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Robert C. Rubel

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CONNECTING THE DOTS

Capital Ships, the Littoral, Command of the Sea, and the World Order

Robert C. Rubel

An announcement in 2013 by then–Secretary of Defense Chuck Hagel that the Navy might reduce its aircraft carrier fleet from eleven to eight was an indication not only of harsh budget realities but also of changed operational circumstances at sea.¹ In World War II, the aircraft carrier displaced the big-gun battleship as the capital ship. The United States subsequently used its fleet of aircraft carriers to exercise the command of the sea that it had won in the war to secure the peace. It stationed them around the periphery of Eurasia, initially to support a grand strategy of containing the Soviet Union and then, after the Soviet collapse,

to maintain general strategic stability. This use of aircraft carriers has lasted almost seventy years, a period in which naval technology has evolved significantly, and much of that new technology could pose a credible threat to the aircraft carrier. Absent actual fighting or a direct challenge to American command of the sea, it is hard to know when the nuclear-powered aircraft carrier might pass into obsolescence. What happens in that case? This is not simply a technical naval question; the capital ship, currently in the form of the nuclear-powered aircraft carrier (CVN), has constituted an important feature of the global geopolitical terrain since at least the Napoleonic Wars. It is part of a global political and economic ecology, and it is therefore reasonable to think that any changes in its status

Professor Rubel was Dean of Naval Warfare Studies at the Naval War College from 2006 to 2014. Previously, before retiring from the U.S. Navy in the grade of captain, he was an aviator, participating in operations connected with the 1973 Yom Kippur War, the 1980 Iranian hostage crisis, the TWA Flight 847 crisis, and DESERT SHIELD. He commanded Strike Fighter Squadron 131 and served as the inspector general of U.S. Southern Command. He attended the Spanish Naval War College and the U.S. Naval War College, in Newport, Rhode Island, where he served on the faculty and as chairman of the War Gaming Department, in the Center for Naval Warfare Studies, before his last appointment. He has a BS degree from the University of Illinois; an MS in management from Salve Regina University, in Newport, Rhode Island; and an MA in national security and strategic studies from the Naval War College (1986).

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will have ripple effects in that ecology. In this article we will explore that ecology and speculate on how it might change if the capital ship, as a key naval function, capability, and concept, passes from the scene.

When the aircraft carrier displaced the battleship as the key type of capital ship, the transition, for all its tactical and operational impact, did not alter the fundamental character of naval warfare. Decisive offensive power remained concentrated in a relatively small number of large, expensive combatants. It is not clear that a large warship of new design is waiting in the wings to replace the aircraft carrier if indeed it becomes obsolescent. One possibility is that naval offensive power will reside in various types of missiles that could be widely distributed among a variety of vessels.² In fact, this process has been under way for some time in the form of Tomahawk land-attack missiles loaded on destroyers, cruisers, and submarines. If “missilization” is carried to its logical conclusion, displacing the carrier and its air wing as the principal offensive power of the fleet, the nature of naval warfare could change, and that change could have ripple effects in the global geopolitical ecology, one that has been, to this point, generally favorable to American interests.

This article will not attempt to pass judgment on whether the aircraft carrier and its embarked tactical air wing are in fact headed for obsolescence, although there exists just such a debate in the current literature.³ To be clear, and as will be discussed later, the U.S. Navy might elect to keep some aircraft carriers in commission even if only in support roles. Also, care must be taken to distinguish between the “capital ship” as a particular physical object and “capital ship” as a warfare function. Later, for illustrative purposes, we will explore a world in which the capital-ship function has been made obsolete by new kinds of weapons and sensors, whether or not aircraft carriers remain in the inventory.

COMMAND OF THE SEA AND CAPITAL SHIPS

From the galleasses of the Christian armada that prevailed at Lepanto in 1571 to the *Gerald Ford*-class CVN of today, there has been an intrinsic relationship between capital ships and command of the sea. Command of the sea, rightly understood, is simply the strength relationship between two contending navies.⁴ The one that is sufficiently stronger than the other enjoys freedom of action, including the ability to move its nation’s army by sea, disperse to protect its commerce, and come to the aid of allies. Such command was traditionally achieved by winning a decisive sea battle, and the arbiter of such battles since Lepanto has generally been the capital ship—the largest and strongest ship type afloat, capable of defeating lesser types. Since 1945 the United States has, by virtue of its eradication of the Imperial Japanese Navy in World War II and thereafter in the absence of a serious Soviet challenge, enjoyed virtually uncontested command of the sea.

The U.S. Navy's dominance has been so complete that some writers question whether the concept has relevance anymore.⁵ However, a pair of analysts who traced the history of the concept from the late fifteenth century through the late twentieth argue that a particular dimension of command of the sea is operative especially in times of dominance—the leading nation's ability to use command of the sea to enforce the rules of the international order according to its interests.⁶ Throughout this period, this dimension included the ability to regulate commerce but also to project power ashore. A dominant capital-ship fleet either dispersed to support such operations or lurked in the background, dissuading by its existence any potential challenger from even trying to build a competitive fleet.

