THE ARSENAL OF DEMOCRACY

TECHNOLOGY, INDUSTRY, AND DETERRENCE IN AN AGE OF HARD CHOICES

EYCK FREYMANN
HARRY HALEM

FOREWORD BY ADMIRAL JAMES O. ELLIS JR., USN (RET.), AND NIALL FERGUSON

1

FRAMEWORK

If the United States ever fights a war with China, it will be primarily an air-naval war. The US military has not fought such a war against a peer adversary in almost eight decades. The last time the US military had to plan for such a war was in the 1930s, when it faced a rising Imperial Japan and Nazi Germany and tense relations with the British Empire, the other major naval power in the Pacific.[1] That historical record is not encouraging. Although the United States ultimately triumphed over Japan, it failed in its original goal—to deter the war in the first place. Tokyo's decision to attack the United States in December 1941 was a failure of deterrence with chilling implications for our time.

Large-scale air-naval wars are fundamentally different from the land wars that have dominated US military planning since 1945 and particularly since 1991.[2] The Soviet Union built out naval capabilities in the 1960s and 1970s, challenging NATO in the North Atlantic and the Mediterranean, but it did not threaten US and allied maritime interests to the extent that China does today.[3] As this chapter will explain, air-naval conflict throughout history has some common, unchanging features, particularly relating to the use of reserves and the importance of scouting and logistics.

At the same time, the technologies underlying air-naval combat have changed profoundly in recent years. Generational transitions in defense technology invariably render old systems obsolete. The current transition is no exception, not least because a technological revolution is coinciding with a shift in focus from counterterrorism operations to great-power deterrence. Many platforms and systems that the US and allied militaries today deem essential will need to be adapted, and some will need to be defunded. A crash effort to preserve deterrence today requires a framework for understanding how militaries can adapt their legacy forces at the same time as they reach for disruptive new technologies.

The second part of the chapter offers a sweeping overview of technology in naval history in the nineteenth and early twentieth centuries. It then looks back to the Carter and Reagan administrations, when the DOD successfully brought about a "revolution in military affairs" (RMA) through strategic investments in satellites, computing, and other emerging technologies. The RMA analogy is not perfect, but it is instructive. Technological revolutions always present militaries with wrenching political-bureaucratic dislocations, forcing trade-offs between short-term and long-term risk. Insofar as the history of the RMA has a lesson, it is not that the DOD must gamble everything on emerging technology. Rather, it is that the DOD leadership, in concert with Congress, must build consensus among the services about what missions and capabilities are essential. The DOD's leadership must also place concentrated bets on technologies and high-tech supply chains that enable the Joint Force to implement its operational concepts. Building consensus around the core mission makes it politically and institutionally easier to adapt or divest antiquated systems.

The third and final part of the chapter briefly introduces the US military's new operational concepts for air-naval conflict in the Indo-Pacific. After very briefly sketching out the US force posture in the region, it concludes that the services basically have the right idea about how the character of warfare is changing and what a war with

China might entail. However, these new concepts will be of limited utility unless the US defense industrial base, DOD procurement system, and allied logistics system can support them. Drawing inspiration from technological transformations in the past, Congress must push the DOD to move faster.

Fundamental Characteristics of Land and Air-Naval Warfare

As Carl von Clausewitz observed, the purpose of war is to achieve political goals, but the character of warfare depends on technology, geography, resources, and the correlation of forces.[4] Moreover, land war and naval war are fundamentally different. They move at different speeds and require distinct mentalities, operational concepts, and strategies. As J. C. Wylie notes, land strategy focuses on controlling and dominating physical territory through occupation and direct control. By contrast, naval strategy is about exerting influence and maintaining freedom of movement over vast maritime spaces. Land and sea power therefore have different objectives, with land strategy being more direct and sea strategy being more fluid and flexible.[5]

Over the last eight decades of land warfare, the Joint Force has become accustomed to a certain kind of land warfare. Before exploring specific capabilities that the Joint Force will need to acquire for a potential air-naval war with China, and the operations for which it will need to prepare, it is necessary to highlight those features of naval combat that differ from those of land combat and do not change, regardless of technology.

In land combat, perhaps the two most important variables are terrain and reserves.[6] Terrain shapes the battlefield, and with it the menu of viable tactical options for a commander. The commander who can exploit terrain more effectively often gains a decisive advantage. Famous battles from antiquity emphasize this point.[7] The same principle applies on the battlefield in Ukraine.

Terrain generally favors the defender as long as it is well understood, particularly if the defender fights in their own country.[8] In 1941–42, the Soviets traded space for time against the advancing German armored forces, grinding down the enemy in preparation for the punishing counterattacks of 1943–45.[9] A similar defensive dynamic is on display in the Russia-Ukraine war. During the defense of Kyiv, the Ukrainian Armed Forces held key river crossings to halt the Russian advance, while deploying light infantry into northeastern Ukraine's woodlands to harass Russian logistics.[10] Later, Ukraine's defensive network in the Donbas checked Russia's assault, even though the Russian Armed Force had superior matériel. Russia, meanwhile, used the Dnipro as a natural defensive barrier, shortening its defensive line.[11] Combined with an extensive fortification system, Russia was able to concentrate forces and prevent a Ukrainian breakthrough during the 2023 summer offensive.

