armed forces and into the enemy’s territory or external territory under the enemy’s control. It is possible for navies to “win” a war without resorting to land forces, but that is circumstantial—it depends on the enemy’s objectives, its calculation of risks and outcomes, and a willingness to accept (at least temporarily) a “defeat.” In most cases, land and land-air forces are required to force a decision, but global geography dictates that naval forces are a prerequisite thereto. Unfortunately, *Advantage at Sea* does not make this dichotomy of functions—which indeed could help to define *all-domain naval power*—clear and definitive. Nor does it do so for the argument that naval forces are the prerequisite for joint force power; that argument is but hinted at.

In evaluating *Advantage at Sea* against the three criteria of effectiveness, it is difficult to credit it with the ability to overcome the six political-bureaucratic-doctrinal disadvantages and provide a persuasive and confident argument.

Hindsight recommendations are easy to discard, but a comparative view suggests that for the naval services to achieve results similar to those of the *Maritime Strategy* in a new global-systems competition—particularly if they are to gain the resources necessary to deter or win a great-power conflict against a pacing-threat near peer—their public triservice strategy requires a bolder and *Maritime Strategy*-esque approach. As but one indicator of the success of an updated *Advantage at Sea*, if critics not only mention but denounce it in prestigious print or web journals, that will mean it is on an effective course. Such denunciations helped the *Maritime Strategy* to achieve prominence during the previous great-systems competition.

NOTES

1. *Advantage at Sea: Prevailing with Integrated All-Domain Naval Power* is an unclassified document of thirty-two pages (not counting blanks), signed by the Secretary of the Navy and the uniformed chiefs of the U.S. Navy, Marine Corps, and Coast Guard, published in December 2020, and available on the web at media.defense.gov/. Its intended audience

is indicated by the opening salutation of the Secretary of the Navy’s personal remarks (in letter form, as the preface): “To the American People.” Obviously, Congress, embodying the representatives of the American people, is the initial target.

2. *Ibid.* The foreword states, “The security environment has dramatically changed since we

last published *A Cooperative Strategy for 21st Century Seapower* in 2015.” The full title of the previous official strategy is *A Cooperative Strategy for 21st Century Seapower: Forward, Engaged, Ready*. It also is referred to as *A Cooperative Strategy for 21st Century Seapower (Revised)* or *A Cooperative Strategy for 21st Century Seapower (R)* because its predecessor of 2007 also was named *A Cooperative Strategy for 21st Century Seapower*.

3. Throughout *Advantage at Sea*, the document refers to the U.S. Navy, U.S. Marine Corps, and U.S. Coast Guard as “the Naval Service.” This is a break in tradition that inadvertently could raise political or legal objections. In previous Department of the Navy strategic documents, the Navy and Marine Corps are together called “the Naval Services,” and when the U.S. Coast Guard is included with that duo the collective combination is referred to as “the Sea Services.” This distinction is meant to clarify that the Coast Guard is not under the authority of the Department of the Navy in peacetime, and that (until so assigned in a declared war) it is not legally obligated in any way to conform to a Department of the Navy–issued strategy. Although the distinction appears to be mere nuance, the reality is that the Coast Guard’s participation in the drafting of *Advantage at Sea*—as with previous naval strategic documents—is a purely voluntary activity initiated by the chiefs of the “Naval Services” and the Coast Guard Commandant, but not necessarily supported in its details by the Secretary of Homeland Security, who is the civilian authority for the Coast Guard. The traditional “Naval Services” need to conform to a strategy dictated by the Secretary of the Navy (and Secretary of Defense); as a “Sea Service,” the Coast Guard does not. Referring to the U.S. Coast Guard as a “naval service” fuzzes the nature of its command relationship and the measure of its responsibility for the strategy.
4. Bruce Stubbs describes similar criteria or measures of effectiveness for naval strategies in Stubbs, *Crafting Naval Strategy: Observations and Recommendations for the Development of Future Strategies*, ed. Sam J. Tangredi, Leidos Chair of Future Warfare Studies 1 (Newport, RI: Naval War College Press, 2021). See, in particular, pp. 24–25, 36–38, 58–59, 68–70.
5. The contemporary literature debating the *Maritime Strategy* is prodigious, particularly about its strategic nuclear implications. The unclassified version of the strategy document was published as a supplement to the U.S. Naval Institute *Proceedings* in January 1986, available at www.usni.org/, although the actual strategy had been in the making since the late 1970s, and a frequently updated classified version preceded the public document. An outline of this development can be seen in Thomas B. Hayward [Adm., USN], “The Future of U.S. Sea Power,” U.S. Naval Institute *Proceedings* 105/5/915 (May 1979), pp. 66–71. Until 1986, John F. Lehman, “Rebirth of a U.S. Naval Strategy,” *Strategic Review* 9, no. 3 (Summer 1981), pp. 9–15, was the most public expression of the developing maritime strategy. Even before the actual public document was released, prominent critics challenged some of the principles. Critical assessments include Barry R. Posen, “Inadvertent Nuclear War? Escalation and NATO’s Northern Flank,” *International Security* 7, no. 2 (Fall 1982), pp. 28–54; Robert W. Komer, “Maritime Strategy vs. Coalition Defense,” *Foreign Affairs* 60, no. 5 (Summer 1982), pp. 1124–44; and John J. Mearsheimer, “A Strategic Misstep: The Maritime Strategy and Deterrence in Europe,” *International Security* 11, no. 2 (Fall 1986), pp. 3–57. There were spirited and sometimes scholarly defense efforts, such as Linton F. Brooks [Capt., USN], “Naval Power and National Security: The Case for the Maritime Strategy,” *International Security* 11, no. 2 (Fall 1986), pp. 58–88. Many of these are collected in Steven E. Miller and Stephen Van Evera, eds., *Naval Strategy and National Security: An International Security Reader* (Princeton, NJ: Princeton Univ. Press, 1988). The most comprehensive, contemporary, single-volume assessment of the strategy is Norman Friedman, *The US Maritime Strategy* (London: Jane’s, 1988). A recent history of the development and writing of the strategy (particularly in comparison with subsequent strategies) is Steven T. Wills, *Strategy Shelved: The Collapse of Cold War Naval Strategic Planning* (Annapolis, MD: Naval Institute Press, 2021). In addition to his own writings on the subject, Capt. Peter M. Swartz, USN (a participant in the drafting of the *Maritime Strategy*), created two contemporary annotated bibliographies that remain of great