In the post-World War II era, the U.S. Navy's fleet of aircraft carriers has been employed in this way. In roles ranging from stopgap application of airpower against an invading North Korean army in 1950 through support of special forces in the opening moves of Operation ENDURING FREEDOM in 2001, to most recently air strikes to limit the advance of Islamic State forces, the Navy's carriers have been dispersed around the periphery of Eurasia as a ready tool for the president. In a 1954 U.S. Naval Institute *Proceedings* article, Samuel Huntington summed up the Navy's postwar situation: "Its purpose now is not to acquire command of the sea but rather to utilize its command of the sea to achieve supremacy on land. More specifically, it is to apply naval power to that decisive strip of littoral encircling the Eurasian continent."⁷ The key to the utility of the aircraft carrier in these roles has been its ability to project power deep inland, taking up station wherever the situation demanded. The pattern of aircraft-carrier utilization, combined with deployments and movements to assure allies or deter potential aggressors, clearly indicates these ships have been dispersed around the world to exercise American command of the sea.

ANTI-CAPITAL SHIP TECHNOLOGY

Since the latter part of the nineteenth century, a series of technological developments have challenged the dominance of capital ships. The "automotive" (i.e., self-propelled) torpedo, the aircraft, the submarine, and the missile have all presented potentially disruptive challenges. To date, however, the capital ship in its various forms has survived and retained its utility for seizing, maintaining, and exercising command of the sea. In World War II, despite some submarine successes against them, both Japanese and American capital ships, mainly carriers, used speed, maneuver, and offensive reach to neutralize or at least contain threats. Beyond those at sea, threats emanating from land have always constituted a mortal danger to capital ships. Admiral Horatio Nelson is supposed to have said "a ship's a fool to fight a fort," referring to the high volume and accuracy of fire that can be produced by a fort in comparison with what can be generated by a

ship. A number of destroyers, cruisers, and even battleships have suffered damage in duels with shore batteries. In the Pacific War, American carriers before 1944 were careful to remain out of range of Japanese air bases except for covert dashes into such zones for hit-and-run raids.

The post-World War II world has seen the development of nuclear submarines, long-range shore-based bombers carrying antiship cruise missiles, and, most recently, land-based intermediate-range ballistic missiles with antiship seekers.⁸ Yet in the absence of a shooting war involving these weapons, the aircraft carrier has been able to exercise its command-of-the-sea function virtually unmolested. A close call occurred in the eastern Mediterranean in 1973 when U.S. and Soviet fleets intermingled during the Yom Kippur War. The Soviet fleet was well armed with antiship missiles, and a few nuclear submarines were present.⁹ The author was a junior attack aviator on board USS *Independence* (CV 62) in that crisis and can attest to the precarious situation of the U.S. carriers. While defensive systems such as Aegis and directed energy have since been developed, the threats have become more challenging. The danger is that the net outcome of an offense-versus-defense battle cannot be truly known short of actual fighting. Thus the ability of aircraft carriers, as capital ships, to carry out the command-of-the-sea mission is increasingly being placed in question.

THE LITTORAL

Many writers and theorists have divided the seas into two parts, the open ocean and the littoral. Conventional lay wisdom on naval matters links large ships with the “blue water” of the high seas and smaller craft with the “green water” of the littoral. In fact, most major naval battles have taken place within the littoral or at least in the vicinity of land features. Large ships, capital ships not excepted, are designed to *cross* oceans and to carry a lot of payload; their purpose is not to “hang out” in midocean. It is instructive to examine three tacit operational rules for capital-ship fleets that have remained valid since the seventeenth century:

- Keep the fleet concentrated.
- Do not become decisively engaged with land forces unless decisively superior (a more general rewording of Admiral Nelson’s “A ship’s a fool to fight a fort”).
- Do not sacrifice the mobility of the fleet by tying it to a geographic feature.¹⁰

These rules can be broken if conditions are right, but in the presence of a significant opposing force ignoring them has been a recipe for losing ships. We can skip over the first rule for the purposes of this article and focus on the second two. The second rule reflects, as generally noted, the ability of land-based forces to generate a higher rate of fire—or aircraft sorties—per unit time than can ships;

a land adversary is also less likely, on a force-wide basis, to suffer disabling damage per hit.

The third rule has to do with detectability. A widely maneuvering fleet is harder to find and target than one that is forced to remain in the vicinity of an island or other geographic feature. The distance the littoral effectively extends seaward can be thought of as the distance out to which these two latter rules retain their salience. New weapons and new modes of search and surveillance have extended this effective distance considerably in several regions of the world. Given the strategic mission of exercising command of the sea through power projection ashore, it really is not useful to talk about U.S. aircraft carrier operations outside the littoral—anywhere. Where no threats are manifest, carriers disregard the rules with impunity, operating as airfields at sea.¹¹ Palpable threat levels force their consideration.