Terrain does exist at sea, but it has a different function than in land war. Most major naval battles in history have been fought in the littorals, especially around the crucial choke points that restrict international trade and limit naval movement.[12] Islands and straits are crucial for naval combat. Water depth matters too, particularly for submarine operations. The Battle of Algeciras Bay during the Napoleonic Wars illustrated the strategic importance of controlling narrow waters and nearby ports. British forces used the confined bay to trap and inflict severe damage on the French and Spanish fleets, exploiting the local geography to disrupt French reinforcements.[13] In World War II, the Allies destroyed the dry docks at Saint-Nazaire, France, and thereby split the German fleet in half. Absent a major repair facility, any German ship in the Atlantic then had to make a dash through the English Channel, a dangerous proposition in the face of British airpower.[14] The key feature of combat on the ocean surface is that there are no defensive lines. It is impossible to construct a fortification network akin to that on the Western Front on an undifferentiated ocean. (Since the early twentieth century, naval mines have made it possible to create something like a defensive line at sea. However, such "sea denial" strategies amount to a declaration of war against neutral countries and are in essence incompatible with international law.[15]) Partly because of this fact, reserves play a very different role in land and sea combat.

In land combat, reserves are crucial.[16] By concentrating forces at a decisive moment, whether to strike an enemy flank or break through a defensive line, a ground commander can turn the tide of battle. This requires keeping some portion of the force out of combat for commitment at the right moment. Most great land battles have been won through the skilled employment of reserves.[17] Historically speaking, these were mounted cavalry units. In modern contexts, with battles stretching over days or weeks and including dozens of individual engagements, reserves are equally important.[18] The Germans learned this lesson during their defeat in 1918 and again during the Battle of the Bulge in 1944–45.[19] The need for reserves in land combat stems from the flexible structure of ground forces. Ground units are organized into layers—squads, platoons, companies, and so on—that each maintain some combat power and can operate semi-independently. A tank battalion, for example, contains around fifty individual vehicles, each with one major weapon. A platoon's three squads or sections are each composed of around just nine soldiers, allowing it to maneuver effectively on its own. This structure lets reserves quickly reinforce any part of a unit, adapting to shifting battlefield needs. Reserves also allow units to rotate in and out of combat to prevent exhaustion, preserving their overall effectiveness. Therefore, losing a single soldier or vehicle reduces only a fraction of combat power, as reserves can be mobilized to sustain operations.[20]

Reserves have a very different role at sea.[21] In naval war, there are far fewer individual units in any engagement. Even in World War II's largest naval engagement, the Battle of the Philippine Sea, there were fewer than two hundred individual combatant ships and submarines and only fifteen hundred combat aircraft.[22] The numbers were similar at Leyte Gulf, the largest naval battle in history by combined naval tonnage involved. Warships' combat power is not individually divisible. On land, an artillery battery, with eight individual guns, can deploy and fire in a distributed fashion. By contrast, an *Arleigh Burke*–class destroyer fields ninety-six Vertical Launching System (VLS) cells on one hull—but if it is destroyed, all ninety-six cells and their loaded missiles are taken permanently out of the fight.[23] In general, once a naval engagement begins, the best approach is therefore to surge as much firepower as quickly as possible. Early strikes against enemy ships tend to bring compounding advantages.

Naval ships are designed to fulfill more differentiated tactical functions than land units. As a result, ships become far less effective when the units in which they are fighting are incomplete. The US Army can create new combined arms units, such as Brigade Combat Teams or entire divisions, and reconstitute them if they suffer attrition, but the US Navy faces a tougher challenge.[24] Building new ships and creating and reconstituting combined-capability naval forces, like the Navy's carrier strike groups (CSGs), is much harder.[25] The Army has several dozen active and reserve artillery regiments. The Navy has eleven carriers. (The PLA has three and is currently building a fourth.) Each US CSG deploys with one carrier, four or five surface warships (cruisers, destroyers, and, in the future, frigates), and typically a submarine, depending on the mission. The loss of even a single ship can jeopardize the cohesion and effectiveness of the entire group far more than the incapacitation of a battalion would in a ground force.[26] This is all the more reason for the United States to seek ways of surging naval forces quickly at the beginning of a fight, rather than holding them in reserve.

Repair is also much harder in naval contexts than on land.[27] Ukraine, with its assortment of Soviet-standard and Western-donated armored vehicles, can sustain its force because individual repairs are relatively simple if skilled technicians and spare parts are available.[28] Warships, by contrast, need large, specialized facilities for even basic overhaul. Intense repairs of damage incurred in combat can take years.[29] Some ships, such as nuclear-powered submarines, can be repaired at only one or two dedicated yards in their home country. When one navy wins a decisive engagement, it can therefore seize a structural advantage in combat power over its adversary for some time.[30]

In short, the victor in naval combat is typically the side that can attack effectively first.[31] Therefore, unlike in land combat, there is far less cause to hold back forces in reserve. Of course, because initial engagements can be decisive, naval commanders do not necessarily throw their forces into combat immediately.[32] As we discuss in chapter 2 about surveillance and reconnaissance, they must win the scouting fight and first identify the enemy to attack effectively. However, once an engagement begins, both sides have strong incentives to commit everything they have. This is what Japan did at the 1905 Battle of Tsushima, destroying the Russian Pacific Fleet while losing only three torpedo boats.[33] The relative advantage that the offensive side enjoys at sea explains why naval planners often agonize about fleet size. It also explains why naval combat engagements tend to be brief.[34] Although the major naval battles of World War II nominally lasted for days, the actual engagements between adversaries often lasted only a few minutes at a time. Savo Island (1942), the US Navy's most punishing defeat in the Pacific War after Pearl Harbor, included just a few hours of active fighting, most of which was spent maneuvering and hunting for the enemy.[35]

In air-naval warfare, airpower extends the principles of naval combat into three dimensions, introducing new considerations for terrain and reserves.[36] With no terrain in the air, the side with a dominant air force can often achieve air superiority relatively quickly. Without control of the skies, few offensive naval and land operations can succeed. In air-naval warfare, controlling airspace over and around strategic choke points and islands is also important, since this can shape the effective terrain that enemy ships must navigate. However, airpower is limited by range. Fighters cannot venture more than a few hundred kilometers from their bases. Fighters can be modified to carry additional fuel, but this reduces maneuverability and increases vulnerability in combat. Alternatively, they can be refueled in-air, but refueling operations are complex and require specialized refueling aircraft. Aircraft carriers are therefore valuable because they act as mobile air bases, conferring their commanders with the ability to project airpower anywhere on the high seas.

