THE U.S. NAVY'S LOSS OF COMMAND OF THE SEAS TO CHINA AND HOW TO REGAIN IT

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In 2005, a U.S. Navy plan was forwarded to Congress: It entailed reducing force structure and transforming to a capabilities-based forward force posture. However, the Navy continued to pursue unattainable force levels and, today, has lost command of the seas to China in the Western Pacific. China's pace of war is the speed of light through cyberspace, leaving U.S. forces blind and deaf, while America's is 30 knots, taking weeks to arrive at the fight. A fundamental shift in mindset needs to be made. The focus should no longer be on the number of hulls, but on a return to the plan for a capabilities-based, more forward force posture, primarily by commanding cyberspace in order to regain command of the seas.

"There is nothing more difficult to carry out, nor more doubtful of success ... than to initiate a new order of things. For the reformer has enemies ... and only lukewarm defenders."

–Machiavelli[1]

No country owns the "great commons" of the seas, but when America assumed international leadership after World War II, the U.S. Navy's primary *raison d'être* became command of those seas in support of U.S. global interests. Command of the seas meant that the Navy's mastery of the oceans would assure access almost anywhere for American sovereign power. This would enable the military guarantee of security, political, and economic interests whenever needed, while denying the seas to others when necessary. It would also secure America's greatest power: its power to convene — to bring like-minded nations of the world together for common causes that have served America's democratic ideals. When I arrived in the Arabian Sea as commander of an aircraft carrier battle group to begin its carrier strikes against Afghanistan, waiting there to become part of our American battle group was an international armada: Japan was alongside Germany, with nations from Canada to Australia crossing the Atlantic and Pacific. No one could challenge America's ability to bring together, in that distant sea, the power of those who shared America's values.

For the collective good of all nations, American command of the earth's oceans has also provided the bedrock for a globalized economy where 80 percent of the volume and 70 percent of the value of all trade transits safely on the sea.[2]

But the U.S. Navy has now lost its assured command of the seas — for the first time in the post-World War II era — to China in the Western Pacific. In his confirmation hearings for commander, U.S. Indo-Pacific Command in 2018, Adm. Philip Davidson stated, "China is now capable of controlling the South China Sea in all scenarios short of war with the United States." While China may allow the U.S. Navy (or any other navy) to have peacetime access to the South China Sea, Adm. Davidson made clear he can no longer assure such access to protect U.S. interests if a battle were to erupt since "there is no guarantee that the United States would win a future conflict with China."[3] When the U.S. Navy's presence in an area is at the

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1   Nicolo Machiavelli, *The Prince* (1532), trans. George Bull, 4th printing (London: Penguin Classics, 1995), ch. 6, 19.

2   "How Much Trade Transits the South China Sea," Center for Strategic and International Studies, accessed Sept. 28, 2020, https://chinapower.csis.org/much-trade-transits-south-china-sea/.

3   Adm. Philip Davidson, "Advance Policy Questions for Admiral Philip Davidson, USN Expected Nominee for Commander, U.S. Pacific Command," Senate Armed Services Committee, April 17, 2018, 18, 11, https://www.armed-services.senate.gov/imo/media/doc/Davidson_APQs_04-17-18.pdf.

sufferance of another power, America no longer commands the seas. David Ochmanek of the RAND Corporation, who participated in a series of war games against China, recently put things quite bluntly: Without command of the seas, the United States "gets its ass handed to it."[4] How — and why — did this happen?

How America Lost Command of the Seas

The "how" began in March 1996 as two U.S. carrier battle groups were ordered to sail toward Taiwan in response to China firing missiles in the waters surrounding the island. The Chinese missile exercises were intended to intimidate Taiwan's electorate not to move away from the "One-China" policy. I watched these events unfold from the National Security Council at the White House. Due in large part to American command of the seas, the 1996 Taiwan Strait crisis ended with China's humiliating acknowledgement that it lacked the ability to stop American forces from protecting Taiwan — or providing protection anywhere else in the "three seas" of the Western Pacific. While the United States prevailed in this crisis, China learned from it: The Chinese government realized that, largely due to the vast difference in distance that U.S. forces had to travel compared to Chinese forces, speed was everything if China were to seek to break America's command of the seas.

To help prevail in the battle for speed, China sought to exploit weapons systems that could delay the already-slow, 30-knot speed of U.S. warships crossing the Pacific. By making their submarines quieter and developing ballistic missiles that could target U.S. aircraft carriers from hundreds or thousands of miles away, the People's Liberation Army Navy sought to make sailing directly to waters near China too risky for U.S. forces, requiring them to stand off at great range until enough forces arrived so that together they could provide sufficient protection. But, as potent as these threats might be, the domination of cyberspace was even more important, since China's command of this new domain of warfare could instantaneously splinter U.S. battle networks and their data flow. This promised to provide a safe haven for Chinese forces while simultaneously denying a sanctuary to American ones. If high-tech U.S. Navy ships are like an advanced smart phone, the Chinese sought to

disable Wi-Fi and cellular networks so that the U.S. Navy can't call for help in the face of intruders or be informed about where they might be.

Slowing the Arrival of the U.S. Navy: Trading Time for Space

China's development of ballistic missiles, such as the DF-21 and DF-26, to target airbases and surface ships (especially aircraft carriers) at ever-longer range means that although U.S. advanced aircraft are peerless in their mission once airborne, they would have no place to land were conflict to break out. And China's constant upgrades in the quieting of diesel and nuclear attack submarines have meant that early warning detection could no longer be done by long-range, passive sonar. It would have to be done by close-in, active sonar instead. The physics of active sonar mean that, in most cases, submarines can only be detected using active sonar after they are already within their weapon-firing range. These threats keep most U.S. forces at a great distance until enough warships (and airlift) have arrived to provide a defensive sanctuary to allow U.S. forces to move forward.

As a result, the U.S. war plan is now to fight primarily from outside what is called the first island chain (of which Taiwan is a part): Long-distance strikes are to be launched as forces surge from the United States to begin "massing" in dispersed areas at a distance beyond the island chain. Aircraft are to head to a distribution of airfields as Marine Corps forces disembark to protect or seize contingency areas for emplacement of U.S. weaponry, with air and missile defenses being key. Eventually, having sustained some attrition, U.S. forces are to advance in a spread out, networked mass.

Operationally, this plan requires the United States to trade time for safe space by keeping its distance in order to build up enough force structure to provide a mobile sanctuary from which U.S. forces can then achieve the plan's objective, using the traditional domains of warfare.

What Is China Doing While the United States Is Building Up Its Forces?

While America takes time to build up this force structure — as it did for the 1991 and 2003 wars against Iraq — China plans to have already achieved its war objectives, unlike its inaction during the 1996 Taiwan Strait Crisis. The Chinese government

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4   Ryan Pickrell, "The US Has Been Getting 'Its Ass handed to It' in Simulated War Games Against Russia and China, Analysts Say," *Business Insider*, March 8, 2019, https://taskandpurpose.com/news/russia-china-war-games; "Panel Discussion: A New American Way of War," Center for a New American Security, March 7, 2019, https://www.cnas.org/events/panel-discussion-a-new-american-way-of-war.

intends to exploit this U.S. time trade-off by commanding the new, non-traditional domain of warfare: cyberspace. According to Ochmanek, in every war game against China, "The brain [data, computers] and the nervous system [battlefield networks] that connects all of these pieces [U.S. force structure] is suppressed, if not shattered."[5] With U.S. forces blind and deaf, the maritime domain becomes a safe haven for Chinese forces to quickly achieve their objectives. American units — each unable to take advantage of their disabled "Wi-Fi" or "cell signal" — fight alone (assuming that their onboard digital systems haven't also been compromised by China's cyber offensive) instead of as part of a networked, team-built sanctuary.