Where the relationship of high sea to the littoral comes into practical effect is in the design of fleet defensive systems. A carrier strike group (CSG) employs a layered defense scheme in which fighter aircraft establish an outer ring, reaching perhaps out to three hundred miles. Inside this fighter-engagement zone, Aegis destroyers and cruisers employ surface-to-air missiles for area defense. Finally, the innermost zone consists of various point-defense systems on each ship. This three-layer scheme is best thought of as a strainer, not a shield. The outer layers are not likely to destroy all inbound aircraft or missiles in saturation raids. They are supposed to reduce the number of “leakers” to a number that can be managed by point-defense systems. To function effectively, the scheme requires distance, ideally hundreds of miles. A preferred operational case against a land-based threat would be an “approach battle,” in which the CSG launches long-range air and missile strikes to disable enemy defenses before they can be brought to bear effectively on the group. By the time the group enters the littoral, the threat level would be reduced to the point that the two fleet-employment rules could at least be bent, if not broken. But political circumstances, such as those encountered in the eastern Mediterranean in 1973, and long-range shore systems, such as anti-ship ballistic missiles, not to mention cruise missile-armed submarines, force the CSG out of its preferred mode and make the consequences of breaking the rules severe.

The difficult logic of littoral warfare prompted Rear Admiral Yedidia Ya'ari of the Israel Navy to write twenty years ago, “I argue that when warships designed for the high seas enter the confined waters of the littoral arena, the fundamental relationships of maneuverability and firepower are upset,” and “The surface ships now in commission were designed with the open ocean and distant defensive perimeters in mind; to keep deploying them to a playing field where, under the most optimistic assumptions, their survival requires as a normal operating mode

the highest level of *everything, all the time*, is unhealthy and unrealistic in the long run.”¹²

The objective here is not to advance an argument against aircraft carriers; it is to illuminate the relationship among American command of the sea, aircraft carriers as the capital ships that are collectively the instrumentality for its exercise, a favorable world order based on that command, and the nature of the littoral. These factors are inextricably intertwined, and changes to one inevitably affect the others.

CONCENTRATION OF RESOURCES AND RISK

If kinetic threats to the aircraft carrier are latent, the budgetary threat is all too real. USS *Gerald Ford* (CVN 78) will cost around thirteen billion dollars. That figure is for the ship alone; the air wing would add another five to six billion.¹³ Moreover, the carrier aviation “enterprise” absorbs a significant plurality of U.S. Navy resources, including personnel and infrastructure. Beyond the absolute numbers, this investment represents an enormous concentration of assets and therefore risk. However, it has always been this way with capital ships; they require concentration both in investment and, when there is a contending navy, in employment. If, through their construction and use, command of the sea is seized, maintained, and exercised, adequate return on investment is realized.

Assuming that Secretary Hagel was correct and the CVN force will be reduced below eleven, the Navy faces two strategic problems that involve the connection between capital ships and command of the sea. The first is one of simple numbers. If the exercise of command is strictly associated with capital ships, what number of CVNs is the minimum needed? Finding the answer requires assessment of which regions require such exercise and which do not. After the Cold War, the U.S. Navy all but abandoned carrier deployments from Norway’s North Cape all the way to the strait of Bab el Mandeb, because there was no further need for the exercise of command in those waters. As the global system evolves both politically and economically, the need to exercise command may shrink even more—or it may expand because of Chinese or Russian adventurism. In the case of contraction, it may be the case that the CVNs can be retained in home waters, whereby the justification for investment would decline even further. But even in the expansion case the ability to increase the number of CVNs may simply evaporate as their cost escalates and defense budgets contract.¹⁴

The other issue is whether the CVN itself is able to continue as a capital ship. Can it operate at an acceptable degree of risk in waters it needs to enter to carry out its power-projection function? And indeed, can manned tactical aircraft continue to be viable weapons-delivery vehicles in the face of modern air defenses? Again, these questions have been addressed elsewhere, and it is not within the

scope of this article to argue the matter either way. However, we will make the assumption that sufficient uncertainty exists to warrant thinking about what American naval posture might be like if the answer, with respect both to carriers and to their manned aircraft, is judged at some point to be no.

In a more general and abstract sense, there is the question whether concentration in any form is a good idea in an age of cyberspace, ubiquitous sensing, machine intelligence, precision missiles, and, of course, nuclear weapons. Early in the nuclear age the Navy developed highly dispersed tactical formations and spread out its home ports so that one nuclear bomb could not destroy too much. Over the decades of the 1950s, '60s, and '70s, U.S. Sixth Fleet conducted a series of experiments to determine whether dispersed formations, emission control, and deceptive maneuvers could be effective in protecting the aircraft carrier from air and submarine attack. Progressive tactical development over this span of time produced an array of methods and equipment that appeared to be effective, at least for a given number of hours or days.¹⁵ Nevertheless, combat power was still concentrated in the carrier, and losing the carrier, through equipment failure or bad luck, put the fleet substantially out of business. Today, arguments for dispersal rotate around the networking capability of forces and the range of weapons. That is, given a battle-force network and long-range weapons, ships can be physically dispersed but operate as if they were in close formation. However, this disposition does not change the basic fact that most offensive power is concentrated in the carrier. Investment bankers urge diversified portfolios. Concentration of combat capability, like concentration of investment, may constitute strategic vulnerability, if, in the naval case, it has not already done so. But concentration does produce various efficiencies in both investment and the application of force, so the incentives to concentrate will always be there.