- utility: “Contemporary U.S. Naval Strategy: A Bibliography,” U.S. Naval Institute *Proceedings* 112/1/995 (January 1986), supplement, pp. 41–47, and *Addendum to “Contemporary U.S. Naval Strategy: A Bibliography”* (Annapolis, MD: Naval Institute Press, 1987), both available at www.usni.org/.
6. In fact, the public version of the *Maritime Strategy* provided a graph (intensity versus probability) of the “spectrum of conflict.” Variants of the graph were used by the other armed services and NATO, becoming a de facto joint concept that eventually was codified; see the supplement to the January 1986 *Proceedings*, p. 8.
 7. This argument peaked in the late 1990s; however, the effects remain evident in joint doctrine. For example, Joint Chiefs of Staff, *Joint Planning*, JP 5.0 (Washington, DC: 1 December 2020), available at www.jcs.mil/, which is intended to describe the military planning process in the Department of Defense, mentions the individual “Services” only once (in a diagram on page II-11) in its 383 pages. However, it does include a short list of the titles of selected service concept and doctrine documents, in appendix M (pp. M-5 to M-6, but pp. 364–65 in the overall publication). (An interesting observation is that appendix M lists nine publications of the U.S. Air Force and eight publications of the U.S. Army but only two publications each from the Navy and Marine Corps.) It is hard not to develop the impression that the individual services play no role whatsoever in the overall strategic-planning process within the Department of Defense, at least from the perspective of the Joint Staff.
 8. On identification of *strategic concept*, see Samuel P. Huntington, “National Policy and the Transoceanic Navy,” U.S. Naval Institute *Proceedings* 80/5/615 (May 1954), pp. 483–93. On the term *strategic vision*, see discussion in Sam J. Tangredi, “Running Silent and Algorithmic: The U.S. Navy Strategic Vision in 2019,” *Naval War College Review* 72, no. 2 (Spring 2019), pp. 129–65, available at digital-commons.usnwc.edu/.
 9. Robert A. Gleckler, “Why War Plans, Really?,” *Joint Force Quarterly*, no. 79 (4th Quarter, October 2015), pp. 71–76, available at ndupress.ndu.edu/. Gleckler argues that *war plans* is a “legacy term” that should be replaced by *contingency plans* or *operational plans*. Nevertheless, he points to the fact that they are “plans,” not “strategy,” which is the purview of the chairman (and Joint Staff), not the combatant commanders.
 10. Joint Staff documentation downplays this role to some extent, stating that “all [Joint Chiefs of Staff] members are by law military advisers, and they may respond to a request or voluntarily submit, through the Chairman, advice or opinions to the President, the Secretary of Defense, or [National Security Council]”; see “The Joint Staff,” *Joint Chiefs of Staff*, www.jcs.mil/. The emphasis appears to be on “respond to a request,” with “voluntarily” seeming ancillary. Chapter 5, “The Joint Chiefs of Staff,” of Title 10 of the U.S. Code states that the “other members of the Joint Chiefs of Staff are military advisers to the President, the National Security Council, the Homeland Security Council, and the Secretary of Defense,” and clarifies, “A member of the Joint Chiefs of Staff (other than the Chairman) may submit to the Chairman advice or an opinion in disagreement with, or advice or an opinion in addition to, the advice presented by the Chairman to the President, the National Security Council, the Homeland Security Council, or the Secretary of Defense. If a member submits such advice or opinion, the Chairman shall present the advice or opinion of such member at the same time he presents his own advice to the President, the National Security Council, the Homeland Security Council, or the Secretary of Defense, as the case may be.” 10 U.S.C. ch. 5, available at usc.house.gov/. However, there is no legal prohibition on a service chief giving advice directly. In any event, *Advantage at Sea* certainly can be viewed as a “voluntary” submission of service chiefs’ advice or opinions.
 11. Lawrence Freedman, *Strategy: A History* (Oxford, U.K.: Oxford Univ. Press, 2013), p. x. In an assessment of this volume’s thoroughness, *Financial Times* selected it as a “Best Book of 2013”; a review in *The Economist* calls it “magisterial”; and a review in the *Washington Post* deems it “arguably the best book ever written on strategy.”
 12. *Advantage at Sea*, summary statement, preface, and foreword.