The role of reserves in air combat is, by itself, closer to that of land combat than naval combat. Air-naval forces must maintain air superiority for the duration of an operation if their surface ships are to be able to operate safely. History shows that multiple waves of airpower are crucial for delivering decisive blows at critical moments, as seen most clearly in the Battle of Britain, where fresh British forces were just enough to turn the tide.[37] In combined air-naval operations, the integration and timing of air and naval reserves are therefore interrelated.

The Pacific War, the best single historical analogy for a potential US-China conflict, illustrates these principles clearly. Between December 1941 and February 1942, Japan won a string of naval battles after it damaged the US Pacific Fleet at Pearl Harbor. A key reason for Japan's success was that its forces outnumbered its opponents in each battle, particularly when it came to naval airpower.[38] The US Navy turned the tide at Midway in June 1942, when—in a stunning surprise—its outnumbered fleet sank four Japanese carriers while losing only one. The US force attacked effectively first, despite being outgunned. Its aerial strike force arrived at just the right time to hit Japan's carriers, through a combination of prior intelligence, scouting, persistence, and sheer luck. American dive bombers, about to turn home, identified the wake of a destroyer returning to the Japanese carrier group and arrived as Japan's aircraft were refueling, delivering a backbreaking blow against two Japanese carriers and providing the United States with a decisive advantage for the rest of the battle.[39] This single victory tipped the naval balance in the United States' favor for the rest of the war. Although Japan did win individual engagements after Midway, US naval construction by 1943 had far outpaced Japan's.[40] The United States had therefore locked in a structural combat power advantage over Japan in engagements after the war's first year, arguably making Allied victory a foregone conclusion.[41] The United States is unlikely to enjoy similar advantages over China in an air-naval conflict in the 2020s or 2030s, an issue we will discuss in more detail in chapter 5 on the surface fleet. The PLA fleet is already larger in ship count, though not yet in tonnage. China is likely to compound its quantitative advantages in the coming years, thanks to its vastly superior shipbuilding capacity.[42]

A final distinctive characteristic of naval combat is that it relies on logistical nodes and focal points far more than land combat.[43] Land forces need supplies, including fuel, food, ammunition, and other military matériel, but supply depots can move and indeed often do move.[44] Air-naval forces, by contrast, need land-based support for refueling and maintenance. Large-scale capital investments and technological innovation can ease the burden on land-based sustainment locations, as the US Navy's auxiliary dry docks did during World War II.[45] But access to specific pieces of maritime geography, whether islands or archipelagoes, is ultimately fundamental to a force's long-term ability to project air-naval power. We will return to this issue in chapter 4 on logistics.

How Militaries Adapt to Technological Change

Two major technological transitions in naval warfare during the nineteenth and twentieth centuries—the shift from sail to steam power and the advent of the dreadnought battleship—illustrate crucial lessons about military modernization. These cases demonstrate that although it can be strategically advantageous to adopt a new technology first, successful deployment is often a matter of industrial competition in which infrastructure plays a key role. Furthermore, older platforms often remain in supporting roles for a long time during successful technological transitions. As the US military contemplates how to adapt its legacy force, it is worth looking briefly at the divergent paths of early adopters in these two cases.

The British Royal Navy and the French Navy transitioned to steam power over the course of around four decades in the mid-nineteenth century. Both navies recognized the military potential of steam power in the 1820s. Steamships were unburdened by the wind, allowing them to maneuver with far greater freedom. Britain launched HMS *Comet* in 1822, and France deployed the paddle steamer *Sphinx* in 1829. By the 1860s, the Royal Navy had fully committed to steam, and the French Navy had fielded the world's first oceangoing steam-powered ironclad, the *La Glorie*. Their investments paid off. Britain maintained control of key sea routes in the Mediterranean, Indian Ocean, and Western Pacific, while France expanded its empire in Southeast Asia. Other navies fell behind. Even though steam power was obviously the technology of the future, the transition from sail to steam was not smooth. Early steam engines were bulky and unreliable, necessitating hybrid designs that maintained a full sail rig alongside a steam engine.[46] Furthermore, the transition to steam power required significant infrastructure investments, such as coaling stations and dry docks.[47] During this interim period, legacy ships remained useful for training and patrol duties.

The advent of the HMS *Dreadnought* in 1906, and subsequently the HMS *Inflexible* battlecruiser, marked another revolutionary shift in naval warfare, fundamentally altering the naval arms race and setting a new standard for battleship design. Dreadnoughts were armed with uniform main batteries of large-caliber guns, which allowed for greater long-range firepower and more simplified fire control than traditional battleships. They had better armor and more efficient steam turbine engines, which made them significantly faster and better protected.[48] The deployment of the HMS *Dreadnought* had immediate strategic effects. Functionally, older battleships were now obsolete for main-line combat. Alongside the *Dreadnought* came the first battlecruisers, ships with the armament and fire control of a dreadnought battleship but the speed of a fast cruiser, gained by reducing armor.[49] This allowed them to hunt down or escape any older ship they might face. These two developments defined the Anglo-German naval rivalry between 1906 and the outbreak of World War I in 1914.