BREAKING THE LINK BETWEEN COMMAND OF THE SEA AND CAPITAL SHIPS

Command of the sea as an operative basis for naval decision making has been around, whether the term has been explicitly used or not, since at least the Peloponnesian War, when the land power Sparta based its strategies on the presumption of Athenian predominance at sea. It predates the development of the capital ship, perhaps offering a basis for delinking the two concepts. Could command be maintained and exercised with a distributed force of smaller ships? Capital ships arose to meet the needs of gun and, later, aircraft technology, both of which required progressively larger hulls and physical concentration to be effective against “symmetric” forces—that is, adversaries armed essentially like oneself. It is not clear that missile, mine, or other unmanned technologies require concentration; they may in fact require the opposite—that is, distribution—to be

effective. As a result, distribution of power brings into question the whole idea of command of the sea as traditionally conceived.

As long as naval power was defined in terms of fleets of capital ships, admirals shaped their strategies on the basis of how they viewed their strength relative to that of their enemies. Weaker navies, feeling they would meet defeat in a pitched naval battle, tried at times to compensate for their deficiencies in capital ships through the use of distributed small forces to interdict commerce or achieve some form or degree of denial using raiders, flotillas of small combatants, or mines against the stronger navy. However, the stronger force, enjoying command, was at liberty to blockade and to conduct amphibious operations directly against the flanks of the enemy or somewhere that mattered on the periphery. Using capital-ship power to provide security for such operations has been normal practice, because it has been effective.

But in today's emerging operational environment it is not clear that using capital ships to cover an amphibious landing would be either tactically effective or strategically wise. An enemy possessing an array of modern missile, cyber, and unmanned forces might plausibly achieve disabling hits on several capital ships. If it did, the task force commander would have a difficult decision between proceeding with reduced security and abandoning the operation. A real-world example is the Falklands War of 1982. What if the Argentines had put one of the British carriers out of action? The British commander later admitted that such a loss would have caused him to cancel the landing of troops.¹⁶

The point is that emerging technology appears to give a decisive edge to the tactical offense at sea—that is, to reinforce the historically normal state of affairs.¹⁷ In the early years of the Pacific War, aircraft carriers took advantage of this condition by attempting to strike effectively first, the paradigm being the battle of Midway.¹⁸ The logic of striking effectively first extends to projecting power against the shore. One of the criteria for success in the Sixth Fleet experiments on deception and dispersal was whether carriers remained untargeted long enough to get in disabling first strikes against enemy airfields.¹⁹ The presumption was that the resulting impairment of enemy strike operations would be sufficient to reduce the threat to levels manageable by battle group defenses. If initial strikes cannot be sufficiently disabling, or if the enemy's offensive power (missiles, say) is dispersed and hidden, the logic of striking effectively first evaporates, negating the true value of a capital ship. The capital-ship group or fleet is thus forced to break the second fleet-employment rule—"Do not become decisively engaged with land forces unless decisively superior"—and losses can be expected. The question then becomes whether the operation is worth the loss of one or more capital ships. Unless the warfare is nuclear or an existential issue is otherwise at stake, the trade-off is not likely to be advantageous.²⁰

Capital ships generally should be hazarded only when the potential strategic gain—command of the sea, national survival, or some other vital interest worth such risk—is at stake. That said, the U.S. Navy in 1942 twice risked its few available aircraft carriers in the defense of the beachhead at Guadalcanal, and it suffered losses in the process. However, it did so in the knowledge that within a year *Essex*-class carriers would start coming off the shipways in numbers. Moreover, the U.S. carriers were risked only when Japanese carriers were involved. Would the carriers have been placed in jeopardy had the Japanese dispatched a large flotilla of submarines and destroyers? The point is that it may not be worthwhile to employ capital ships even when command of the sea is at risk, as they could be lost without prospect of meaningful gain.

On the flip side, could distributed and possibly dispersed missile-centric forces perform the capital-ship function, at least the traditional one of seizing command of the sea against a similar force? We will explore this question more shortly, but it appears that distributed, missile-centric warfare obliges navies, the stronger as well as the weaker, to act as if they did not have command. Thus it is hard to see how the concept of command of the sea could be delinked from the function of the capital ship.

A POST-CAPITAL SHIP WORLD

What might happen in a future operational environment in which the seas, or at least the significant portions of them, become too dangerous for capital ships?²¹ To envision such a world, we must understand what strategic functions would be lost. To do that, in turn, we must first recognize that there has been a shift in the global geopolitical ecology, a shift that has been generated in part by the displacement of the dreadnought by the aircraft carrier and that, reciprocally, has transformed the function of the capital ship. Prior to 1945, the strategic function of the capital ship was to seize command of the sea by destroying the opposing fleet. After 1945, following Samuel Huntington's logic, the carrier's strategic function became projecting power ashore. When Huntington wrote, land-attack cruise missiles were barely embryonic; carrier-based tactical airpower was the principal weapon of the U.S. Navy, functioning either independently or in support of Marines or other land forces. The carrier's ability to take station in the near littoral (that is, close to shore) and function there as an airfield at sea was its key strategic capability.²² Over the years, Tomahawk cruise missiles have taken over much of tactical airpower's deep interdiction and raiding portfolio, but the airfield-at-sea function remains the carrier's irreplaceable core capability. This capability has made virtually the whole Eurasian littoral accessible by American power, in whatever form, hard or soft. Loss of the airfield-at-sea capability removes from the table certain forms of power projection in certain areas.