For China, the pace of war is the immediacy of cyberspace and ballistic missiles: the speed of light and Mach 12. For America, it is the speed at which force structure moves: 30 knots for ships and 450 knots for aircraft. The result is that U.S. forces cannot respond in time or, increasingly, even survive in order to prevent the *fait accompli* Adm. Davidson warned about: "Due to the distances involved in the Indo-Pacific, we cannot rely solely on surge forces from the Continental United States to deter Chinese aggression or prevent a *fait accompli*."[6] Continuing, the admiral advocated for a larger, forward-based force posture: "I believe current forward-stationed naval forces do not provide sufficient support to [Pacific Command] requirements." But he also stressed significant warfighting deficiencies in the capability of sensors, cyberspace, and undersea warfare, among others.[7]

Why Cyberspace Is Indispensable to Command of the Seas

The key to speed in contemporary warfare is the transformational capabilities of cyberspace, both offensive and defensive. The growth of sensor awareness is also crucial, especially for more rapid and assured gathering of data about the targets that must be located, tracked, and attacked. But because military operations in the traditional domains of warfare — air, land, and sea — are dependent on data networks in cyberspace, it has become the controlling domain in warfare. The capability to access, exploit, use, misuse, damage, render useless, or just gain information from within battle data networks and netted systems whenever needed is what actually allows for an immediate sanctuary for one's forces while denying it to an adversary. And because the pace of cyber warfare is measured in nanoseconds, its pervasive impact in war far outstrips that of forces that require weeks before being fully available under the timeline of U.S. war plans, making U.S. force structure less than effective.

The failure to command this new domain of cyber warfare could ultimately mean a lack of relevance for naval force structure, at least against a peer competitor. The time frame for changing this has become even more compressed because data requirements — including the ability to capture, filter, store, and analyze a vast amount of data — are increasing exponentially along with growing cyber vulnerabilities due to expanding data storage, networks, and analytical AI. For example, the announced plans to build U.S. unmanned warships demand vast amounts of both stored and netted data. It is the vulnerabilities in these huge and complex databases and network connections that have become China's primary target — not the platforms themselves. Such netted and data-driven aircraft and ships may, for example, unknowingly lose their weapons-control systems; or missiles, their flight paths; or ships, the connection to real-time data.[8]

This does not mean the U.S. Navy cannot have a global forward presence today to engage, reassure, persuade, and deter, or to respond rapidly to contingencies — at least outside the South China Sea. However, the credibility of this geostrategic presence is derived principally from the U.S. Navy's assurance it can command the seas if confronted in combat — something it cannot do in the Western Pacific. Over time, this could become true elsewhere in the world with regard to China, or other nations as they observe China's global approach. This is because the cyberspace domain is not exclusive to the military. It is now central to worldwide activities, and China's efforts to command it

5   Pickrell, "The US Has Been Getting"; and "Panel Discussion: A New American Way of War."

6   Davidson, "Advance Policy Questions," 8.

7   Davidson, "Advance Policy Questions," 11, 13.

8   Eric Heginbotham, et al., "The U.S.-China Military Scorecard: U.S. and Chinese Cyberwarfare Capabilities," Rand Corporation, 2015, 282–83, https://www.rand.org/pubs/research_reports/RR392.html; Michael E. O'Hanlon, "Forecasting Change in Military Technology, 2020-2040," The Brookings Institution, September 2018, 12–17, https://www.brookings.edu/research/forecasting-change-in-military-technology-2020-2040/; Mark Pomerleau, "3 Ways China's Military Could Use Cyber in War," *Fifth Domain*, Jan. 16, 2019, https://www.fifthdomain.com/dod/2019/01/16/3-ways-chinas-military-could-use-cyber-in-war/; Kyle Rempfer, "Report: Navy Is Under 'Cyber Siege,' National Secrets Leaking from the Hull," *Navy Times*, March 13, 2019, https://www.navytimes.com/news/your-military/2019/03/13/report-navy-is-under-cyber-siege-national-secrets-leaking-from-the-hull/; and Glenn S. Gerstell, "I Work for N.S.A. We Cannot Afford to Lose the Digital Revolution," *New York Times*, Sept. 10, 2019, https://www.nytimes.com/2019/09/10/opinion/nsa-privacy.html.

globally have immense implications for the U.S. Navy and the other services, as well as for the U.S. government and America as a nation.

China's Global Vision

The U.S. Navy's responsibility for global command of the seas was the result of the American-led effort after World War II to safeguard a new global order that made great-power war less likely. The United States and its allies built a rules-based world order founded upon the values of open and fair markets, representative and just governments, and individual and human rights. It was an order that embraced the world's collective good. Whether to confront Stalinism or world recessions, America convened the global community with the power of these ideals. It was by bringing together countries that shared these values in multilateral organizations and agreements that we all became safer, stronger, and more prosperous. The allied navies' command of the seas was a prerequisite for this global accord to provide for this security and for the safety of shared economies — as illustrated in their assemblage with my U.S. carrier battle group in the Arabian Sea during the war in Afghanistan. The U.S. Navy commanded the "great commons" in support of a U.S.-led world order.[9]

Today, however, China is removing barriers to its own emerging global order of Sino-centric institutions (and authoritarian values). And the means by which it is doing so have significant consequences for the Navy's ability to continue its mastery of the seas.

With an economy poised to surpass America's in a decade or more, China is imposing its values of "might makes right" through its expanding institutions.[10] Through China's worldwide Belt and Road Initiative — which offers predatory loans and infrastructure investments and has already attracted 70 nations and international organizations — cash-hungry countries throughout the world find themselves saddled with massive debt to China.[11] China then forces these countries to cede their sovereignty as if, as the prime minister of Malaysia has said, they are now Chinese colonies — all in support of China's emergent global interests.[12] For instance, unable to pay off massive debts to China, Djibouti gave China a port for its first overseas naval base. Cambodia gave China its second, and Sri Lanka gave it a 99-year lease on a major port. These add to a growing concern that the "string of pearls" China is constructing — 42 global ports from Vanuatu to Myanmar — are sites for future Chinese naval bases or way stations. In fact, the "road" of China's Belt and Road Initiative refers to its sea routes.[13]

> **Because of China's development of capabilities in a new domain that touches every walk of life — from critical infrastructure to the economy — the effectiveness of a U.S. fleet based primarily upon force structure seems diminished, if not altogether gone.**

Simultaneously, China is exploiting the international commons of cyberspace that impact U.S. global national security through its "Digital Silk Road," another component of its initiative. Because China now has a virtual monopoly on the manufacture of high-technology products — making 75 percent of the world's mobile phones and 90 percent of its personal computers, as well as providing most of the 300 foreign critical parts and materials the U.S. military relies upon — it uses this control of corporations' supply chains to its advantage. For example, data from Android phones with Chinese software are surreptitiously sent to China, and — according to a controversial report published by *Bloomberg Businessweek* — Chinese motherboards for worldwide servers from Apple and Amazon to

9   "The Economist at 175: Reinventing Liberalism for the 21st Century," *Economist*, Sept. 13, 2018, https://www.economist.com/essay/2018/09/13/the-economist-at-175.

10   Fergal O'Brien, "China to Overtake U.S. Economy by 2032 as Asian Might Builds," *Bloomberg*, Dec. 25, 2017, https://www.bloomberg.com/news/articles/2017-12-26/china-to-overtake-u-s-economy-by-2032-as-asian-might-builds; and William Schneider, Jr., "Why 5G Is a Big Deal for Militaries Throughout the World," *C4isrnet*, Feb. 5, 2019, https://www.c4isrnet.com/opinion/2019/02/05/why-5g-is-a-big-deal-for-militaries-throughout-the-world/.

11   "China's Belt-and-Road Plans Are to Be Welcomed—and Worried About," *Economist*, July 26, 2018, https://www.economist.com/leaders/2018/07/26/chinas-belt-and-road-plans-are-to-be-welcomed-and-worried-about; Susan Crawford, "China Will Likely Corner the 5G Market—and the US Has No Plan," *Wired*, Feb. 20, 2019, https://www.wired.com/story/china-will-likely-corner-5g-market-us-no-plan/; and Richard Javad Heydarian, "Malaysia's Bold Play Against China," *Washington Post*, Nov. 14, 2018, https://www.washingtonpost.com/news/theworldpost/wp/2018/11/14/malaysia/.

12   Heydarian, "Malaysia's Bold Play Against China."

13   "China's Belt-and-Road Plans Are to Be Welcomed"; Heydarian, "Malaysia's Bold Play Against China"; and Maria Adele Carrai, "China's Malleable Sovereignty Along the Belt and Road Initiative: The Case of the 99-Year Lease of Hambantota Port," *International Law and Politics*, July 29, 2019, 1068, https://nyujilp.org/wp-content/uploads/2019/09/NYI401.pdf.

the Defense Department (including Navy warships) and CIA drone operations were reportedly implanted with microchips to enable hacking.[14] Embedded firmware and malicious microchips nested onto computer hardware to provide stealth doorways into connected networks are but some of China's means to gain command of cyberspace.