13. Freedman, *Strategy*, p. xi.
14. A forceful justification for this debate comes from Vietnam veteran and former Secretary of the Navy James Webb. “Military subservience to political control applies to existing policy, not to policy debates. The political process requires the unfettered opinions of military leaders, and military leaders who lack the courage to offer such opinions are just as accountable to their people as the politicians who have secured their silence.” James H. Webb Jr., “The Silence of the Admirals,” U.S. Naval Institute *Proceedings* 125/1/1, 151 (January 1999), pp. 29–34, available at www.usni.org/.
15. *Advantage at Sea*, pp. 1–2, 16.
16. For example, see U.S. Navy, *How We Fight: Handbook for the Naval Warfighter* (Washington, DC: U.S. Government Printing Office, 2015), pp. 142, 144.
17. Steven Wills argues that as a result of the Goldwater-Nichols Act, the quality of naval personnel in strategy-development positions on the Chief of Naval Operations staff (i.e., OPNAV) declined as the “trained experts” migrated to the Joint Staff, thereby ensuring de facto as well as de jure Joint Staff dominance of defense-strategy development. See Wills, *Strategy Shelved*, pp. 228–29.
18. On the concept of describing the current era as one of *great-systems conflict*, see Chris Demchak, “Achieving Systemic Resilience in a Great Systems Conflict Era: Coalescing against Cyber, Pandemic, and Adversary Threats,” *Cyber Defense Review* 6, no. 2 (Spring 2021), pp. 51–69.
19. Tom Bowman, “Reagan Guided Huge Build-up in Arms Race,” *Baltimore Sun*, 8 June 2004, www.baltimoresun.com/; Greg Schneider and Renae Merle, “Reagan’s Defense Buildup Bridged Military Eras,” *Washington Post*, 9 June 2004, www.washingtonpost.com/.
20. The U.S. Air Force also had a strategic-deterrence mission, which it shared with the Navy. Within the Air Force, those leading the operational/tactical mission also vied for resources with those leading the strategic.
21. An NBC News poll conducted 14–17 August 2021 indicated that 61 percent of Americans polled said the Afghanistan war was not worth fighting. In a similar Associated Press poll from 12–16 August, it was 62 percent. Frank Newport, “American Public Opinion and the Afghanistan Situation,” *Polling Matters* (blog), *Gallup*, 27 August 2021, news.gallup.com/. This was even before the chaotic withdrawal from the Kabul airport.
22. Jim Garamone, “Official Talks DOD Policy Role in Chinese Pacing Threat, Integrated Deterrence,” *U.S. Defense Department of Defense*, 2 June 2021, www.defense.gov/.
23. Julia Bowie, “China: A Responsible Stakeholder?,” *The Buzz* (blog), *National Interest*, 10 May 2016, nationalinterest.org/; Colin Grabow, *Responsible Stakeholders: Why the United States Should Welcome China’s Economic Leadership*, Cato Institute Policy Analysis 821 ([Washington, DC]: Cato Institute, 3 October 2017), available at www.cato.org/; Hal Brands and Zack Cooper, “After the Responsible Stakeholder, What? Debating America’s China Strategy,” *Texas National Security Review* 2, no. 2 (February 2019), pp. 68–81, available at tnsr.org/; Andrew Taffer, “Washington Still Wants China to Be a Responsible Stakeholder,” *Foreign Policy*, 29 December 2020, foreignpolicy.com/.
24. An example of a photographed tragedy prompting foreign-policy action (as well as interest) concerns Trump administration actions toward Syria. See, for example, Jonathan Lemire and Vivian Salama, “Photos of Syria Victims Spurred Trump to Action,” *Boston Globe*, 8 April 2017, www.bostonglobe.com/, and Luke Harding, “‘It Had a Big Impact on Me’—Story behind Trump’s Whirlwind Missile Response,” *The Guardian*, 7 April 2017, www.theguardian.com/.
25. Paul Taylor, “Good Work, Volodya! Putin Resurrects NATO,” *Politico*, 25 January 2022, www.politico.eu/; Jamie Dettmer, “Putin Helping to Revive NATO, Say Western Officials,” *VOA*, 4 February 2022, www.voanews.com/; Matthias Gebauer and Ralf Neukirch, “How Putin Has Revived the NATO Alliance,” *Spiegel International*, 25 February 2022, www.spiegel.de/.
26. *Advantage at Sea*, p. 5.
27. Richard Haass argues, “There is a tendency to overlook or underestimate the direct cost of sanctions, perhaps because their costs do not show up in U.S. government budget tables. Sanctions do, however, affect the economy

by reducing revenues of U.S. companies and individuals. Moreover, even this cost is difficult to measure because it needs to reflect not simply lost sales but also forfeited opportunities. Sanctions cost U.S. companies billions of dollars a year in lost sales and returns on investment—and cost many thousands of workers their jobs.” Richard N. Haass, “Economic Sanctions: Too Much of a Bad Thing,” Policy Brief 34, *Brookings*, 1 June 1998, www.brookings.edu/. Although the paper itself is dated, it is one of the best expressions of a logic that has been repeated into the 2020s.

28. Joe Petrucelli, “Mike McDevitt on the Strategic Studies Group and Connecting Strategy with Programming,” *CIMSEC*, 24 March 2021, cimsec.org/.
29. Prior to the Russian invasion of Ukraine, Center for Strategic and International Studies fellow Andrew P. Hunter described the public attitude to defense policy within the Democratic Party as episodic and of secondary interest. “One thing that may unify all of them is that defense is usually not at the top of their priority list, it’s somewhere further down. I tend to find that it’s really hard to come up with overarching themes that you can get consensus on.” Kathleen Hicks, “The Democratic Debate over Defense, Part 1,” 9 January 2020, in *Defense 2020*, produced by CSIS, podcast and transcript, www.csis.org/. The Republican Party is seen as traditionally prioritizing defense issues. However, Thomas Mahnken, CEO of the Center for Strategic and Budgetary Assessments and former political appointee in a Republican administration, notes that in the early 2020s “the historian in me would say that, well, maybe defense will come up or it’ll come up in a debate or a couple of debates, but that’s probably it. Now, it might come up, if it comes up more centrally, I think it would probably be because of a disaster, and so let’s hope that that’s not the case.” Kathleen Hicks, “The Republican Debate over Defense, Part 1,” 10 January 2020, in *Defense 2020*, produced by CSIS, podcast and transcript, www.csis.org/. Concerning the effect of disasters, see note 24 above.
30. A search of *New York Times* and *Washington Post* articles reveals no mention of the *Advantage at Sea* document, even under the *triservices strategy* keyword. The *Wall Street Journal* did carry a single op-ed concerning the document, written by a former Under Secretary of the Navy, Seth Cropsey. The Norfolk-based *Virginia Pilot* (despite its large Navy-related audience) carried no detailed reporting, although it has published articles on the unveiling of naval-strategy documents in the past. Outside of websites devoted to military news and analysis (such as USNI News, CIMSEC, *War on the Rocks*, and the *National Interest*—the last mentioned of which typically features op-ed-type commentary), only Forbes.com maintained any coverage. Of U.S. think tanks, only the Brookings Institution and Heritage Foundation published any analysis. The International Institute for Strategic Studies, primarily based in the United Kingdom, published some commentary.
31. Professors Jon Caverley and Peter Dombrowski of the Naval War College are attempting to rebuild such scholarly interests. See Jonathan D. Caverley and Peter Dombrowski, “Too Important to Be Left to the Admirals: The Need to Study Maritime Great-Power Competition,” *Security Studies* 29, no. 4 (August–September 2020), pp. 579–600.
32. Arguments against the existence of such a world order include Jakob Grygiel, “Ukraine War Shows the ‘Rules-Based International Order’ Is a Myth,” *Wall Street Journal*, 28 March 2022, www.wsj.com/. More-fundamental arguments against a concept of “world order” include John J. Mearsheimer, *The Great Delusion: Liberal Dreams and International Realities* (New Haven, CT: Yale Univ. Press, 2018).
33. *Advantage at Sea*, preface, p. 1.
34. Use of the term *rules-based international order* appears in the preface and on page 1.
35. Andrew Lambert, *Seapower States: Maritime Culture, Continental Empires and the Conflict That Made the Modern World* (New Haven, CT: Yale Univ. Press, 2018), p. 6.
36. Corbett’s focus is the military potential of sea power, as indicated by “command of the sea,” and he provides only a short treatment of Mahan’s emphasis on global trade and his “six fundamental principles of sea power”: “geographical position, physical conformation, extent of territory, size of population, character of the people, and character of government.” See Julian S. Corbett, *Some Principles of Maritime Strategy* (London:

- Longmans, Green, 1911), pp. 93–107, available at www.gutenberg.org/. If sea power is judged on military potential alone, then the United States has been *the* global sea power from 1943 to the present.
37. Chris Parry, *Super Highway: Sea Power in the 21st Century* (London: Elliott and Thompson, 2014), pp. 329–31.
 38. A recent effort to lift this “blindness” is Bruce D. Jones, *To Rule the Waves: How Control of the World’s Oceans Shapes the Fate of the Superpowers* (New York: Scribner, 2021). In addition to discussions of the global economy, Jones includes considerable attention to the effects of climate change on the oceans—perhaps a more popular topic.
 39. Rob Garver, “No Quick Fix for Shipping Crisis Creating Supply Chain Bottlenecks,” *VOA*, 28 August 2021, www.voanews.com/; Darren Dodd, “Hundreds of Container Ships Stuck as Global Bottlenecks Grow,” *Financial Times*, 15 October 2021, www.ft.com/; Jackie Northam, “The Pandemic Economy’s Latest Victim? The Lowly Shipping Container,” *NPR*, 16 November 2021, www.npr.org/; Marc Jones, “Snarled-Up Ports Point to Worsening Global Supply Chain Woes—Report,” *Reuters*, 3 May 2022, www.reuters.com/.
 40. “Maritime Services Trade Data,” *U.S. Department of Commerce, International Trade Administration*, www.trade.gov/maritime-services-trade-data/.
 41. Robert Little, “U.S. Merchant Fleet Sails toward Oblivion,” *Baltimore Sun*, 6 August 2001, www.baltimoresun.com/.
 42. The number 120 is approximate, since the definition of *ship capable of foreign commerce* remains vague. In 2010, the Transportation Department reported that there were “115 self-propelled, U.S.-flag ships engaged in U.S. foreign commerce.” There is no indication that the number has increased since. See *Status of the U.S.-Flagged Vessels in U.S.-Foreign Trade: Hearing before the Subcomm. on Coast Guard and Maritime Transportation of the H. Comm. on Transportation and Infrastructure*, 111th Cong. (2010) (prepared statement of David T. Matsuda, Maritime Administrator), available at www.transportation.gov/.
 43. The “Jones Act” is a term used to refer to section 27 of the Merchant Marine Act of 1920, which has been modified on numerous occasions by the U.S. Congress, the latest in 2006. Currently it appears in 46 U.S.C. §§ 50101 et seq. The Merchant Marine Act of 1920 is wide-ranging and includes a variety of provisions, with section 27 dealing with *cabotage* (coastwise trade). Section 27 requires that all goods transported by water between U.S. ports be carried on ships constructed in the United States, owned by U.S. citizens, crewed by U.S. citizens or permanent residents, and flying the U.S. flag.
 44. For decades, Cato Institute scholars have railed against the Jones Act in a large number of publications. See, for example, Colin Grabow, Inu Manak, and Daniel J. Ikenson, “The Jones Act: A Burden America Can No Longer Bear,” *Cato Institute*, 28 June 2018, www.cato.org/.
 45. Mahan states: “[I]t is the possession of that overbearing power on the sea which drives the enemy’s flag from it, or allows it to appear only as a fugitive.” The full quote is in Alfred Thayer Mahan, *The Influence of Sea Power upon History, 1660–1783* (Boston: Little, Brown, 1890; repr. New York: Dover, 1987), p. 138; also discussed in Mahan, *Lessons of the War with Spain, and Other Articles* (Boston: Little, Brown, 1899), p. 106.
 46. In addition to subjective opinions, scholarly study on trade between wartime enemies exists. See, for example, Mariya Grinberg, “Wartime Commercial Policy and Trade between Enemies,” *International Security* 46, no. 1 (Summer 2021), pp. 9–52, direct.mit.edu/.
 47. Early in the Russian invasion, Putin pledged that oil and gas supplies to Europe would remain uninterrupted. See Katya Golubkova and Oksana Kobzeva, “Russia’s Putin Pledges Uninterrupted Gas Supplies as Sanctions Loom,” *Reuters*, 22 February 2022, www.reuters.com/. However, as European support for Ukraine solidified, Russia began to use energy exports as an economic weapon against those states through which weapons to Ukraine transited. See Benjamin Storrow, “Russia Halts Gas Flows to Poland, Bulgaria,” *Energywire*, 27 April 2022, www.eenews.net/. In response to Western financial sanctions, Russia has insisted that energy exports be paid for in rubles, which created supply disturbances.
 48. *Advantage at Sea*, p. 3.