The decision to make the technological leap to the *Dreadnought* was a calculated risk for the Royal Navy. As the first mover, Britain would enjoy a temporary monopoly on these advanced vessels, but it was inevitable that if Britain made a major bet on dreadnoughts, rival navies—including the German navy—would respond by building their own. As they did so, Britain's existing fleet would become increasingly irrelevant for combat purposes, and an arms race would likely follow to build a new fleet of dreadnought-style battleships and cruisers.[50] Having triggered this arms race, Britain would need to stay ahead. Early in the arms race, the loss of even one British dreadnought might have shifted the overall balance of power significantly.[51]

This reality was not lost on the Royal Navy and the British defense intellectual establishment. Shortly after the *Dreadnought* was launched, former First Sea Lord (the Royal Navy's professional head) Sir Frederick Richards declared that its deployment meant "the moral and material scrapping of the Fleet."[52] Politicians found the *Dreadnought* equally problematic. Liberal Radical David Lloyd George called the ship a "piece of wanton and profligate ostentation."[53] Before the ship's construction, George Clark, the permanent secretary for the Committee on Imperial Defence (the ancestor of the modern US National Security Council), appealed to then–Prime Minister Henry Campbell-Bannerman to cancel the project, arguing that the United Kingdom should rely on its construction capacity rather than design cutting-edge naval technology that would transform the military balance. It took the indefatigable commitment of First Sea Lord Sir Jacky Fisher, a well-known disruptor and innovator who spearheaded British submarine and torpedo development, to drive the project through. As Fisher put it, "A cabbage can't fight with a camel! The camel would eat all the cabbages! So that the time is approaching when the present strength will be wiped out and we must build a new Navy pro rata with those we may have to fight."[54]

This discussion highlights an important theme about military-technological innovation that will echo throughout this book. Countries' decisions about when and how to adopt new military technologies are not inevitable. They depend on context, including states' perceptions of their rivals' strategies and industrial and technological capacities, and uncertainty about how emerging capabilities will interact. When one state makes a major commitment to an emerging technology—in this case, the dreadnought battleship and battlecruiser and the basket of fire control, heavy gun, propulsion, and armor technologies that they represented—it reveals valuable information about the state's perceptions of future competition. In military-technological competition, timing is key because a properly timed move can obviate an adversary's high-cost investment.[55] China's decision to invest heavily in military modernization is essentially a challenge to the United States to engage in an industrial competition on China's terms. In response, the United States must prepare to keep up in this industrial competition, while it also considers the character and timing of its next technological offset.

While Fisher's bet on the *Dreadnought* turned out to be sound, a notable theme in naval history is that it does not always pay to be a first mover.[56] The United Kingdom's development of carrier aviation in the first half of the twentieth century is a good example. The UK was the first country to field aircraft carriers. It built the HMS *Argus* and HMS *Furious* during World War I and maintained a four-carrier fleet in the 1920s. However, by the late 1920s, the Royal Navy faced a funding crunch that limited its ability to invest in emerging technology and explore the new operational approaches to naval aviation that the technology enabled. Thus, paradoxically, the UK's first-mover advantage turned into a disadvantage. The Royal Navy kept requesting modern carriers throughout the interwar period, recognizing that its older designs were increasingly obsolete, but the Treasury rejected them, so the Royal Navy had to adapt its existing fleet instead.

In several respects, British adaptation succeeded. The United Kingdom developed extremely advanced torpedo tactics, which it used at Taranto in 1940 to cripple the Italian battle fleet. The UK also developed aircraft carriers with an armored deck in the Illustrious class, which incorporated innovative damage control and storage mechanisms. Unfortunately for Britain, the budget crunch, compounded by a lack of high-performance engines and poor assumptions about fighter design, led the Fleet Air Arm to bet heavily on all-rounder aircraft rather than purpose-built fighters, which were unprepared for the demands of World War II.[57] The story was not simply that Britain's carriers were ineffective at their intended role but rather that there were limits to how far they could be adapted to new situations. The best time for London to invest heavily in next-generation carriers and purpose-built fighters would have been the mid-1930s, just a few years before war broke out with Germany.

China's force was designed to offset the advantages of the legacy US force—but this means that the next round of US force modernization can offset PLA advantages. In the process, some aging US legacy systems can be adapted and continue to play critical roles such as surveillance, electronic warfare, communications, and logistics support while new platforms with advanced capabilities are phased in. Ultimately, however, several existing platforms will lose relevance to this fight over time as long-range missiles and unmanned technologies mature.

The Revolution in Military Affairs (RMA)

In thinking about how to overcome the internal political and institutional challenges that hold the DOD back from adapting to new technology, it is helpful to look at the history of the RMA, which was similarly the product of years of planning and intensive bureaucratic infighting. The decisions and commitments that the DOD took during the 1970s and early 1980s transformed the character of air-naval warfare and contributed directly to US victory in the Cold War, namely through AirLand Battle doctrine and the Maritime Strategy.[58] Many of the technologies and paradigms developed during this period are still in service today in modified forms. The policy choices that made the RMA possible were also responses to a technological and geopolitical context that in some ways resembles our own time. For all these reasons, it is helpful to briefly review the history of how the RMA came about. The analogy is not perfect, but reflecting on this history can illuminate risks, opportunities, and pathways in the present that are not immediately obvious.

In the early 1970s, the Pentagon faced significant challenges. The Vietnam War was drawing to an unsatisfying end, US alliances were strained, and the domestic economic situation demanded spending cuts. Concurrently, the Soviet Union was approaching nuclear parity, while Soviet conventional forces were modernizing. As a result, it was becoming increasingly apparent that existing NATO doctrine might not suffice to maintain deterrence.[59]

In this context, the DOD made a strategic decision to change the way it conceptualized, developed, procured, and deployed technology. The primary initial proponents of this idea were William J. Perry, an electronic and radio intelligence specialist who served as Jimmy Carter's undersecretary of Defense for Research and Engineering; Andrew Marshall, the director of the Pentagon's newly established Office of Net Assessment (ONA); and Harold Brown, the secretary of defense. Backed by work throughout the military's various institutional research centers, particularly ONA, the three men identified the potential of advanced technology to erode the Soviet Union's conventional advantages, resetting the European balance and ensuring continued American strategic capacity.[60] This strategy later came to be known as the "Second Offset" because it aimed to use qualitatively superior technology to "offset" the Soviets' quantitative military edge.