Command of the sea confers on its possessor, specifically the United States, three key strategic benefits: sanctuary for the nation's war economy, credible and useful contact with allies, and strategic options in terms of lines of operation. In addition to breaking, potentially, the sea links with allies, loss of the modern capital-ship function would narrow the range of strategic options available to the United States. This restriction would have implications and effects not just in war but for the dynamics of peacetime competition. Loss of American ability to intervene in certain areas in certain ways would provide potentially hostile actors freedom of action locally or regionally that they do not now enjoy. (What, for instance, would now be the situation in Iraq if carrier aircraft had not conducted interdiction strikes against Islamic State forces in 2014–15?) Such freedom of action would increase the chances that the current world order, turbulent as it is, would deteriorate even more, trending toward worsened anarchy, the rise of hostile regional hegemonies or trade blocs, or other geopolitical pathologies.

If the disputes spawned or exacerbated by this set of adverse trends were to erupt into war, especially one with a significant naval component, what would that war look like? Let us assume that the U.S. Navy, as well as virtually all others, will have recognized the shift in conditions and restructured accordingly, distributing offensive power among submarines, unmanned systems, and smaller surface combatants. The advantage would still lie with coastal powers that could build strong antiaccess/area-denial (A2/AD) systems, but the U.S. Navy would be more able and willing, owing to the higher risk tolerance of its new force structure, than it might be now to send forces into contested waters, and some A2/AD systems, such as the antiship ballistic missile, might become obsolete. While China, for example, might be more able than today to prevent the insertion and support of U.S. ground forces in-theater, the United States would be more able to prevent Chinese deployment of ground forces into Taiwan or elsewhere. The East Asian littoral could become a kind of naval no-man's-land, a zone in which only the most stealthy sea-denial forces would be able to operate. Similar situations might arise in the Persian Gulf and the eastern Mediterranean.

Would command of the sea have any meaning in those conditions? Certain traditional elements of command would indeed evaporate in some way. Navies—such as they would be—would operate dispersed not only tactically but also, perhaps, at the operational and strategic levels, depending on what an opponent did. Dispersal to avoid being found is an old tactic, but flotillas of smaller ships might need to be brought together if the enemy forces concentrated. (The German U-boat wolf-pack tactic was, in this sense, the logical response to Allied convoys.) But in this potential world, one could never be sure where the enemy might show up, especially one whose offensive power was contained on board submarines. Strategic dispersal as a benefit of command of the sea thus becomes

problematic: How does one know when one has command? More than likely, a prolonged and dispersed attrition fight would be required, during which the risks of moving ground forces by sea might be unacceptable. At what point would a supreme commander feel comfortable in dispatching an invasion force?

One possible tenet of future naval warfare (if it is not already true) would be that if a vessel or force can be found and identified, it can, and most likely will, be hit. On this basis the naval war becomes a fight for information superiority. In the 1942 carrier battles, finding first meant striking first, which tended to put a quick end to each battle, since offensive power was concentrated in a few carrier decks. In the future, victories would be tactical and incremental, because offensive power would be distributed and hidden. Information superiority would thus be episodic and require constant effort, the balance perhaps swinging daily. The oceans would thus become an arena for one big, long, sea-denial fight.

An aspect of command of the sea that would be problematic on both sides of the equation would be sea commerce. Whereas German U-boats and American submarines in World War II could prey on shipping with confidence that hitting what they were shooting at would hurt the enemy, today no such confidence is possible, because of the convoluted web of ownership of ships and cargoes. Moreover, oil changes hands on the spot market while it is at sea on tankers, and the container shipping system has assumed a hub-and-spoke structure in which the bulk of containers carry subcomponents for products.²³ All this means that in the current shipping regime seizing or sinking merchant vessels may hurt oneself and one's allies as easily as the enemy, regardless of the flag of a ship attacked. In fact, perhaps the only viable form of physical sea-commerce interdiction would be a close blockade based on a form of unrestricted submarine warfare or mining. However, whether or not commerce interdiction will be feasible in such a world, command of the sea would not be an issue either way. The old Mahanian prescription of driving the enemy's flag from the sea except as a fugitive appears to be increasingly irrelevant; ships of all types would either be fugitives or be left unmolested, whosever "side" they were on. It is possible to envision some kind of "limited" naval war in which each side hunts the other's naval units but by tacit mutual agreement allows commercial traffic to continue.²⁴

At this point it would appear that doing away with the capital ship does not simply break the link between the two concepts but invalidates the concept of command of the sea. But to penetrate to the most central issue, does asymmetry in strength continue to matter? If naval strength is a function of how much you can build and how well you can use it, logic says that a weaker party would seek to avoid a pitched fight at sea. Yet the dynamics of naval warfare in a non-capital ship environment may allow weaker powers to challenge the stronger in ways not possible when capital ships were dominant. Even in a capital-ship regime,

there are operational options for a weaker navy, including maintaining a fleet-in-being, raiding commerce, and mounting local denial and disruption operations. This last option might be expanded beyond the local context as missile ranges increase, nuclear submarines proliferate, and missiles, mines, and unmanned systems begin to be hidden on merchant vessels or sown from submarines or aircraft. Such a dynamic can really be only about disruption, but that might be enough—for both the weaker and stronger power. What would be gone is the freedom of action that command of the sea traditionally provided.