49. Michael Whitby (senior naval historian, Canadian Department of National Defence), "Canada and the Cuban Missile Crisis" (presentation to the Western Naval History Association, 28 May 2022, virtual).
50. On the ship count, see Louis Jacobson, "Anatomy of a Talking Point: The Smallest Navy since 1917," *PolitiFact*, 3 August 2015, www.politifact.com/. A congressional goal of 355 as U.S. policy was set by section 1025 of the fiscal year 2018 (FY18) National Defense Authorization Act, P.L. No. 115-91, 131 Stat., p. 1283 (2017).
51. Vago Muradian, "US Must Learn Falklands War Lesson That Deterrence Matters," *Defense & Aerospace Report*, 4 May 2022, defaeroreport.com/.
52. On the PLA as the pacing threat, see Garamone, "Official Talks DOD Policy Role in China Pacing Threat."
53. *Advantage at Sea*, p. 4.
54. U.S. Defense Dept., *Military and Security Developments Involving the People's Republic of China 2021: Annual Report to Congress* (Washington, DC: Office of the Secretary of Defense, 2021) [hereafter U.S. Defense Dept., *Report to Congress: PRC 2021*], pp. vi, 48, available at media.defense.gov/.
55. James Fanell estimates that the PLAN will have at least 432 surface combatants and ninety-nine submarines by 2030. James E. Fanell, "China's Global Naval Strategy and Expanding Force Structure: Pathway to Hegemony," *Naval War College Review* 72, no. 1 (Winter 2019), p. 43, available at digital-commons.usnwc.edu/.
56. Mallory Shelbourne, "Davidson: China Could Try to Take Control of Taiwan in 'Next Six Years,'" *USNI News*, 9 March 2021, news.usni.org/.
57. Kawashima Shin, "CCP Regulations and Xi Jinping's Bid for a Third Term," *China Power* (blog), *The Diplomat*, 22 April 2022, thediplomat.com/.
58. Mikio Sugeno and Tsuyoshi Nagasawa, "Xi's Potential 2027 Transition Poses Threat to Taiwan: Davidson," *Nikkei Asia*, 18 September 2021, asia.nikkei.com/; Ashish Dangwal, "Xi Jinping's Top Advisor Says China Can Launch Invasion of Taiwan by 2027, Restrict US Navy within 1,000 Nautical Miles," *EurAsian Times*, 31 January 2022, eurasianimes.com/; Joe Saballa, "China to Develop Ability to Seize Taiwan by 2027: US Intel," *Defense Post*, 21 September 2022, thedefensepost.com/.
59. Fred Kaplan, "Will China Really Invade Taiwan?," *Slate*, 9 November 2021, slate.com/; Rachel Esplin Odell and Eric Heginbotham, "Don't Fall for the Invasion Panic," in "Strait of Emergency? Debating Beijing's Threat to Taiwan," *Foreign Affairs*, September/October 2021, www.foreignaffairs.com/; Hope Yen, "Despite Readiness Plans, China Has Doubts on Ability to Invade Taiwan, CIA Chief Says," *Los Angeles Times*, 27 February 2003, latimes.com/.
60. *Advantage at Sea*, p. 5. Emphasis in original.
61. Fanell writes: "Numbers matter. In the past, it was fair to say that numbers of hulls, or even tonnage, were not a complete measure of force-on-force capabilities and that American technology would outweigh the PLAN's numbers. Today, that argument is no longer credible." Fanell, "China's Global Naval Strategy," p. 13.
62. *Advantage at Sea*, p. 4.
63. Marcus Weisgerber, "Top Navy Admiral: Fleet Size Doesn't Always Matter," *Defense One*, 4 April 2022, www.defenseone.com/.
64. Sydney J. Freedberg Jr., "HASC Chair Slams F-35, 500-Ship Fleet; Highlights Cyber," *Breaking Defense*, 5 March 2021, breakingdefense.com/. Emphasis in original.
65. *China's Cyber Capabilities: Warfare, Espionage, and Implications for the United States; Hearing before the U.S.-China Economic and Security Review Commission*, 117th Cong. (2022), available at www.uscc.gov/. U.S. Defense Dept., *Report to Congress: PRC 2021*, states: "The PRC has continued its aggressive, top-level push to master advanced technologies and become a global innovation superpower" (p. xi) and "[t]he PLA's focus on an integrated approach to cyber defense using advanced technologies likely will lead to the PLA improving its cyber defense capabilities over the next several years" (p. 79).
66. FY18 National Defense Authorization Act § 1025.
67. Brent Sadler, "Is Joe Biden's New US Navy Budget Illegal?," *1945*, 8 April 2022, www.1945.com/.