The key breakthrough that the RMA delivered was a decisive US advantage in satellite navigation and communications. The DOD had been exploring precursor technologies for satellite navigation since the 1960s, but progress was slow and hampered by interservice rivalries. At first, the Navy, the Army, and the Air Force each pursued their own satellite navigation efforts independently.[61] Malcolm Currie, director of Defense Research and Engineering and chair of the Defense Systems Acquisition Review Council, directed the services to merge their systems to reduce costly duplication. In April 1973, the Air Force converted its Project 621B into the Defense Navigation Satellite System Program Office, commanded by Colonel Brad Parkinson, and submitted it for consideration.[62] The Army and Navy Defense Systems and Acquisition Review Council representatives vetoed the plan in August. Some of their justifications were understandable, others bureaucratic. Each service wanted a system optimized for its own operations and was reluctant to abandon a program in which it had already invested resources. Moreover, the Army and the Navy did not want to depend on a repackaged Air Force system for a mission-essential capability.[63] Parkinson, under Currie's direction, took the rejection in stride and developed a new proposal that incorporated components of each service's program. Four months later, the new plan was approved. Unsurprisingly, interservice disagreements were resolved through compromise rather than capitulation.[64] Successfully resolving this issue required a leader who was intensely committed to interoperable systems and joint operations.

In February 1975, under President Gerald Ford, the Pentagon launched Assault Breaker, a Defense Advanced Research Projects Agency (DARPA) program to achieve what the Soviets called a "reconnaissance-strike capability."[65] Assault Breaker was meant to solve a specific operational problem. The Soviets enjoyed a large conventional advantage over NATO in Europe that had only grown since the mid-1960s. Under these circumstances, war with NATO would have been risky for Moscow, but Soviet forces had gained such a preponderance of capability that they might have been able to smash through NATO units along the inner German border in just a few days and reach the Rhine in just a few weeks. The USSR's greatest advantage was its mass. France had left NATO's unified command structure in 1966, and French forces were not expected to deploy forward into Germany and counterattack against Soviet armored divisions. Without this strategic depth, NATO risked running out of space for a robust conventional defense. US planners expected that in such a scenario, both sides would use tactical nuclear weapons. Even so, if the Soviets could move quickly enough, they could present the United States with an unfavorable choice: abandon Europe to Soviet domination or commit to an open-ended conflict with a high probability of strategic nuclear use.

Assault Breaker sought to assemble a combination of long-range precision-guided missiles, advanced sensors, and, over time, stealth aircraft that could attack Soviet forces while they were transiting toward the combat zone in Western Europe. By striking Warsaw Pact armored divisions on the move, rather than waiting to engage them until they reached NATO defensive lines, the Pentagon believed it could reduce the ferocity of the Soviet offensive hammerblow, allowing NATO forces with superior equipment and training to prevent Germany from being overrun. The objective of these investments was focused squarely on deterrence. Washington needed to persuade Moscow that the Soviet quantitative advantage in conventional forces might not be decisive in a conflict. The idea behind investing in US technological advantages and displaying them prominently was to force Soviet war planners to reckon with the uncertainty of what US technological advantages might mean.

The making of the Second Offset was messier in practice than the DOD's collective memory has it. When Carter appointed Brown as secretary of defense in 1977, Brown was the first nuclear scientist to lead the department. Under his leadership, the DOD "turned technology leadership into a national strategy" and doubled DARPA's budget.[66] Although this was an inspired choice in retrospect, detractors satirized Brown for a quixotic search for the so-called magic weapon.[67] Brown's techno optimism and pessimism about the value of legacy systems came as a shock to the DOD's internal culture, highlighting profound doctrinal and cultural differences between the services. To take just one example, it took a decade for the Army and the Air Force to accept the concept of AirLand Battle, which described how the new long-range precision weapons being developed under the Second Offset strategy would be delivered to targets. It took strong leadership at the top levels of the Pentagon, creative cooperation within the services, and a willingness to embrace a new model of acquisitions to help carry many projects across the finish line. Several major projects failed due to bureaucratic fights between technologists at DARPA and the services and unrealistic program requirements.[68]

These frictions were inevitable costs of the Second Offset and well worth it—but not everyone at the time saw it that way. Budget-conscious offices within the Pentagon were broadly skeptical about Perry and Brown's ambitions. In 1978, the Program Analysis and Evaluation office, led by Russell Murray, moved to eliminate the Navstar GPS satellite program from the DOD budget. Navstar was to be an indispensable reconnaissance component of Assault Breaker, but Murray argued that it was "unproven and expensive."[69] When Perry heard the news, he scrambled to put together a demonstration by Navstar, personally flying in a "blinded" helicopter in which the pilot navigated exclusively with GPS. Brown was convinced and went on to fight for GPS against skeptics in the White House and Congress.[70] Navstar survived not only because techno-optimists occupied the key decision-making roles within the DOD but because they had the political skills to convince others that this was a bet worth making.

In retrospect, Murray's skepticism of GPS may seem foolish, but in context he had a reasonable case to make. The program had not proved functionality, much less battlefield operability. It had become a drain on resources in a time when US forces' readiness for a conflict in Europe was at a multidecade nadir. The opportunity cost was high: building tanks and airplanes could strengthen conventional deterrence in the short term. The debate was therefore not just a question about the viability of this particular technology but more broadly about the distribution of risk in time. The disagreement was not simply over Perry's strong belief in the transformative potential of GPS. It was about his belief that GPS would strengthen deterrence so much in the medium to long term that to develop it, a higher short-term risk of war with the Soviet Union was worth accepting.[71]