However, a complicating (or perhaps mitigating) factor in this scenario is the issue of sanctuary. None of the three operational options just mentioned for a weaker navy are viable without some sort of sanctuary, be it a secure base of operations (either defended or hidden) or covertness in deployment, approach, and attack. In the emerging naval warfare environment such sanctuary is increasingly problematic, especially secure basing. Submarines armed with land-attack cruise missiles or land-based ballistic missiles of sufficient range could neutralize or disrupt almost any naval base, not to mention logistics ships. Even underground submarine shelters are not immune.

Forces that are significantly weaker than their opponents frequently resort to the disruptive form of warfare, normally manifested on land as guerrilla warfare.²⁵ Three factors must exist if disruptive warfare (which is usually prolonged and cumulative) is to be viable: sanctuary, a sustainable tactical mechanism, and strategic resilience—that is, the ability to keep going despite losses and without clear evidence of progress toward victory. In the Battle of the Atlantic of World War II the German submarine force came close to achieving all three; the Allies finally tilted the balance of victory in their own favor by making the U-boat tactical mechanism unsustainable. They did so by adopting the convoy, forcing the U-boats to go to where the escorts were, and inflicting enough attrition to prevent the German navy from keeping enough boats at sea to generate the level of merchant sinkings needed to ruin the British war economy.

In the future, non-capital ship naval warfare might evolve to the point that both sides operate as if they were the weaker and both adopt disruptive warfare. The fight would be very much a distributed, tactical, cat-and-mouse game characterized by incremental attrition, one in which neither side has a clear idea of which way the balance is tilting. Of course, no such form of warfare would exist without a cyber dimension or, at least on the U.S. side, long-range bombers being brought into play. These latter elements would likely spawn, sooner or later, conventionally armed ballistic-missile salvos. Whether or when mushroom clouds would appear is not knowable, but this extended warfare dynamic might make their appearance more likely.

In fact, nuclear weapons represent yet another issue that could decisively affect the future naval warfare environment. Beyond their direct effects on a naval operation, the issue of whether a war at sea might precipitate an intercontinental nuclear exchange is increasingly relevant as nuclear weapons and long-range ballistic-missile technology proliferate. This is not the place for an in-depth analysis of the question, but we must at least consider whether a naval war devoid of capital ships, a war that is likely to be more prolonged and cumulative than in the past, would be more likely or less to be consummated without the use of nuclear weapons. War games at the Naval War College in Newport, Rhode Island, during the late 1970s and early 1980s indicated, contrary to the existing opinion of the time, that a conventional war with the Soviet Union, even with a robust naval component, would not necessarily escalate into a nuclear exchange.²⁶ At the time, the Soviet Union had little in the way of capital ships in its navy, but the U.S. Navy, of course, was flush with aircraft carriers, a number of which were lost in the games until the American players got savvy about using them. The only speculation that can be made at this point is that in a “new age” naval war (by definition, one between major powers) that dragged on for a considerable time—like, say, the Battle of the Atlantic—there would be more opportunity for escalation to occur, but it would not be a foregone conclusion.

What does appear to be the case is that in such a world the United States would have a much harder time even than it does now providing support and security for an ordered global system. Prevention of the emergence of a Eurasian hegemon might have to be based on a threat of bombardment, nuclear or conventional. Limited wars on the periphery would be more risky, especially if a competing naval power—a resurgent Russia, for example—objected. Commerce might continue, but if it did, systemic disorder or bloc building on the Eurasian or African continent might promote retrenchment of national business interests and produce a massive global economic downturn.

CHOICES

The vision that has been presented—one of increased global turbulence and perhaps prolonged and indecisive missile raids, commerce warfare, and slow-motion escalation—is not very encouraging, but it would seem to follow from the loss of the strategic airfield-at-sea function and the logic of distributed naval missile warfare. The thought experiment we have just conducted examines the edges of the envelope and does not presume to be predictive. Nonetheless, in a scenario like the one at which we have looked in which capital ships become obsolete, what options does the United States have?

Go “All In” to Keep the Capital-Ship Function Viable. To maintain the capital-ship function, the United States would invest as necessary to keep the CVN viable as a floating airfield. Directed-energy weapons, radio-frequency obscurants, better electronic warfare, and a host of other things might add up to an acceptable level of protection. Additionally, improvements to tactical aircraft survivability or a shift to unmanned aviation would be required. However, all will be an expensive proposition, even if it works, and could well curtail other programs and so mean a significantly smaller fleet. That might in turn require the Navy to change its forward-presence strategy, perhaps to something approaching a “surge” posture.