Chinese corporations are also in the process of connecting a majority of the world's population to the transformational speed of the 5G network, or are contracted or bidding to do so.[15] This is arguably the greatest threat of all. It will revolutionize not only the world's economies, but also warfare, because 5G's almost instantaneous transmission and reception of tremendous amounts of data will allow things to be accomplished that cannot be done practically with today's technology. It effectively enables every mobile wireless device to perform even the most advanced computer capabilities, such as quantum computing, AI, and facial recognition. For economies, it will permit millions of self-driving cars to safely communicate among themselves, for doctors to do remote precision medicine, and for people to try on clothes virtually or remodel their homes as if they were actually there.[16]

When it comes to warfare, 5G will allow for the guidance of hypersonic missiles with speeds exceeding Mach 5 — five times the speed of sound — on variable trajectories. It will do this by ordering a change of direction in fractions of a second in order to avoid interceptor missiles after gathering and transmitting enormous amounts of data, instantly. At the same time, 5G will also permit the activation and guidance of U.S. missile defenses against such a hypersonic attack. 5G's processing speed will vastly increase lethality by greatly enhancing the capability of AI and machine learning to empower "swarms" of robotic attackers linked together, or killer drones capable of facial recognition or recognition of other characteristics, such as gait.[17]

Speed will be everything in future warfare. It is why the U.S. Defense Innovation Board said in a 2019 report that "5G's true potential will be in its impact on the battle network of the future," as it combines large numbers of smaller networks into a single one that is vastly improved in terms of situational awareness and decision-making.[18] At least $325 billion will be spent worldwide on 5G development and deployment by 2025, and nearly half of that will be spent by China globally. The Defense Science Board has acknowledged that this prohibitive cost underscores the practical reality that the military must use global 5G networks built by private companies for its operational requirements. However, no American company manufactures the key cell tower equipment through which all 5G wireless communications will pass — something that will have national security consequences.[19]

Whoever builds a 5G network owns it. This gives China's ownership of its 5G networks a police-state capability to surveil everything passing through them for commercial, intelligence, and military purposes. It might use these networks to observe virtual business meetings or to close down critical infrastructure or military communications during international tensions, perhaps prior to a conflict.[20]

14   Matt Stoller, "If the U.S. Doesn't Control Corporate Power, China Will," *Foreign Policy*, Oct. 11, 2018, https://foreignpolicy.com/2018/10/11/if-the-u-s-doesnt-control-corporate-power-china-will/; Jordan Robertson and Michael Riley, "The Big Hack: How China Used a Tiny Chip to Infiltrate U.S. Companies," *Bloomberg Businessweek,* Oct. 4, 2018, https://www.bloomberg.com/news/features/2018-10-04/the-big-hack-how-china-used-a-tiny-chip-to-infiltrate-america-s-top-companies; and Jason Koebler, Joseph Cox, and Lorenzo Franceschi-Bicchierai, "The Cybersecurity World Is Debating WTF Is Going on with Bloomberg's Chinese Microchip Stories," *Vice*, Oct. 9, 2018, https://www.vice.com/en/article/qv9npv/bloomberg-china-supermicro-apple-hack.

15   Emily Feng and Amy Cheng, "China's Tech Giant Huawei Spans Much of the Globe Despite U.S. Efforts to Ban It," *NPR*, Oct. 24, 2019, https://www.npr.org/2019/10/24/759902041/chinas-tech-giant-huawei-spans-much-of-the-globe-despite-u-s-efforts-to-ban-it; Michael Goodier, "The Definitive List of Where Every Country Stands on Huawei," *New Statesman*, July 29, 2020, https://tech.newstatesman.com/security/where-every-country-stands-huawei; Asya Likhtman, "Which Countries Have 5G," *The Week*, May 12, 2020, https://www.theweek.co.uk/106957/which-countries-have-5g; Katharina Buchholz, "Which Countries Have Banned Huawei?" Statista, Jan. 30, 2020, https://www.statista.com/chart/17528/countries-which-have-banned-huawei-products/; and "The State of 5G Deployments," Viavi Solutions, February 2020, https://www.viavisolutions.com/en-us/literature/state-5g-deployments-2020-poster-chart-en.pdf.

16   Schneider, Jr., "Why 5G Is a Big Deal"; Molly Wood, "The U.S. Government Doesn't Want 5G Tech that's Made in China," *Marketplace*, Nov. 30, 2018, https://www.marketplace.org/shows/marketplace-tech/us-government-doesnt-want-its-5g-tech-be-made-china/; and Jamie Carter, "How the 5G Network Could Benefit the Military," *techradar*, June 13, 2019, https://www.techradar.com/news/how-the-5g-network-could-benefit-the-military.

17   Manlio Dinucci, "The Hidden Military Use of 5G Technology," *teleSUR*, Dec. 21, 2029, https://www.telesurenglish.net/opinion/The-Hidden-Military-Use-of-5G-Technology-20191221-0006.html; Carter, "How the 5G Network Could Benefit the Military;" and John Pomfret, "A Deeper Tech Concern Is at the Core of the U.S.-Huawei Spat, *Washington Post,* Feb. 4, 2019, https://www.washingtonpost.com/opinions/2019/02/04/deeper-tech-concern-is-core-us-huawei-spat/.

18   Milo Medin and Gilman Louie, "The 5G Ecosystem: Risks & Opportunities for DoD," Defense Innovation Board, April 2019, 21, https://media.defense.gov/2019/Apr/03/2002109302/-1/-1/0/DIB_5G_STUDY_04.03.19.PDF.

19   Schneider, Jr., "Why 5G is a Big Deal"; Dinucci, "The Hidden Military Use of 5G Technology;" Wood, "The U.S. Government Doesn't Want 5G Tech"; "Defense Applications of 5G Network Technology," Defense Science Board Task Force, June 24, 2019, 5, https://dsb.cto.mil/reports/2010s/5G_Executive_Summary_2019.pdf.

20   Erica D. Borghard and Shawn W. Lonergan, "The Overlooked Military Implications of the 5G Debate," Council on Foreign Relations, April 25, 2019, https://www.cfr.org/blog/overlooked-military-implications-5g-debate; Wood, "The U.S. Government Doesn't Want 5G Tech"; and Pomfret, "A Deeper Tech Concern."

This is a concern the commander of U.S. Africa Command, Gen. Thomas Waldhauser, has expressed in response to the fact that Chinese corporations are largely set to build these telecommunications networks in Africa. Chinese companies could undermine the integrity of America's netted systems by intercepting or denying military communications, or impeding precision targeting, which leverages the use of signals intelligence from 5G networks.[21] Making matters worse, in the last few years China has laid or upgraded a quarter of the undersea fiber-optic cables connecting the world's continents, cables that carry more than 95 percent of all international communications traffic.[22] Data that is not gathered on wireless networks will pass into China's hands, thus ensuring that China has "eyes on" everything.

China's global geostrategic approach in recent years and how the country (mis)uses the public "commons" of cyberspace have made China this century's strategic challenge for the United States. When I was a National Security Council director for defense policy in the mid-1990s, the national security adviser once asked, "Where is our China strategy?" Unfortunately, today we are still in search of it.

These developments pose daunting challenges for U.S. global leadership as well as for the Navy, which is charged with maintaining that leadership through global command of the seas. China's transformative approach to future warfare should cause U.S. naval leadership to consider if it is creating a Potemkin village by measuring its command of the seas by the number of its ships. Because of China's development of capabilities in a new domain that touches every walk of life — from critical infrastructure to the economy — the effectiveness of a U.S. fleet based primarily upon force structure seems diminished, if not altogether gone.

Why We Lost Command of the Seas

Given China's advancements in cyberspace and the increasing ineffectiveness of a U.S. fleet based on force structure, why hasn't the U.S. Navy changed its warfighting posture? And, were it so inclined to make such changes, how might it be done today?