68. Sadler states that Senator Jim Inhofe (R-OK) “called out the [Navy budget’s] potential violation of the law.” Ibid.
69. In addition to Senator Inhofe, in 2022 such supporters included Senators Jack Reed (D-RI) and Roger Wicker (R-MS) and Congresspeople Joe Courtney (D-CT), Mike Gallagher (R-WI), Elaine Luria (D-VA), and Rob Wittman (R-VA).
70. Dave Ress, “Navy Shipbuilding Plan Draws Congressional Fire as Legislators Gear Up for Another Funding Battle,” *Daily Press*, 3 May 2022, www.dailypress.com/.
71. Dave Ress, “‘The Navy Owes the American Public an Apology,’ Luria Says during Rebuke of Biden’s Budget Proposal,” *Daily Press*, 30 March 2022, www.yahoo.com/.
72. Sam LaGrone and Mallory Shelbourne, “CNO Gilday: ‘We Need a Naval Force of Over 500 Ships,’” *USNI News*, 18 February 2022, news.usni.org/.
73. As the 2018 congressionally chartered assessment of the National Defense Strategy (NDS) of 2018 states, “The [Defense] Department has not clearly explained how it will implement the NDS with the resources available; in fact, many of the additional resources made available so far have been distributed uniformly across the defense bureaucracy so that ‘everybody wins,’ rather than being strategically prioritized to build key future capabilities.” Commission on the National Defense Strategy for the United States, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission* (Washington, DC: United States Institute of Peace, [2018]), p. 19, available at www.usip.org/.
74. A recent discussion of how this distorts concepts and strategy is John Schaus, “Bad Idea: Overprioritizing ‘Jointness’ in the Joint Warfighting Concept,” *Defense360*, 10 December 2021, defense360.csis.org/.
75. In his 1985 defense of the *Maritime Strategy* from within a prime forum for its academic critics, Linton Brooks admits that “[n]o meaningful single-service strategy is possible in the modern era,” and the *Maritime Strategy* was the “maritime component of the National Military Strategy,” which naturally included the Army and Air Force. See Brooks, “Naval Power and National Security,” p. 59. Wills cites and expands on this discussion in terms of Goldwater-Nichols in Wills, *Strategy Shelved*, pp. 118–19.
76. A detailed assessment of naval-force roles in the current U.S. grand strategy (if such exists) is Simon Reich and Peter Dombrowski, *The End of Grand Strategy: US Maritime Operations in the Twenty-First Century* (Ithaca, NY: Cornell Univ. Press, 2017).
77. *Advantage at Sea*, p. 18.
78. Wills, *Strategy Shelved*, p. 184.
79. *Advantage at Sea*, p. 8.
80. Phillip Ewing, “The Rise and Fall of Air-Sea Battle,” *DoD Buzz: Online Defense and Acquisition Journal*, 1 May 2012, www.dodbuzz.com/.
81. *Advantage at Sea*, p. 21.
82. Ibid., p. 7.
83. Jeffrey R. Cares and Anthony Cowden, *Fighting the Fleet: Operational Art and Modern Fleet Combat* (Annapolis, MD: Naval Institute Press, 2021), p. 69.
84. Paul McLeary, “CJCS Milley Predicts DoD Budget ‘Bloodletting’ to Fund Navy,” *Breaking Defense*, 3 December 2020, breakingdefense.com/.
85. Wills, *Strategy Shelved*, p. 185.
86. It must be acknowledged that the Marine Corps is transitioning to a force structure supporting expeditionary advanced base operations, which may impact the nature of future deployments outside the U.S. Indo-Pacific Command area.
87. This interprets the newly restored Atlantic Fleet as primarily supporting Commander, Naval Forces Europe—component commander to the COCOM, U.S. European Command—which controls that part of the Atlantic region requiring forward naval forces as a deterrent to Russia, and secondarily supporting U.S. Northern Command.
88. *Advantage at Sea*, p. 9.
89. Ben Werner, “SECDEF Esper Blames Failures of Optimized Fleet Response Plan for Delay of New 355-Ship Fleet Outlook,” *USNI News*, 26 February 2020, news.usni.org/.
90. There is one exception: designated regional fleet flagships. But even then, during the Gulf War of 1991 the flagship of U.S. Seventh

Fleet—normally under the command of U.S. Pacific Command—transited and “chopped” into U.S. Central Command’s region to enable the Seventh Fleet commander to take command as Central Command’s joint naval component commander.

91. *Advantage at Sea*, pp. 6, 9.
92. For example, see Robert O. Work, “A Slavish Devotion to Forward Presence Has Nearly Broken the U.S. Navy,” U.S. Naval Institute *Proceedings* 147/12/1,426 (December 2021), pp. 34–42.
93. *Ibid.* Bryan Clark and Jesse Sloman conclude that “reducing presence may not be an option.” They suggest ways to mitigate the readiness problem identified. Bryan Clark and Jesse Sloman, *Deploying beyond Their Means: America’s Navy and Marine Corps at a Tipping Point* (Washington, DC: Center for Strategic and Budgetary Assessments, n.d. [ca. 2016]), pp. 19–29, 41.
94. Robert C. Rubel [Capt., USN (Ret.)], “Think Differently about Naval Presence,” U.S. Naval Institute *Proceedings* 147/12/1,426 (December 2021), pp. 28–33; Work, “A Slavish Devotion to Forward Presence,” p. 41.
95. All such vessels were decommissioned during the 1990s and early 2000s, after the end of the Cold War, with the exception of a handful of submarine tenders.
96. Fanell, “China’s Global Naval Strategy,” pp. 17–19.
97. Frank Kendall, *Getting Defense Acquisition Right* (Fort Belvoir, VA: Defense Acquisition Univ. Press, [2017]), p. 95, available at dod.defense.gov/.
98. Geoffrey Till, “Adopting the Aircraft Carrier: The British, American, and Japanese Case Studies,” in *Military Innovation in the Interwar Period*, ed. Williamson Murray and Allan R. Millett (Cambridge, U.K.: Cambridge Univ. Press, 1996), pp. 191–226; Jan M. Van Tol, “Military Innovation and Carrier Aviation—the Relevant History,” *Joint Force Quarterly*, no. 16 (Summer 1997), pp. 77–87, available at apps.dtic.mil/; Terry C. Pierce, *Warfighting and Disruptive Technologies: Disguising Innovation* (London: Frank Cass, 2004), pp. 121–31.
99. Trent Hone, *Learning War: The Evolution of Fighting Doctrine in the U.S. Navy, 1898–1945* (Annapolis, MD: Naval Institute Press, 2018), pp. iv–vi, 1–12.
100. The suggestion that the Defense Advanced Research Projects Agency (DARPA) or the Strategic Capabilities Office (SCO)—both controlled by OSD—carries out development of one-of-the-kind platforms for experimentation in the same way that the naval services of the 1920s and ’30s did is inaccurate. DARPA and SCO conduct individual and isolated experimentation; they do not thrust new platforms directly into ongoing naval exercises and actual operations (including forward deployment) to determine their effectiveness. Thus, programs such as Ghost Fleet Overlord are perceived as “successful” when they demonstrate limited application to combat requirements. (See the “Thirsting after Technology” section.) The creation of a surface-warfare development squadron (SURFDEVRON 1) in 2019 may lead to the insertion of new experimental platforms into fleet exercises, but thus far the squadron largely has concentrated on scripted exercises “proving” the potential to achieve optimistically expected capabilities.
101. Will Kenton, “Economies of Scale: What Are They and How Are They Used?,” *Investopedia*, 14 May 2022, www.investopedia.com/.
102. It can be argued that individual system modeling and simulation can reduce this gamble. On occasion it does, but often it does not. As Frank Kendall writes, “One example of a framing assumption, again on the F-35, was that modeling and simulation were so good that actual physical testing wasn’t necessary to verify performance prior to the start of production. In the case of the Littoral Combat Ship, the assumption was that commercial construction standards were adequate to guide the design. . . . [I]t’s a good [point] that programs often get into trouble when framing assumptions prove invalid. However, these assumptions are so ingrained and established in our thinking that they are not challenged or fully appreciated as risks until reality rears its ugly head in a very visible way. This type of risk can be mitigated by acknowledging that the assumptions exist.” Kendall, *Getting Defense Acquisition Right*, pp. 77–78.
103. *Advantage at Sea*, p. 6.