Create a “Bimodal” Fleet. Embedded in the development of the 2007 national maritime strategy was a bimodal fleet concept created by Captain Wayne Hughes, U.S. Navy (Ret.), of the Naval Postgraduate School, in Monterey, California.²⁷ In his vision the Navy, acknowledging the increasing threat to carriers, creates regional flotillas that conduct routine “presence” cruises and in war attempt to create safe operating space in the littoral into which the carriers can subsequently move. The carriers themselves, while they might still conduct peacetime presence and low-threat operations, in the event of war would seek refuge in the open ocean, perhaps providing distant support for regional flotillas, until enemy A2/AD capabilities had been sufficiently neutralized. The Navy might well have to reduce the number of carriers to afford this option, taking them off center stage as the key presence platform.

Preemptive Transformation. Here the Navy would either mothball its carriers or maintain only a few as support vessels, as was done with the *Iowa*-class battleships. Its key striking power would reside in large numbers of missiles housed in a wide variety of numerous platforms. The Navy would compensate for the loss of the airfield-at-sea function as best it could with unmanned systems and long-range land-based aircraft. Depending on budgets, the Navy might be able to support a larger fleet (in fact, that would be a necessary element of this option) and thus in some ways enhance its forward-presence posture. The risk would be that without mobile tactical airpower from the sea, that presence might not be as effective.

Debates on the future of the aircraft carrier tend to focus on technical and tactical issues and thereby to beg a number of important strategic questions. This article has attempted to connect some strategic dots: the capital-ship function, command of the sea, the littoral, and the world order. Doing so illuminates the true relevance of the aircraft carrier, creating a basis for devising and judging options in case the carrier becomes obsolescent. One set of options has been presented, but many more perspectives are possible. While carrier obsolescence

is not a foregone conclusion, it is clear that the geopolitical competitors of the United States are seeking ways to nullify the American capability to influence and intervene that the carrier confers. Understanding the linkages helps us refine and enhance the debate about what to do.

We cannot simply wish away the problem of potential obsolescence or argue by assertion. If emergent antiaccess/area-denial technology does not do the trick, escalating construction costs coupled with shrinking defense budgets might. We have to recognize that the aircraft carrier is not just another warship or defense program. It is the current capital ship and as such has an intimate relationship with the modern geopolitical terrain—we might even consider the CVN a geopolitical terrain feature in itself. It is intimately connected also with the world order that the United States has expended so much blood, effort, and taxpayer money to create and that has been so congenial to American values and interests. The various sides in the current debate, both “pro-carrier” and “con,” should take this factor into account.

NOTES

1. Announcement quoted in “Fox News Politics,” 31 July 2013, www.foxnews.com/.
2. In this article, “distributed” denotes the division of offensive power among a number of ships, whereas “dispersed” refers to physical separation of ships. Tactical dispersion involves either spreading out a mutually supporting formation over a large area or abandoning mutual support to enhance maneuver and the covertness of individual vessels. Dispersion at the strategic level involves splitting the fleet into a number of smaller formations that can be dispatched to different areas of the world.
3. Articles that address this issue include Cdr. Phillip E. Pournelle, USN, “The Rise of the Missile Carriers,” U.S. Naval Institute *Proceedings* (May 2013), and Capt. Henry J. Hendrix, USN, *At What Cost a Carrier?*, Disruptive Defense Papers (Washington, D.C.: Center for a New American Security, 11 March 2013). See also George Friedman and Meredith Friedman, *The Future of War: Power, Technology and American Dominance in the 21st Century* (New York: St. Martin’s / Griffin, 1998). The Friedmans develop the concept of weapon system “senility,” in which the cost of system defense becomes higher than the value of the system’s offensive mission capability (see esp. chap. 8, “The Aircraft Carrier as Midwife,” pp. 180–94).
4. See Robert C. Rubel, “Command of the Sea: An Old Concept Resurfaces in a New Form,” *Naval War College Review* 65 no. 4 (Autumn 2012), pp. 21–33.
5. See, for example, Capt. R. B. Watts, “The End of Sea Power,” U.S. Naval Institute *Proceedings* 135/9/1279 (September 2009), pp. 40–44.
6. George Modelski and William Thompson, *Seapower in Global Politics 1494–1993* (Seattle: Univ. of Washington Press, 1988), pp. 16–17.
7. Samuel P. Huntington, “National Policy and the Transoceanic Navy,” U.S. Naval Institute *Proceedings* 80, no. 5 (May 1954), pp. 490–91.
8. For an entertaining look at Soviet naval aviation and its approach to anticarrier warfare, see Maksim Y. Tokarev, “Kamikazes: The Soviet Legacy,” *Naval War College Review* 67, no. 1 (Winter 2014), pp. 61–84.
9. See Lyle J. Goldstein and Yuri M. Zhukov, “A Tale of Two Fleets: A Russian Perspective on the 1973 Naval Standoff in the Mediterranean,” *Naval War College Review* 57, no. 2 (Spring 2004), pp. 27–63.