One chief of naval operations did propose a significant reduction in Navy force structure in order to transform to a capabilities-based force posture. He also proposed stationing more ships forward, primarily with a focus on an emerging China. It was precisely what Adm. Davidson would recommend a decade and a half later: address the capability shortfalls in cyberspace, sensor technology, and undersea warfare (among others) while maintaining more forces forward.

After I returned from commanding a battle group in the Afghanistan war in 2002, I was tasked with directly providing Chief of Naval Operations Adm. Vernon Clark alternative approaches to the Navy's strategic planning, budget, and procurement, instead of just continuing the programs of record, which were based on long-accepted norms about the numbers and types of ships, planes, and personnel needed to maintain the U.S. Navy's superiority. These assessments and plans were to be grounded in analyses of alternative assumptions, building upon the work that we had started after forming "Deep Blue" immediately after 9/11 to propose needed warfare changes to Adm. Clark.

With the admiral's guidance, the plans that our office developed challenged the ingrained assumption that numbers were the best measure of military capability and argued that an assured command of the seas was to be had by whoever best harnessed cyberspace and sensor technology in the future. This change in investment from "number of hulls" to "control of the commons of the cyberspace domain" would also free up funding that is vital for continued readiness of the fleet. Our assessment was based upon China being the strategic imperative for the United States in the 21st century.

Shifting to China as the Strategic Focus

The institutional pivot to China as a strategic and military challenge after the Cold War was slow for a number of reasons. One was because the country had never been a principal focus, as demonstrated by the thin gruel sent to the National Security Council outlining options for the possible defense of Taiwan during the 1995–1996 Taiwan Strait Crisis. I had personally encountered this lack of focus on China previously when Americans were first permitted to travel unescorted through just-opened regions of China in the early 1980s. There was no interest by naval intelligence in the photos I had taken of Chinese warships. (Compare this to a lengthy debriefing that naval intelligence conducted after I backpacked through Warsaw Pact countries in the mid-1980s.)

Another reason was that, for a period in the 1990s and beyond as we engaged China economically and politically, military leaders were not permitted to

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21   Borghard and Longergan, "The Overlooked Military Implications of the 5G Debate."

22   Jeremy Page, Kate O'Keeffe, and Rob Taylor, "America's Undersea Battle with China for Control of the Global Internet Grid, *Wall Street Journal*, March 12, 2019, https://www.wsj.com/articles/u-s-takes-on-chinas-huawei-in-undersea-battle-over-the-global-internet-grid-11552407466.

discuss China in the context of combat scenarios. Even war-gaming with China as an adversary was restricted. When I presented on the challenge China posed for the U.S. Navy at an all-flag officer conference, the then-commander in chief of U.S. Pacific Command informed me several times, "you're wrong." Meanwhile, the transformation of China's national defense under Deng Xiaoping's "Four Modernizations" was continuing.

As a result of the institutional inertia not to focus upon China, America did not get much of a "leg up" on what was to become the new "great commons" — cyberspace. A few months after the Afghanistan war began in 2001, I was part of a small group that went there and to several other countries nearby. Our task was to gather insights and lessons learned from conducting this new war on terror and provide recommendations directly to the secretary of defense. Before departing, we met with, among others, the director of the National Security Agency. Asking to see the U.S. cyber efforts regarding China, I was surprised by their embryonic, almost rudimentary nature.

Adm. Clark was one of the first senior officers who stated openly that China was a growing threat: "It is fair to say that it is really impressive to see what China is doing... . We must very clearly be able to defeat potential conventional or traditional threats ... in the maritime domain." Having delivered and maintained a ready fleet for the "Global War on Terror," it was now clear what nation the chief of naval operations had had in mind when he announced, a year and a half after the war on terror began, "It is time to turn my full focus on the issue of future readiness."[23]

Assuring Command of the Seas Through Command of Cyberspace

Adm. Clark's solution for ensuring America's future command of the seas was the same as that of today's commander of U.S. Indo-Pacific Command: increase the speed of response of U.S. forces by posturing more forces forward and relying on the emerging transformational capabilities that cyber and sensor technologies presage for off-board undersea warfare.[24]

In 2004, I was appointed as director of warfare requirements and programs to implement the alternative approaches to the Navy's strategic planning, budget, and procurement that had been developed in my previous office for Adm. Clark. A number of these approaches proved unnerving to the military-industrial-congressional complex, particularly additional analyses that supported the chief of naval operations' shipbuilding plan for Fiscal Year 2006. In forwarding it to Congress, Adm. Clark proposed reducing ship-level goals from 375 to as low as 243 — so long as there were an extensive adaptation of emerging technologies, forward basing, and innovative manning concepts.[25]

The decision to make this shift was undergirded by wargaming assessments and analyses with regard to China, which included other organizations' work in areas such as cyberspace. Although less robust than today's wargaming models, they forecast a future analogous to today's wargaming results — one that shows the United States "get[ting] its ass handed to it." The message was clear: Whoever controlled the commons of cyberspace would have command of the sea and air with a swiftness that made "knots" look like a snail's pace.

To tackle the issue of ship speed, Adm. Clark proposed basing an aircraft carrier battle group in Guam, close to Asia. It took approximately five rotating ships to keep just one ship constantly forward in the Western Pacific. This number varied somewhat by category of ship due to a number of factors: how long a ship type is out-of-service due to depot-level maintenance (especially if nuclear work is being done); the amount of time a ship's crew is deployed overseas (the goal is six months but sometimes deployments last up to nine); where a ship is deployed to (the transit to and from the Persian Gulf, for example, shaves off nearly three months of a ship's six-month deployment time, requiring more ships in the rotation); and the goal of having 18 to 24 months between deployments for ship maintenance and crew training. These factors are why the Navy's force level has historically been based upon maintaining a rotational forward presence — not warfighting.[26]

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23   Adm. Vernon Clark, "Building a 21st-Century Navy," Interview with *Naval Forces Magazine*, no. 1, 2005; Adm. Vernon Clark, "SEAPOWER 21: Operational Concepts for a New Era," Remarks at Current Strategy Forum, Naval War College, June 12, 2002.

24   "An Interim Report to Congress on Annual Long-Range Plan for the Construction of Naval Vessels for FY2006," Report Delivered to the House and Senate Armed Services Committees, March 23, 2005. Also see, "Potential Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress," Congressional Research Service, updated June 23, 2005, https://www.everycrsreport.com/files/20050623_RL32665_04cc73f3866c-35deb08cc57866b6d13f03078f0e.pdf, 3–6; Scott C. Truver, "The U.S. Navy in Review," *Proceedings*, no. 131 (May 2005), https://www.usni.org/magazines/proceedings/2005/may/us-navy-review.

25   See, "Statement of Admiral Vernon Clark, USN, Chief of Naval Operations," Testimony Before the Senate Armed Services Committee, Feb. 10, 2005, 17–19, as quoted in "Potential Navy Force Structure and Shipbuilding Plans"; and "Annual Long-Range Plan."

26   "Annual Long-Range Plan"; and "Military Bases: Analysis of DOD's 2005 Selection Process and Recommendations for Base Closures and Realignments," U.S. Government Accounting Office, Report to Congressional Committees, July 2005, 100, https://www.gao.gov/new.items/d05785.pdf.

Because of these challenging ship rotation requirements, the chief of naval operations conducted (successful) trials that instead rotated the crews on forward-deployed ships, permitting one vessel to stay on station for several years — what Adm. Clark called "sea swap" — thereby reducing the number of ships needed for peacetime rotation purposes without affecting warfighting requirements.[27]

The key to this new approach was realizing the extent to which emerging cyber technologies and other enhanced capabilities undermined old assumptions about how many and what types of ships would be

revealed (through post-deployment analyses by high-capacity computers) that there had been quiet, modern Chinese submarines close by that had gone undetected. Meanwhile, certain off-platform sensor technologies were being developed to locate objects in the water as though the water were translucent and, perhaps, eventually transparent, offering a low-cost alternative to building a $3 billion submarine for certain missions in a geographically wide, fast-paced conflict.[29]

This vision of the future caused Adm. Clark to make clear that

However, throughout the years, no one has challenged the long-accepted assumption upon which the Navy has based its command of the seas — that numbers win. This changed with Adm. Clark's congressional testimony in 2005.