Meanwhile, Perry and Ben Rich, director of Lockheed Martin's stealth aircraft program, were dreaming up a radar-evading surface ship for the Navy. In spring 1978, Perry authorized DARPA to contract Lockheed to study the "Sea Shadow" concept: a stealth catamaran with anti-aircraft capabilities to offer a more cost-effective alternative to the Navy's Aegis missile defense system.[72] The Navy was skeptical, believing its existing submarines already served this function. In the fall, Chief of Naval Operations Admiral Thomas Hayward said as much. But Perry decided to proceed with the project regardless, telling Hayward, "We are going to build this ship; the only question is whether the Navy is going to be a part of it."[73] Perry used DARPA funding to pay for the construction of a one-third-scale prototype.[74] The prototype performed well in early tests, but the Navy remained skeptical, preferring the standard evolutionary approach to shipbuilding through incremental improvements. Navy leadership dry-docked full-scale prototypes developed in the early 1980s, and Sea Shadow never joined the fleet.[75]

The failure of Sea Shadow is notable for several reasons. The fact that DARPA was able to produce a prototype quickly, despite the Navy's outright objections, testifies to Brown and Perry's influence within the Pentagon and single-minded commitment to the tech-first strategy. Broadly, DARPA was free from meddling by the services during this period—and benefited greatly from that fact. Still, too much isolation from the services ultimately doomed the program. The experience shows that the Pentagon's visionary technologists must work collaboratively with pragmatic systems implementers. Even if Perry was right that the Navy's resistance to Sea Shadow was "hidebound and bureaucratic," he did himself no favors by picking this fight.

Once the DOD reached internal consensus about what it needed to do, it had to overhaul procurement processes to effectively incorporate private-sector technology. From the late 1950s into the 1960s, the Pentagon was the leading buyer of microelectronics. Contractors developed small-batch and highly specialized production lines essential to meeting defense requirements. But by the 1970s, the emerging semiconductor industry, which was to play an indispensable role in

Brown's offset strategy, was more interested in the booming commercial market. National Semiconductor, Fairchild, and Advanced Micro Devices, the three largest semiconductor makers, had watched Lockheed and Watkins-Johnson struggle to convert from defense to civilian production. They decided to avoid military involvement altogether and embrace standardized mass production for the commercial market.[76] Eventually, the rise of Japanese competition pushed US chipmakers to return to defense-related applications in the 1980s. In the 1970s, however, the industry drew just one-tenth of its revenue from military contracting.[77] The DOD therefore had to design its contracts carefully to incentivize the private sector to make the chips it needed.

The DOD's solution was to ask the chipmakers to spin off versions of their existing commercial chips with military applications.[78] To get industry hooked, in March of 1980, the DOD launched the Very High Speed Integrated Circuits (VHSIC) program to align its strategy with its suppliers' existing commercial strategies. Working with the military, the Pentagon told firms, was an opportunity to advance commercial competitiveness on the government's dime.[79] Buying off-the-shelf chips with minor differences in their specifications made adoption faster and easier and saved billions in research and development (R&D) investments.[80] More important, this approach ensured that private firms maintained the capacity to produce high-end chips in abundance, so the DOD and its contractors could acquire as many as they needed.

Characteristics of Effective Adaptation

Comparisons between the RMA and the contemporary situation are far from exact. Many of the systems and concepts established during the RMA remain highly effective.[81] It is not so simple to say that the Pentagon should gamble everything on a "new RMA" today, because most of the DOD's key needs cannot simply be bought off the shelf in the commercial market. In the context of relatively flat defense spending, increasing investments in the medium and long term come directly at the cost of short-term readiness. China's threat to Taiwan today is different from Russia's threat to Europe in the 1970s, and the short-term threat is almost certainly more acute.

Still, it is possible to discern a few stylized lessons about how the DOD deals culturally and bureaucratically with technological change. Debates about defense technology are not—or, at least, should not be—simply about the merits or potential uses of particular technologies. Rather, they are debates about how to manage the trade-offs between short-term readiness and long-term potential capability, all within the context of operational concepts and doctrine. Given the DOD's intrinsic bureaucratic inertia and the services' preference for incremental change that builds on existing programs, it can be helpful to install technologists in roles where they are empowered to challenge conventional wisdom and facilitate conversations about creative alternatives. Given a political mandate, thoughtful technologists can push stakeholders across the DOD's sprawling bureaucracy to compromise parochial interests in the interests of the Joint Force. Technologists can also see the bigger picture. Even if the process is perfect, if the DOD takes a lot of high-tech bets, a lot of them will fail. The RMA succeeded in part because it forced a cultural change in which the services became more comfortable placing bets on emerging technologies. The DOD's broader procurement process also created the right incentives for private industry to do business with the government. However, letting techno-optimists run roughshod over the services is unwise. If the services have not bought into programs that affect their essential missions, the programs are unlikely to succeed.

The final and perhaps most important lesson is that new technologies are useful only if there are operational concepts to employ them coherently. Assault Breaker would not have been possible without AirLand Battle, just as AirLand Battle would not have been possible without Assault Breaker. Achieving alignment between technologies and concepts can take years. The DOD's leadership can demand that these conversations take place, but it must be careful about micro-management. Getting new technologies to the point of deployment ultimately requires consensus—or at least compromise—across the department.