10. This is the author's synthesis of the literature.
11. See Robert C. Rubel, "The Future of Aircraft Carriers," *Naval War College Review* 64, no. 4 (Autumn 2011), pp. 13–27. Aircraft carriers have performed a number of different roles and functions, that of an airfield at sea being one of them. Such a role is very different from that of a raider or of a traditional fleet-versus-fleet "capital ship," the part they played in the six carrier battles of World War II in the Pacific. Functioning as an airfield at sea, the carrier supports a land fight with continuous sorties and must accordingly stay within a relatively constrained area, where it can tolerate very little threat.
12. Rear Adm. Yedidia Ya'ari, Israel Navy, "The Littoral Arena," *Naval War College Review* 48, no. 2 (Spring 1995), pp. 7–21; repr. *Naval War College Review* 67, no. 3 (Summer 2014), quotes on pp. 82, 87 (repr.) [emphasis original].
13. Author's estimate, arrived at by adding openly available unit-cost information for the F-35C, F-18E/F/G, E-2D, and H-60.
14. There has been a debate since at least the 1970s on the relative merits of small and large aircraft carriers. Despite arguments by a number of different writers and analysts, the Navy has remained committed to the large nuclear carrier. It is beyond the scope of this article to incorporate the permutations that would have to be considered if a fleet of small carriers (perhaps of a vertical/short-takeoff-and-landing design) either replaced or augmented the current CVN fleet. However, for a taste of the debate, see Mark A. Randol and Wallace J. Thies, "The Opportunity Costs of Large-Deck Carriers: Naval Strategy for the 1990s and Beyond," *Naval War College Review* 43, no. 3 (Summer 1990), pp. 9–31.
15. Robert G. Angevine, "Hiding in Plain Sight: The U.S. Navy and Dispersed Operations under EMCON, 1956–1972," *Naval War College Review* 64, no. 2 (Spring 2011), pp. 79–95.
16. Adm. Sandy Woodward, with Patrick Robinson, *One Hundred Days: The Memoirs of the Falklands Battle Group Commander* (Annapolis, Md.: Naval Institute Press, 1997), p. 5.
17. Wayne Hughes, *Fleet Tactics: Theory and Practice* (Annapolis, Md.: Naval Institute Press, 1986), p. 25. To be clear, tactical offense is the actual use of a weapon against a ship. Tactical defense is the attempt to destroy or somehow evade the weapon. Tactical offense could be a method used in conjunction with operational-level defense.
18. At Midway, code breaking allowed U.S. forces to predict where the Japanese carriers would show up on the morning of 4 June 1942. This warning resulted in tactical sightings and a first strike by the American task force that disabled three of the four Japanese carriers. The remaining Japanese carrier, *Hiryu*, was able to launch a strike before being sunk; this strike succeeded in disabling the U.S. carrier *Yorktown*, which eventually fell prey to a Japanese submarine. It was the ability to achieve an effective first strike that determined the outcome of the battle.
19. Angevine, "Hiding in Plain Sight," pp. 83–84.
20. See Robert C. Rubel, "Deconstructing Nimitz's Principle of Calculated Risk," *Naval War College Review* 68, no. 1 (Winter 2015), pp. 31–45.
21. See Robert C. Rubel, "Talking about Sea Control," *Naval War College Review* 63, no. 4 (Autumn 2010), pp. 38–47.
22. "Close" is a variable term, depending on wind conditions, the range and load of aircraft, required response times, and a host of other factors. However, as a general rule of thumb, "close" would be something between fifty and a hundred miles from the beach.
23. Stephen M. Carmel, "Globalization, Security, and Economic Wellbeing" (address to the 20th International Seapower Symposium, Naval War College, Newport, R.I., 19 October 2011), available at www.maersklinelimited.com/. An adapted text appeared, under the same title, in *Naval War College Review* 66, no. 1 (Winter 2013), pp. 41–55.
24. Robert C. Rubel, *Navies and Economic Prosperity*, Corbett Centre Paper 11 (London: King's College London, October 2012), available at www.kcl.ac.uk/.
25. See Robert C. Rubel, "The Forms of Warfare: Integrating Ethos and Warfighting," in *Writing to Think: The Intellectual Journey of a Naval Career*, Newport Paper 41 (Newport, R.I.: Naval War College Press, 2014).

26. Bud Hay and Bob Gile, *Global War Game: The First Five Years*, Newport Paper 4 (Newport, R.I.: Naval War College Press, 1993), pp. 17–18.
27. Capt. Wayne P. Hughes, Jr., USN (Ret.), “A Bimodal Force for the National Maritime Strategy,” *Naval War College Review* 60, no. 2 (Spring 2007), pp. 29–47. The 2007 strategy is J. T. Conway, G. Roughead, and T. W. Allen, “A Cooperative Strategy for 21st Century Seapower,” 17 October 2007, available at www.navy.mil/; repr. *Naval War College Review* 61, no. 1 (Winter 2008), pp. 7–19.