[i]n a sensor-rich construct, the number of platforms are no longer a meaningful measure of combat capability ... [and] the number of ships is no longer adequate to gauge the health or combat capability of the Navy. The capabilities posture of the Fleet is what is most important.[30]

needed. In some cases, increased precision-targeting capabilities could mean that U.S. forces need fewer of a certain type of platform. For example, by 2010, an aircraft carrier was capable of striking five times the targets within 24 hours than it could a decade earlier by using smaller, precision-guided munitions and ever-more accurate, real-time targeting. That number would double again in the next decade, impacting assumptions about how many aircraft carriers are required.[28]

In other cases, diminished sensor capability could decrease the utility, and therefore the required number of hulls, of a different type of platform, perhaps being replaced by a new capability. For instance, submarines at the time were returning from deployments with sonar tapes that

The chief of naval operations also knew he faced a Hobson's choice as "the current low rate of ship construction and the resultant escalation of platform cost will [of itself] constrain the future size of the Fleet."[31] Also competing with ship procurement were manpower costs that were over half the Navy's budget, rising 5 percent a year, while maintenance costs were growing 15 percent annually above what had been planned for.[32]

A concern was that these spiraling expenditures in maintenance and personnel would consume much of the savings that resulted from decreased force structure procurement rather then be used both for transforming to future capabilities and more effectively maintaining fleet readiness. Adm. Clark had already been focusing on improving man-

27   "Annual Long-Range Plan"; and Truver, "The U.S. Navy in Review."

28   "Statement of Admiral Vernon Clark, USN, Chief of Naval Operations," Testimony Before the Senate Armed Services Committee, 5, (accessed on www.navy.mil March 13, 2020).

29   William J. Broad, "U.S. Loses Hold on Submarine-Exposing Radar Technique," *New York Times*, May 11, 1999, https://www.nytimes.com/1999/05/11/world/us-loses-hold-on-submarine-exposing-radar-technique.html; Bret Stephens, "The U.S. Military: Like the French at Agincourt?" *New York Times*, April 25, 2019, https://www.nytimes.com/2019/04/25/opinion/us-military.html; and O'Hanlon, "Forecasting Change," 11.

30   "Statement of Admiral Vernon Clark" as quoted in "Potential Navy Force Structure and Shipbuilding Plans, 4."

31   "Statement of Admiral Vernon Clark" as quoted in "Potential Navy Force Structure and Shipbuilding Plans, 4"; and Clark, "Building a 21st-Century Navy."

32   A.T. Church, "FY 2003 Budget Overview," Office of the Assistant Secretary of the Navy, Feb. 1, 2002, https://www.secnav.navy.mil/fmc/fmb/Documents/03pres/highbook/03press_brief.pdf; "Recruiting, Retention, and Future Levels of Military Personnel," Congressional Budget Office, Oct. 1, 2006, https://www.cbo.gov/publication/18187; Veronique de Rugy, "Personnel Costs May Overwhelm Department of Defense Budget," Mercatus Center, George Mason University, Feb. 4, 2014, https://www.mercatus.org/publications/government-spending/personnel-costs-may-overwhelm-department-defense-budget; Todd Harrison, "Chaos and Uncertainty: The FY2014 Defense Budget and Beyond," Center for Strategic and Budgetary Assessments, October 2013, 18–20, https://csbaonline.org/uploads/documents/Analysis-of-the-FY-2014-Defense-Budget.pdf; and Bradley Martin, et al., "A Strategic Assessment of the Future of U.S. Navy Ship Maintenance: Challenges and Opportunities," RAND Corporation, 2017, 6–7, https://www.rand.org/content/dam/rand/pubs/research_reports/RR1900/RR1951/RAND_RR1951.pdf.

agerial planning and oversight "to eliminate unnecessary costs, and increase efficiency and effectiveness" in order to maintain readiness under tight budgets.[33] With regard to planning, for example, the original cost estimates given to Congress for the lead ship of both the new Gerald R. Ford-class aircraft carrier and the Virginia-class submarine programs had internal (i.e., not reported to Congress) "confidence factors" of 33 percent — a one-third chance they were accurate. With regard to managerial oversight, every U.S. agency has a U.S. Treasury "bank account" that represents appropriated funds that can be spent. For years, the Navy has been unable to ascertain if $22 billion that is in its "bank account" has, or has not, been used. Adm. Clark therefore re-emphasized his efforts to resolve inefficient planning and managerial oversight in maintenance, personnel, and procurement. Through these savings as well as savings from reduced force-structure procurement, he had the resources to transform to new capabilities.[34]

For decades, Navy leadership has had unrealizable force goals: 375 in the past, 355 currently, and more recently 500 ships, according to former Secretary of Defense Mark Esper. However, throughout the years, no one has challenged the long-accepted assumption upon which the Navy has based its command of the seas — that numbers win. This changed with Adm. Clark's congressional testimony in 2005:

> I don't believe that it's all about numbers; numbers have a quality all their own, there's no question about that. But, it is more important that we buy the right kinds of capabilities in the ships that we are procuring in the future, and that we properly posture our force to provide the speed and quality for seizing and retaining the initiative in any fight.[35]

Along with his testimony, the chief of naval operations submitted the Navy's annual shipbuilding plan, departing from the traditional goal of 375 ships. By a "transformation from a threat-based, platform-centric structure to a capabilities-based, fully integrated force" that "fully leverages technological advances with maximum use of sea swap [and forward basing]," force levels could be as low as 243 ships. If there were a "less extensive" transformation effort by the three warfare communities (air, surface, and submarine), the number would range from 260 to 325 ships.[36]

For a Navy that had measured and justified its combat value and forward presence since World War II on the size of its force structure, this change to having its warfare value measured in force capabilities and posture was immense. The obvious implications triggered intense opposition. After more than half a century, the understandably ingrained, almost dogmatic adherence to the value of numbers calls to mind Machiavelli's wise caution that "the reformer has enemies — and only lukewarm supporters."[37]

Nevertheless, legitimate concerns did need to be addressed, beginning with how the Navy could maintain its global forward presence with significantly fewer ships, particularly with the simultaneous increase of vessels in the Western Pacific. Instead of needing approximately 30 ships to maintain a carrier and five surface ships rotationally forward deployed in the Western Pacific, basing them in Guam (joining the submarine force already there) would mean not having to procure and maintain a higher force structure to achieve such a presence and would thus represent a significant savings. Similarly, the four destroyers homeported in Spain provide for a greater constant Mediterranean presence, even today.

For six years, the Navy conducted Adm. Clark's sea swap experiment with ships and their rotating crews in the Western Pacific, Indian Ocean, and Persian Gulf. The results were an increase in overall savings for the same or greater presence; a reduction in rotational ship requirements; and a material condition not substantially different than

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33   Kevin Eyer, "What Happened to Our Surface Forces," *Proceedings*, no. 144 (January 2018), https://www.usni.org/magazines/proceedings/2018/january/what-happened-our-surface-forces.

34   "Defense Acquisitions: Assessment of Selected Weapons Programs," U.S. Government Accountability Office, Report to Congressional Committees, March 2010, https://www.gao.gov/assets/310/302379.pdf; "Resource Implications of the Navy's Fiscal Year 2009 Shipbuilding Plan," Congressional Budget Office, June 9, 2008, https://www.cbo.gov/publication/41703; "Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress," Congressional Research Service, Sept. 22, 2015; "Defense Acquisitions: Improved Management Practices Could Help Minimize Cost Growth in Navy Shipbuilding Programs," U.S. Government Accountability Office, Report to the Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives, February 2005, https://www.gao.gov/assets/250/245497.pdf; "DoD Financial Management: Ongoing Challenges with Reconciling Navy and Marine Corps Fund Balance with Treasury," U.S. Government Accountability Office, December 2011, https://apps.dtic.mil/dtic/tr/fulltext/u2/a553686.pdf.

35   "Statement of Admiral Vernon Clark" as quoted in "Potential Navy Force Structure and Shipbuilding Plans, 4."

36   The 260 to 325 number of hulls included 10 aircraft carriers, 41 nuclear SSNs/SSGNs, 130 surface combatants, and 17 amphibious ships. "Statement of Admiral Vernon Clark" as quoted in "Potential Navy Force Structure and Shipbuilding Plans, 5"; and "Annual Long-Range Plan."