Despite the obvious echoes between the current situation and the 1970s, many senior DOD officials are wary of drawing the RMA analogy. The reasons for their skepticism trace back to the 1990s and early 2000s, when officials led by Secretary of Defense Donald Rumsfeld promoted a "Transformation" for the military, which the 2001 Quadrennial Defense Review pitched as a vision for "exploiting" the "ongoing" RMA.[82] Rumsfeld saw the "Transformation" as a cultural and institutional reshaping of the DOD, not just as a set of game-changing programs. As he put it in a speech at the National Defense University in January 2002, "We must promote a more entrepreneurial approach to developing military capabilities, one that encourages people . . . to behave somewhat less like bureaucrats and more like venture capitalists."[83]

In practice, many of the promised institutional overhauls never materialized—but a number of the flagship high-tech programs associated with "Transformation" came in massively over budget and behind schedule. The F-35 program finished a decade behind schedule and 80 percent above its projected cost.[84] The *Ford*-class carrier was eight years late and 25 percent over budget.[85] The DOD canceled two major satellite programs—the Transformational Satellite Communications System and the Future Imagery Architecture satellite constellation—after awarding multibillion-dollar initial contracts. Massive investments in ballistic missile defense during the Bush and Obama administrations also paid unsatisfying dividends.[86] Following these failures, and political shifts that resulted in defense spending cuts, the services were forced to pare back many existing programs. These hard choices left significant intellectual and programmatic scars within the DOD. Many young officers at the time, who are now senior and hold positions of leadership, learned to be skeptical about the promises of high-tech transformation. The same is true of the most senior members of the military analytical community and policymakers and bureaucrats in the Pentagon.

Calls for a "new RMA" also risk downplaying the challenge that the DOD faces in maintaining short-term deterrence. To ensure that US forces can adapt to the combat environment and implement their new operating concepts, the DOD needs to plug several capability gaps extremely quickly, given the intelligence community's assessment that Xi Jinping has ordered the PLA to gain the capability to take Taiwan by 2027.[87] The challenge is not just one of acquiring more funding. The services also need support from Congress, the White House, and industry, since decades-old procedures for defense procurement need to be reassessed and reformed.[88]

If the goal is to build consensus within the DOD for a change in approach toward the medium-term challenge, references to the RMA may be politically unhelpful, even if it is instructive to study the history. Officials within the DOD understand that emerging technologies are changing the character of air-naval warfare. They recognize that preparing for a potential air-naval war with a peer adversary in the Indo-Pacific will require a fresh approach to doctrine, force structure, and procurement. Advocates of more aggressive technological transformation in the military—and we are among them—must take the skeptics' arguments seriously rather than caricaturing them. Given budget constraints and the real risk that China could force a Taiwan crisis imminently, investments in long-term technological dominance come at a high opportunity cost. Moreover, new technologies will not support deterrence unless they are effectively integrated into operational concepts. This is why it is generally unhelpful to talk about high-tech solutions in isolation. The question should be how targeted investments in technology can support the adaptation of the existing force, providing a bridge between short-term and long-term futures. Ideally, the DOD and political leaders in both parties should focus on policy actions that can begin to strengthen deterrence immediately and can contribute even more to deterrence over time.

Adaptation in the Context of the Indo-Pacific

As the US military adapts to a new generation of emerging technologies, it must tailor its approach to the geography of the region where it would be called upon to fight. The Indo-Pacific is a vast theater, and it is primarily a maritime space. The US military divides the globe into six “areas of responsibility” (AORs), each assigned to a combatant command. US Indo-Pacific Command (INDOPACOM) is responsible for 52 percent of the earth’s surface. Its AOR stretches from the Arctic to the Antarctic, from the Indian Ocean to the west coast of the Americas.

Because of the enormous distances involved and the challenge of maintaining secure logistical and communications links across this vast maritime area, INDOPACOM is primarily focused on air-naval operations. Land warfare and cyber capabilities are important, but they cannot rescue US interests in the region if air-naval power falls short. Historically, conflicts in the Indo-Pacific have been settled by naval power, often spanning the Indian and Pacific Ocean parts of the theater (see table 1.1). The most relevant example is the Pacific War with Japan. Most fighting in that war took place in the Pacific, but Allied sea power in the Indian Ocean was critical for winning the war.

The Indo-Pacific theater’s Pacific region is naturally divided by two major island chains (see fig. 1.1). The First Island Chain (FIC) separates four smaller seas—the Sea of Japan, Yellow Sea, East China Sea, and South China Sea—from the open waters of the Pacific. The Second Island Chain (SIC) stretches north to south through the middle of the Western Pacific, beginning in Alaska’s Aleutian archipelago and extending through Japan and the Ryukyu archipelago, Guam, Micronesia and Palau, Indonesia, and Australia. The United States maintains a strategic presence along the Second Island Chain through two key military installations on Guam: Naval Base Guam and Andersen Air Force Base. The region’s littoral geography creates limited sea lanes for navigating between the enclosed seas of the First Island Chain and the open waters of the Pacific and Indian Oceans.

Table 1.1 Notable historical conflicts in the Indo-Pacific since the Age of Steam

War	Date	Outcome
First and Second Opium Wars	mid-nineteenth century	UK uses naval power to crush Qing dynasty resistance, operate gunboats deep into mainland Chinese river systems, and impose unequal treaties including the concession of Hong Kong.
First Sino-Japanese War	1894–95	Imperial Japanese Navy uses amphibious operations to colonize Taiwan and Korea, establishing sufficient sea power that Western powers are deterred from intervening.
Russo-Japanese War	1904–5	Japan exploits Russian naval weakness to deploy ground troops across Manchuria and seize Port Arthur; Japanese victory is secured when it smashes Russian fleet at Tsushima.
Second Sino-Japanese War	1937–45	Japan executes amphibious invasion of China, deploying over a million men with minimal resistance and beginning conquest and occupation.
Pacific War	1941–45	Japan first seizes Singapore in 1942, cutting off the UK from its Asian holdings and forcing Allies to resupply Chinese Nationalists by air over the Himalayas. By early 1943, however, US Navy seizes advantage in Pacific theater and "island-hops" to Guam, from where it can devastate Japan's home islands with air raids.
Cold War	1949–90	US naval supremacy within First Island Chain deters China from invading Taiwan in all three Taiwan Straits crises and enables the US to deploy forces to Korea and Vietnam.

Figure 1.1 Map of the Indo-Pacific with the First Island Chain and Second Island Chain highlighted

Source: US Department of Defense, *Annual Report to Congress: Military Power of the People's Republic of China 2009* (2009), 18.