104. John Konrad, "US Navy Is Both Decommissioning and Building More of This Failed Ship," *gCaptain*, 30 September 2021, gcaptain.com/.
105. Megan Eckstein, "Interview: Elaine Luria Says Navy Needs to Build 'Battle Force 2025' Instead of Divesting to Prepare for a 2045 Fight," *USNI News*, 5 May 2021, news.usni.org/.
106. *Department of Defense Authorization for Appropriations for Fiscal Year 1991: Hearings on S. 2884 before the S. Comm. on Armed Services*, 101st Cong., pt. 1, p. 1138 (1990) (prepared statement of Frank C. Conahan, Assistant Comptroller General, National Security and International Affairs Division, General Accounting Office); quotation on p. 6 of prepared statement available at www.gao.gov/. Emphasis added.
107. *Ibid.*, p. 1134; p. 1 of prepared statement available at www.gao.gov/.
108. Daniel Gouré, "In Praise of Concurrency," *Lexington Institute*, 9 September 2015, www.lexingtoninstitute.org/.
109. Randolph B. Robertson, "The Effectiveness of Concurrent Design on the Cost and Schedule Performance of Defense Weapons System Acquisitions" (PhD diss., Indiana State Univ., 2017), p. 89.
110. Tyler Rogoway, "The Pentagon's 'Concurrency Myth' Is Now Available in Supercarrier Size," *Jalopnik*, 17 June 2015, jalopnik.com/.
111. *Advantage at Sea*, p. 5.
112. Sam J. Tangredi and George Galdorisi, eds., *AI at War: How Big Data, Artificial Intelligence, and Machine Learning Are Changing Naval Warfare* (Annapolis, MD: Naval Institute Press, 2021), pp. 8–9, 11–13.
113. Clive Swan, vice president of Oracle, quoted in Aaron Ricadela, "Best Way to Realize AI Benefits: Don't Shoot the Moon," *Forbes*, 2 October 2019, forbes.com/.
114. A number of chapters in Tangredi and Galdorisi, *AI at War*, discuss the specific war-fighting functions that developments in AI may affect. See pp. 168–235.
115. Connor S. McLemore [Lt. Cdr., USN] (remarks at the "Beyond the Hype: Artificial Intelligence in Naval and Joint Operations" conference, Naval War College, Newport, RI, 24 October 2019).
116. Connor S. McLemore and Charles R. Clark, "Practical Applications of Naval AI: An Overview of Artificial Intelligence in Naval Warfare," in Tangredi and Galdorisi, *AI at War*, pp. 151–52.
117. An argument that naval AI should be designed to enhance the completeness of information rather than simply focusing on processing speed is laid out in Scott H. Swift [Adm., USN (Ret.)] and Antonio P. Sordia, "Mission Command and Speed of Decision: What Big Data, Artificial Intelligence, and Machine Learning Should Do for the Navy," in Tangredi and Galdorisi, *AI at War*, pp. 135–49. The authors point out that when limited resources (such as the missiles a ship has in its magazine) are key factors, "slow" but complete is more effective than fast but based on partial data.
118. *Department of the Navy (DON) Additive Manufacturing (AM) Implementation Plan V2.0 (2017)*, 4 May 2017, available at apps.dtic.mil/; "U.S. Navy Accelerates Uptake of 3-D Printing for Spare Parts," *Maritime Executive*, 1 December 2020, www.maritime-executive.com/.
119. On the difficulty of printing alloys, see, for example, T. Mukherjee et al., "Printability of Alloys for Additive Manufacturing," *Scientific Reports* 6 (2016), 19717, www.nature.com/.
120. Additive manufacturing capabilities (primarily on an experimental basis) largely have been confined to major naval systems development centers such as Naval Surface Warfare Center, Crane [Indiana] Division, where materials indeed can be available in abundance. Nevertheless, every media report on additive manufacturing seems to add to the public hype by including a quote from a scientist who proclaims that "[a]pplying additive manufacturing techniques . . . will truly be a game changer." See Nathan Strout, "Naval Surface Warfare Center Invests in Additive Manufacturing Prototypes," *CAISRNET*, 6 January 2022, www.c4isrnet.com/.
121. Megan Eckstein, "US Navy Eyes 3D Printing for Submarine Parts to Ease Burden on Strained Industrial Base," *Defense News*, 4 February 2022, www.defensenews.com/.