37   Machiavelli, *The Prince*, 19.

for rotational ships.[38] Thus, with proper oversight, forward presence requirements could be readily met by a combination of sea swap and forward basing, and with a significant reduction in the overall number of ships.[39]

The Challenge of the Military-Industrial-Congressional Complex

Nevertheless, obstacles of varying degrees prevailed, not only within the Navy's three major warfare communities but from the shipbuilding and ship maintenance industry and Congress as well. Understanding the political side of this iron triangle is necessary because, at its heart, loss of command of the seas is a national matter. The question that needs to be answered is: "Does America believe it is in its interest for the U.S. Navy to no longer have command of the seas?"

As a U.S. congressman, having experienced the myriad considerations that weigh upon lawmakers in their efforts to craft a breadth of policies, many outside their individual expertise, I saw why the legislative branch often responds to crises rather than attempts to shape the future, including the nation's security. There are also parochial considerations that impede significant change.

For example, I briefed members of Congress in 2005 on the analysis of the chief of naval operation's shipbuilding plan before it was submitted to Capitol Hill. The results were not unexpected: Two senators from one of the submarine-shipbuilding states were gracious in listening to the plan to reduce the Navy's nuclear attack submarine number from 53 to 37. News articles the next day, however, were less tactful. The next year, as I campaigned for Congress, one of those senators said, with a kind smile, that he remembered the effort "to cut my submarine fleet." When I later took my seat on the House Armed Services Committee and asked another representative why she had chosen to be there, her answer was, "To protect my depot." They were both terrific public servants. But considered together, they explain why some assert that, until the last draft of his farewell speech, President Dwight Eisenhower warned of "unwarranted influence ... by the military-indus-

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38   "Crew Rotation in the Navy: The Long-Term Effect on Forward Presence," Congressional Budget Office, October 2007, 8, https://www.cbo.gov/sites/default/files/110th-congress-2007-2008/reports/10-31-navy.pdf; and Jino Choi, Donald Birchler, and Christopher Duquette, "Cost Implications of Sea Swap," Center for Naval Analyses, November 2005, 2, https://www.cna.org/CNA_files/PDF/D0013018.A2.pdf.

39   *Summary of the 2018 National Defense Strategy of the United States of America*, Department of Defense, 2018, 6, https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf.

trial-*congressional* complex."[40]

I came to appreciate these political realities and their potential consequences for congressional members — particularly when thousands of skilled jobs or a company's revenue may be at stake. A congressional hearing on submarine force structure convened shortly after I left the Navy illustrates how daunting change can be due to this understandable dynamic within the military-industrial-congressional complex (and the White House). Gathered with the congressmen and congresswomen were the presidents of the submarine construction corporations as well as active and retired admirals, who were there to answer questions about how many submarines the Navy required. One admiral summarized their view: "My comment to Admiral Joe Sestak, who gave that brief [recommending reducing the Navy's submarines to 37] ... [was]: 'This study is underwhelming.'" He continued: "2020 capabilities: Show me. They don't exist. Distributed network systems ... they are not there."[41] He was right then — those capabilities didn't exist at the time. But they very much do exist now, in 2020, and that is part of today's dilemma.

The Importance of the Navy's Three Major Warfare Communities

That congressional hearing also highlighted the impact that each of the Navy's three warfare communities has on one another's readiness. Each community is understandably intent upon balancing its own force structure goals within limited funding that also has to maintain the readiness of the entire fleet. Therefore, to succeed, a Navy-wide change must have the support of all three communities. The effort in the early 2000s to transition away from a force-structure model was doomed without it. The ramifications this has had on the Navy's operational readiness today are significant, and their lessons are crucial for any future transformation to a capabilities-based model.

In 2010, an assessment of the surface community's ships (known as the *Balisle Report*) was completed. It concluded that over the years "the effort to derive efficiencies" had directly contributed to the decline in surface ship readiness. The community embraced its judgment that the effort to reduce costs "has overtaken our culture of effectiveness."[42] Almost half of the report's 36 essential recommendations were, therefore, for increased funding in maintenance and manpower readiness.

A series of surface ship collisions and a grounding in the Western Pacific seven years later led another assessment, the *Comprehensive Review*, to similarly conclude that "funding shortfalls in ... readiness Navy-wide" had contributed to the deficit of "ready and certified ships ... in the Western Pacific."[43] It argued that the *Balisle Report*'s funding recommendations had fallen short since they "still had to be done in balance with modernization and force structure requirements."[44] The review included an evaluation of the results and impact from the funding recommendations. A detailed examination showed only one of these recommendations received the necessary or sustained increase in funding that resulted in a marked impact. The recommendations that required essentially no additional funding were, on the whole, achieved.[45]

As the *Comprehensive Review* noted, the *Balisle Report*'s funding recommendations ran afoul of the same dire fiscal reality that Adm. Clark foresaw for future Navy leaders if force-structure goals continued to determine warfighting readiness: mounting increases in maintenance and manpower costs locked in a winless competition with the escalating price of procurement. Since its recommendations addressed the symptoms — not the overarching cause — of the readiness problem, the report's monetary "fixes" became part of an endless tail-chase.

But if the funds that were "saved" through planning and oversight efficiencies in maintenance and personnel were unable to be restored, where had these savings gone? Answering this question is important since Adm. Clark's plan had been to use a

40   Barbara Maranzani, "Dwight Eisenhower's Shocking — and Prescient — Military Warning," updated Aug. 22, 2018, https://www.history.com/news/dwight-eisenhowers-shocking-and-prescient-military-warning. Emphasis added.

41   "U.S. Navy's Future Submarine Force Structure," Hearing Before the Projection Forces Subcommittee of the House Armed Services Committee, 109th Congress, March 28, 2006, 33, 34, https://catalog.hathitrust.org/Record/005295649/Home.

42   *Fleet Review Panel of Surface Force Readiness* (*Balisle Report*), Feb. 26, 2010, 7, http://www.sailorbob.com/files/foia/FRP of Surface Force Readiness (Balisle Report).pdf.

43   "Comprehensive Review of Recent Surface Force Incidents," U.S. Fleet Forces Command, Oct. 26, 2017, 9, https://news.usni.org/2017/11/02/document-navy-comprehensive-review-surface-forces.

44   "Comprehensive Review," 10

45   "Comprehensive Review," Appendix 9.7, 131; Martin et al., "A Strategic Assessment"; Robert W. Button, et al., "Assessment of Surface Ship Maintenance Requirements," Rand Corporation, 2015, https://www.rand.org/pubs/research_reports/RR1155.html; Erin Duffin, "Budget of the U.S. Navy and U.S. Marine Corps from Fiscal Year 2001-2021," Statista, March 9, 2020, https://www.statista.com/statistics/239290/budget-of-the-us-navy-and-the-us-marine-corps/; "Military Readiness: DOD's Readiness Rebuilding Efforts May Be at Risk Without a Comprehensive Plan," U.S. Government Accounting Office, September 2016, https://www.gao.gov/products/GAO-16-841; and *Balisle Report*.

portion of these savings to fund new initiatives that lowered the risk to ship readiness by greater "efficiency and effectiveness" in maintaining it. Take the "optimum manning" initiative that the *Balisle Report* called "[t]he most significant change introduced to the surface force." This initiative reduced manning on ships to increase savings in order to allow sailors to arrive onboard more highly trained — but that funding never materialized. Nor did part of the savings end up with shore activities, as they were meant to, so these shore-side repair depots could absorb a significant amount of the shipboard maintenance workload. Where, then, did these monies go that were to prevent risk to surface readiness?[46] Evidently, they were swallowed up by the other two major communities within the Navy.

After arriving from sea for my first tour in the Pentagon, a Navy officer told me the story of the Air Force general who once said, "After the Navy, the Soviet Union is our number two enemy." Although apocryphal, this underscores the harsh political reality of budgets, even within the Navy: Each community is fighting for the best, and highest number, of warfare platforms to ensure its sailors sail safely when in harm's way.

Moreover, there is an added peculiarity to Navy programming that the three communities apparently accept. A U.S. Naval Institute *Proceedings* article notes, "For decades the surface force has played an indispensable role as a sort of 'balancer' among the three major warfare communities" by "accept[ing] that the exactitude required for submarines and aircraft can be balanced on the inexactitude that is evidently acceptable for ships."[47]

The *Proceedings* article's account of the different extents to which the air and submarine communities implemented Adm. Clark's effort, as compared to the surface force, helps illustrate the ramifications on operational readiness when change is not supported Navy-wide. The surface leadership "fully embraced the [chief of naval operation's] vision, and with an unvarnished passion" while "the other communities advocated for efficiencies [only] in line with their community cultures."[48] The consequence of the surface community's ability to find efficiencies — in contrast to other warfare communities — was that these fungible savings were apparently leveraged to "balance" the increasing maintenance and manpower costs required by the "exactitude" of the air and submarine forces' readiness.

Over time, however, any "balance" provided to maintain the readiness of the two other warfare communities by savings in the surface community proved ephemeral to their own "cultures" of maintaining force-structure levels. A complementary *Strategic Readiness Review* following the four surface ship mishaps in the Western Pacific noted that half of the inventory of F/A-18C/D Hornet aircraft (about 300) were awaiting repair, and that the maintenance backlog of nuclear-powered attack submarines added up to 15 lost submarine-years.[49] Like a self-licking ice cream cone, the perpetuation of the force-structure mindset had lost its purpose of ensuring the Navy's warfare readiness.

It mattered greatly how all three warfare communities — not just one — executed Adm. Clark's strategic guidance for how to increase efficiency and therefore increase the effectiveness and readiness of the Navy with the savings. Each community necessarily affected the operational readiness of the other two within a budget that had limited resources. In addition, absent the commitment of all three warfare communities to transforming from a force-structure posture to a force posture that is capabilities-based and more forward, no readiness review that focused on the platforms of just one of these communities would be able to assess if the U.S. Navy was losing command of the seas — and if so, why.

If the Navy does respond to its loss of command of the seas by transforming to a capabilities-based force posture, it will need to do three things to reduce risk during this transition. The first is to use the savings from procuring fewer hulls to help support the readiness of all three warfare communities. The second is to ensure the savings also flow into the new, non-traditional cyberspace domain, including hiring personnel with the expertise and skills to conduct both offensive and defensive cyber warfare, including support from the joint force. Finally, the Navy will also need to conduct readiness assessments that focus on the combined capabilities of all three communities (and with the joint force). If it instead focuses upon the force structure, it will fail to adequately assess the Navy's warfighting readiness.

It took Adm. Davidson, a unified commander — the joint military officer who commands the components of all military services within a defined area of responsibility — to make clear that it was both

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46   *Balisle Report*, 4, 11–13, 25–26, 28.

47   Eyer, "What Happened to Our Surface Forces."

48   Eyer, "What Happened to Our Surface Forces."

49   Michael Beyer and Gary Roughead, "Strategic Readiness Review," Department of the Navy, Dec. 3, 2017, 54, https://news.usni.org/2017/12/14/secnav_readiness_review.

the un-readiness of the force's positioning posture and a significant funding shortfall in advanced capabilities that made U.S. command of the seas questionable, at best. When the admiral advocated for a larger force posture that was forward-based (and rotational) and for addressing significant deficiencies in cyber and sensor technologies and undersea warfare (among others), he noted it was to counter "particularly a resurgent China."[50] Nevertheless, two years later, the Western Pacific force posture remains essentially the same.

For those waiting for sustained, unconstrained legislative funding that would not force a tradeoff between Navy force structure and readiness, it has been much like the play *Waiting for Godot*. The same will be true for those waiting on the recently announced 500-ship Navy. That said, the service must also recognize that its own actions sometimes underwrite this tradeoff in the pursuit of an illusory force structure. For instance, when relatively unconstrained emergency war funding did give the Navy a "leg up" on readiness, force structure was still centrally cast. Reviewing contingency and War on Terror appropriations for the wars in Iraq and Afghanistan that were sent to Congress, I questioned why anti-submarine helicopters and the future Joint Strike Fighter aircraft were included. Why not additional readiness funding for manning, training, and equipping ships *before* their deployment for the wars, as was permitted?[51]

Given the wars in Iraq and Afghanistan, the COVID-19 pandemic, and other urgent policy demands such as climate change — all of which require an accounting with America's relentless national debt — it may be fiscally prudent to take another lesson from the earlier effort to maintain the U.S. Navy's *raison d'être*: command of the seas. After the two readiness reviews of 2010 and 2017 both cited "a culture of efficiency" — to find savings for the needed transformation — as detrimental to effectiveness, few naval officers will be eager to make an effort to ensure the best return for the nation's fiscal treasure with which they are entrusted. This misperception that the naval service should not be accountable for more efficiently managing limited resources must change or we will continue to waste valuable resources.

In the decade since the *Balisle Report*, the admiral for the Navy's maintenance centers admitted that metrics "did not exist" for knowing "where

the inefficiencies are" in shore-side maintenance.[52] Subsequently, the Government Accountability Office stated that "shipyards have not completed the majority of required maintenance on time" and that "the Navy has not set specific benchmarks ... to evaluate the effectiveness of readiness recovery efforts," while the RAND Corporation cited a "routine mismatch between plan and execution" of maintenance.[53] These statements highlight significant opportunities for saving funds from efficient planning and oversight so that the savings could be used to enhance readiness or be redirected to newer capabilities. This failure to ensure accountability for efficient management of limited funds will only hinder the Navy's efforts to command the seas once again.

How We Regain Command of the Seas

The commitment of those who have re-affirmed the Navy's 355-ship force-structure goal is understandable. It is the prime metric the Navy has used for decades to justify what it credibly needs both to win in a conflict and to provide a global presence to engage and respond around the world. Less credible is the belief that this elusive goal will ever be funded. But regardless of whether 355 ships — or more — are funded, such a force structure is not what will win a war against China.

Even if Godot were to show up, the "coin" of maritime warfare is no longer the number of ships the Navy has ready. Instead, it is maintaining secure and transmittable data while denying a sanctuary to Chinese forces by keeping them blind and deaf. Sustaining a certain number of ships is unquestionably vital for conducting missions similar to those that are conducted today, for both war and forward presence. But the heft of those missions, especially initially, must be done with the speed available in the cyberspace domain for a variety of reasons.

First is the speed with which China can achieve its objectives. If China were to, say, occupy Taiwan, U.S. forces would have to decide whether to launch an Iwo Jima-like assault to free Taiwan, putting themselves within closer range of China's mainland arsenal. Second is the overwhelming number of Chinese ballistic and other missiles U.S. forces would need to intercept. Moreover, America cannot bring enough missiles to strike against China's

50   Davidson, "Advance Policy Questions," 11, 13.

51   "Funding for Overseas Contingency Operations and Its Impact on Defense Spending," Congressional Budget Office, October 2018, 7, https://www.cbo.gov/system/files/2018-10/54219-oco_spending.pdf.

52   Interview with Rear Adm. David J. Gale, "Turning the Corner," *Seapower*, Special Report Surface Warfare, December 2012, 33.

53   "Military Readiness," 22, 25; and Martin, et al., "A Strategic Assessment," 6.

defenses when U.S. forces are deployed 7,000 miles away overseas. Third, undersea warfare is facing the nearing reality that it will no longer be opaque to off-board sensors. And finally, there is the fact that none of these missions can be done if U.S. forces cannot use or transmit data at will.

In short, building more 30-knot ships is not the answer. Nor are the ships themselves any longer the primary targets — their networks and data are. But once the ships do become the target, they are likely to quickly use up their defensive magazines while their offensive ones will not be sufficient to take out Chinese defenses and assets.