122. Ibid.
123. Tammy Xu, "Cryptographers Are Racing against Quantum Computers," *Built In*, 30 April 2021, builtin.com/.
124. Vidya Subramanian, "Quantum and the Future of Cryptography," *National Defense*, 27 December 2021, www.nationaldefensemagazine.org/.
125. The negative 1 and x/y axis depiction is my own; however, several technologists have agreed that it is a reasonable way of describing the difference. A source that uses the x/y axis (within a sphere) but not negative 1 is Lukasz Olejnik and Robert Riemann, "Quantum Computing and Cryptography," *EDPS TechDispatch*, no. 2 (2020), edps.europa.eu/.
126. Chris Young, "A New, Simpler Quantum Computer Runs at Room Temperature," *Interesting Engineering*, 30 November 2021, interestingengineering.com/.
127. Former employees of Linkabit, who had worked as Navy contractors on programs that included DAMA, started Qualcomm in 1985 and developed what they termed Code Division Multiple Access (or CDMA) for wireless communications. This is discussed briefly at qualcomm.com/.
128. Noah Shachtman, "How the Navy's Incompetence Sank the 'Green Fleet,'" *Brookings*, 17 July 2012, www.brookings.edu/.
129. For general details on Triton, see "MQ-4C Triton: Making the World's Oceans Smaller," *Northrop Grumman*, 21 May 2022, www.northropgrumman.com/, and U.S. Navy Dept., *MQ-4C Triton Unmanned Aircraft System (MQ-4C Triton): December 2021 Selected Acquisition Report (SAR)* (Washington, DC: Executive Services Directorate, 2022), available at www.esd.whs.mil/. For general details on Fire Scout, see "Fire Scout," *Northrop Grumman*, 21 May 2022, www.northropgrumman.com/, and "MQ-8 Fire Scout (MQ-8B/C)," *AeroWeb*, www.fi-aeroweb.com/Defense/MQ-8-Fire-Scout.html.
130. Diana Stancy Correll, "Navy's 30-Year Shipbuilding Plan Offers Three Options to Increase the Size of the Fleet," *Navy Times*, 21 April 2022, www.navytimes.com/.
131. Daniel Gessner, "Experts Say We're Decades Away from Fully-Autonomous Cars. Here's Why," *Business Insider*, 22 July 2020, www.businessinsider.com/; Tyson Fisher, "Two Studies Reveal How Far Away We Are from Fully Automated Vehicles," *Land Line*, 12 August 2020, landline.media/; Cade Metz, "The Costly Pursuit of Self-driving Cars Continues On. And On. And On," *New York Times*, 24 May 2021, www.nytimes.com/; "What's the Status of Self-driving Cars? There Has Been Progress, but Safety Questions Remain," *CBS News*, 19 February 2022, www.cbsnews.com/. Gessner explains the levels of autonomy: "Level 1 is driver assistance, where the vehicle is able to control steering or braking, but not both simultaneously. Level 2 is partial automation, where the car can assist with both steering and braking simultaneously, but your attention is required on the road at all times. Both Tesla's Autopilot and General Motors' Super Cruise are examples of this. Level 3 is conditional automation, where certain circumstances allow the car to handle most aspects of driving and the driver has the ability to temporarily take their eyes off the road. Level 4 is high automation, where, in the right conditions, the car can take full control, giving the driver a chance to focus on other tasks. And Level 5 is full automation. In this hypothetical situation, the car drives you, and there isn't even a steering wheel."
132. U.S. Defense Dept., "Ghost Fleet Overlord Unmanned Surface Vessel Program Completes Second Autonomous Transit to the Pacific," press release, 7 June 2021, www.defense.gov/.
133. Julian Turner, "Sea Hunter: Inside the US Navy's Autonomous Submarine Tracking Vessel," *Naval Technology*, 3 May 2018, www.naval-technology.com/. The manufacturer, Leidos, reports the goal of the program as "full autonomy." See "Sea Hunter Reaches New Milestone for Autonomy," *Leidos*, 31 January 2019, www.leidos.com/.
134. Lucy Westcott, "Meet Sea Hunter, the U.S. Navy's Robotic, Self-driving Warship," *Newsweek*, 8 April 2016, www.newsweek.com/.
135. C. Todd Lopez, "DOD's Autonomous Vessel Sails through Transit Test, Participates in Exercise DAWN BLITZ," *U.S. Department of Defense*, 13 January 2021, www.defense.gov/.
136. Alex Davies, "Boeing's Monstrous Underwater Robot Can Wander the Ocean for 6 Months," *Wired*, 21 March 2016, www.wired.com/.

137. This confusion is sustained by descriptions on official websites such as the following: “The MQ-4C Triton is an autonomously operated system.” “MQ-4C Triton,” *Naval Air Systems Command*, www.navair.navy.mil/. The key word is *operated*, implying control, not *operating*. Triton is indeed flown from Jacksonville, Florida.
138. Concerning questions of control of autonomy in an electromagnetic-warfare environment, see Sam J. Tangredi, “Four Questions concerning Future Naval Systems and Fleet Architecture,” U.S. Naval Institute *Proceedings* 148/5/1,431 (May 2022), available at www.usni.org/.
139. For example, see Shelby S. Oakley, *DOD Acquisition Reform: Increased Focus on Knowledge Needed to Achieve Intended Performance and Innovation Outcomes*, GAO-21-511T (Washington, DC: U.S. Government Accountability Office, 28 April 2021), pp. 17–20, available at www.armed-services.senate.gov/.
140. Mack DeGeurin, “The Pentagon’s Long Road to an Army of Autonomous Vehicles,” *Gizmodo*, 7 April 2022, gizmodo.com/. Hicks noted that military-applicable autonomy was “more elusive than I think it should have been.”
141. It is possible that the naval services can benefit from the funding provided to independent defense agencies to afford naval applications of these technologies. The Navy has been successful in obtaining funds from the Missile Defense Agency for the development of shipborne ballistic-missile-defense hardware and ordnance.
142. Ress, “The Navy Owes the American Public an Apology.”
143. *Advantage at Sea*, p. 2.
144. SOCOM has been budgeted in part by overseas contingency operations funds and its own budget lines. Cyber Command operations are funded partly by its colocation with the National Security Agency.
145. *Advantage at Sea*, pp. 13, 25.
146. For a preliminary discussion of this logic, albeit in the context of globalization and a more benign view of the objectives of the PRC, see Sam J. Tangredi, “Beyond the Sea and Jointness,” U.S. Naval Institute *Proceedings* 127/9/1,183 (September 2001), pp. 60–63, available at www.usni.org/; also republished in Thomas J. Cutler, ed., *The U.S. Naval Institute on Naval Strategy* (Annapolis, MD: Naval Institute Press, 2015), pp. 141–50.