When it comes to offensive and defensive cyber warfare, it's a fair assessment to say that the United States is operationally at approximate parity with China — but U.S. advantages are diminishing. The opportunity to secure the Navy's (and the armed services' and America's) vast data and protectively transmit it is narrowing and not just because the demand for more storage and distribution is growing incessantly.[54]

With the arrival of machine learning and the looming development of AI, today's defenses against corrupting information in the Navy's already-compromised systems will be continuously playing catch-up unless this area of warfare takes priority over purchasing another hull. Furthermore, although it may not be fully realized yet, quantum computing is more likely to become a reality than not. Quantum computing relies upon atomic and subatomic particles (instead of an electrical "switch"), allowing even the most secure encryptions to be surreptitiously broken because it is capable of doing billions upon billions of operations per second. China has announced its goal to have this decryption capability by 2030. U.S. forces wouldn't even know if Beijing had decrypted all of their protected weapons systems, and read their most highly classified communications going back years. In effect, America is being held hostage without knowing it — until, without warning, one day its entire now-defenseless digital systems are rendered completely useless, and its military capability rendered irrelevant. In short, the nation that controls cyberspace by such emerging means wins.[55] In light of the report noted above indicating that servers on U.S. warships may already be

corrupted, Sun Tzu's words have never been more meaningful for China, or the United States: "Victorious warriors win first and then go to war."[56]

Along with this assessment is a recognition that, for any instrument of warfare, mitigating counter-measures can eventually be found, including for surface and subsurface hulls. The constant upgrade to quiet China's submarines is just one example. Whether it is by quantum computing of wave heights, deep-wake tracking, or other dispersed sensor means, determining submarine location by using stand-off sensors seems to be only a matter of time. While there are tactics a submarine might use to mitigate detection by these new sensors, they are useless when attempting to locate another submarine in a fast-paced war. In such a future, the number of required U.S. submarines will not be determined by its submarine-hunting mission.[57]

The Navy needs a fundamental shift in its mindset. The focus must no longer be on the number of hulls, but rather on the full range of capabilities, especially in cyberspace. China will conduct "system destruction warfare" immediately if war starts. The United States can only win a war if it is better at cyber warfare than China — both offensively and defensively. Such a war will likely be determined within nanoseconds of its beginning. The preparation to land in Europe during World War II or the time to prepare for the invasion of Iraq are not the models to rely on now. The United States must begin preparing for this new type of warfare long before such a war begins. It's why the arrival of ships to a theater of war and their utility have become supporting factors in this now ascendant domain within warfare — whether naval or otherwise.

Preparation has therefore never been more important. Offensively, U.S. forces need: reconnaissance of, emplacements in, and backdoors ready to be unlocked within Chinese networks and databases, mirroring China's efforts; data espionage to learn the vulnerabilities of the adversary's systems; use of machine learning and AI for rapid, persistent means of successful intrusion; data poisoning to feed adversaries corrupt information; malware and pre-positioning beacons; secure footholds for weaponized software to eat data, cause malfunctions, or command hardware to self-destruct; and the personnel talent in science, mathematics, and

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54   Heginbotham, et al., "The U.S.-China Military Scorecard," 282–83; O'Hanlon, "Forecasting Change," 12–17; Pomerleau, "3 Ways"; Rempfer, "Navy Is Under 'Cyber Siege'"; and Gerstell, "Digital Revolution."

55   Gerstell, "Digital Revolution"; Heginbotham, "The U.S.-China Military Scorecard," 259–83; O'Hanlon, "Forecasting Change," 12–17.

56   Sun Tzu, *The Art of War*.

57   O'Hanlon, "Forecasting Change," 7–9, 11, 23; Bill Gertz, "China Steals U.S.-Funded Quantum Research," *Washington Times*, Dec. 4, 2019, https://www.washingtontimes.com/news/2019/dec/4/china-steals-us-funded-quantum-research/; Broad, "U.S. Loses Hold on Submarine-Exposing Radar Technique"; and Stephens, "The U.S. Military: Like the French at Agincourt?"

In effect, America is being held hostage without knowing it — until, without warning, one day its entire now-defenseless digital systems are rendered completely useless, and its military capability rendered irrelevant.

engineering to do these things. This is what must be done to deny China sanctuary.[58]

Defensively, last year's independent *Cybersecurity Readiness Review*, requested by the secretary of the Navy, found a naval service "whose resources are consumed by force structure and platforms that deprive the information systems and capabilities required for warfighting and defense." According to this review, the Navy is "exquisitely organized, structured, equipped, and cultured for a previous era" and "is preparing to fight tomorrow's kinetic war, which may or may not come, while losing the global cyber enabled information war."[59] Furthermore,

> In today's era, where the dependency on information technology (IT) is central to success in any future conflict, the [Naval service's] institutional reluctance to shift its focus from ship or platform centric, to information centric, in order to attend to the world of vulnerabilities presented by its adversaries' capabilities growth and sophistication is striking.

However, "Its reaction to all this has been to assert that what it needs for this fight is what it had previously decided was appropriate for the earlier world, but in slightly larger quantity." As a consequence, "[t]he systems the U.S. relies upon to mobilize, deploy, and sustain forces ... [are] compromised to such [an] extent that their reliability is questionable."[60]

The review then lays out six areas that require change to enable a transformation to defend the Navy's vulnerable systems and data, without which it is blind:

- Culture: The Navy needs data to determine what changes are required in order to ensure accountability;
- People: The Navy needs cyber professionals, as well as trained non-cyber warfare personnel through whom the vast majority of compromises to systems occur;
- Structure: The chief information officers need "sail/not sail" criteria for cyber read-

iness, as the Navy does for other readiness areas;
- Process: To ensure real outcomes, the Navy needs performance indicators; and
- Resources: The Navy needs measures to demonstrate the risks of offensive cyber space warfare by China and the benefits of defending against it. Without clearly showing what the damage would be to the Navy, required funding will never become available.

In short, the review requested by the secretary of the Navy said, "Navies must become information enterprises who happen to operate on, over, under, and from the sea; a vast difference from a 355-ship mindset."[61]

We must recognize that Trojan horses have already compromised the Navy's systems due to the service's legacy use of "open" commercial systems that China (and others) has and will continue to exploit. Cyber readiness must become just like traditional training and material readiness. Sailors need constant "drilling" on secure cyber practices, and there will always be a constant need to find and fix vulnerabilities. After all, there is an average rate of one engineering software error per hundred lines of code.[62] It is why the Defense Science Board has said it has no confidence that any major military weapons system that uses cyber capabilities is secure.[63]

Despite the challenges to making these kinds of fundamental changes, the bottom line is that America has lost assured command of the seas. As it did so, China has been virtually unopposed in its pervasive exploitation of the cyber domain in numerous arenas, from intelligence gathering to economic espionage, including Chinese control of corporations' technological supply chains. As China has been building a Sino-centric global order based on authoritarian values, its 5G "Digital Silk Road" has penetrated the scores of participating nations and international organizations in its Belt and Road Initiative. With China's gross domestic product catching up to America's, the hour has become late to restore U.S. global leadership in so many areas where China puts U.S. security at risk — command of the seas is just one of these areas. Like so much

58   "Task Force on Cyber Deterrence," Defense Science Board, February 2017, https://www.armed-services.senate.gov/imo/media/doc/DSB CD Report 2017-02-27-17_v18_Final-Cleared Security Review.pdf; and O'Hanlon, "Forecasting Change," 16.

59   Secretary of the Navy, *Cybersecurity Readiness Review*, March 2019, 6–7, https://www.wsj.com/public/resources/documents/CyberSecurityReview_03-2019.pdf?mod=article_inline.

60   *Cybersecurity Readiness Review*, 6–7.

61   *Cybersecurity Readiness Review*, 1.

62   Jack K. Horner and John Symons, "Understanding Error Rates in Software Engineering: Conceptual, Empirical, and Experimental approaches," unpublished paper, September 2018, 1, http://www.johnsymons.net/wp-content/uploads/2018/09/Understanding-error-rates-.pdf.

63   O'Hanlon, "Forecasting Change," 17.

in this digital revolutionary world, no country can command the commons of the seas or air without command of the commons of cyberspace.

Whether it is due to an ingrained tendency to support the status quo, to fight the last war, or to adhere to the present culture of how "business is done," it's time for the Navy to make some changes. Continuing as it has done in the past will not help regain America's ability to command the seas, and therefore deter, persuade, and reassure. The legacy of the bitter "battleship versus the aircraft carrier" fight prior to World War II has a parallel today. Gen. Billy Mitchell was even demoted and then court-martialed for his criticism of the Navy in ignoring the aircraft carrier — but the carrier eventually won, just in time to gain command of the seas against Japan.

China, on the other hand, had Deng Xiaoping, who, after being purged twice for his unorthodox ideas on transforming China's economy and military, eventually implemented them in his "Four Modernizations," which gave China not just command of the seas, but an emerging global leadership. Perhaps someone — as the court-martialed Mitchell once did — will help guide the same needed changes to ensure America's security today, including command of the seas. ♞

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