The Strait of Malacca and the Sunda Strait are therefore important chokepoints, as are the Miyako Strait and Bashi Channel that pass north and south of Taiwan.

These geographic features are crucial for the US alliance network. INDOPACOM's area of responsibility (AOR) includes five US treaty allies: Japan, South Korea, the Philippines, Australia, and Thailand. Unlike in Europe and North America, where US allies have a collective security agreement, US allies in Asia cooperate with one another but are not formally allied with one another. This "hub-and-spoke" alliance model is a relic of history, and it creates additional burdens for US planners as they consider how to protect US interests while defending five far-flung allies. In a time of conflict, maintaining access to facilities on allied territory would be critical, since sustaining US and allied personnel, capabilities, and logistics networks across the region while fighting a peer adversary would be no easy task. Taiwan falling under the control of the PRC by force would be particularly problematic. All five regional allies would become acutely vulnerable to subsequent PRC coercion, and Washington would find it very hard to reassure them. National security officials in Tokyo in particular understand this fact, which is why they are quietly signaling that Taiwan is a vital national security interest for Japan.[89]

Guam is the most important node in the US Indo-Pacific security architecture (see fig. 1.2). It links the units forward-deployed at US bases in the First Island Chain to the supply lines that stretch from San Diego to Pearl Harbor. Without a secure Guam, it would be difficult to sustain American naval task forces beyond the Central Pacific for very long.[90] To operate effectively within the First Island Chain, US forces also need access to facilities in Japan and ideally the Philippines. Japanese bases contain forward-deployed ordnance. Yokosuka Naval Base is capable of servicing a carrier strike group. The continued presence of US forces in Okinawa remains critically important, with their forward-deployed position providing an irreplaceable deterrent and immediate response capability that cannot be fully replicated by redistributing forces.[91] US bases in the Philippines

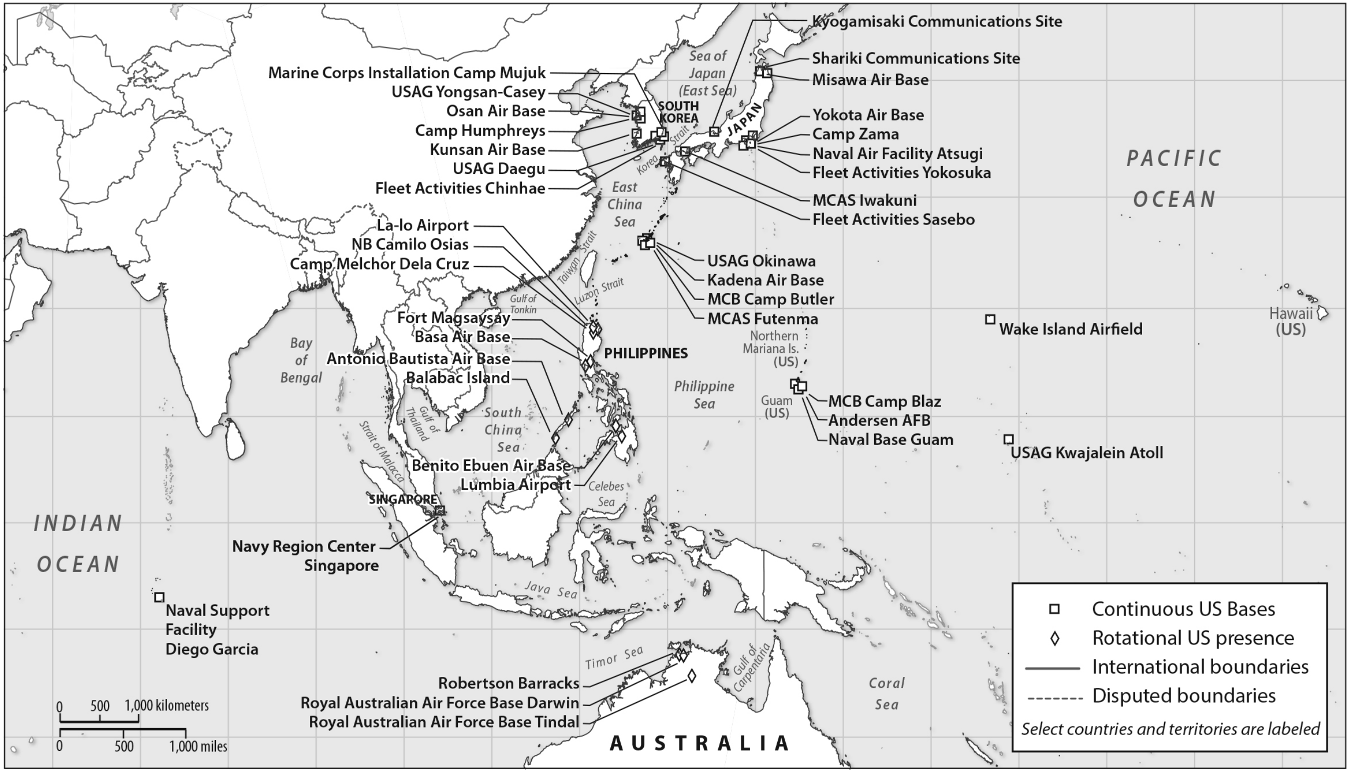

Figure 1.2 US facilities in the First Island Chain

Note: Naval Communications Station Harold E. Holt is not depicted due to space constraints.

Source: Congressional Research Service graphic based on analysis of Defense Department information, including "FY2022 Base Structure Report" data and other documents, reproduced for this volume.

are much smaller, but they are likely to grow in the coming years, thanks to recent agreements between Washington and Manila. The Philippines in the future might host US aviation, forward-deployed ground units, and potentially another major regional naval base.[92] However, existing facilities are in poor condition, and modernizing and expanding them would be nearly as expensive as building new ones. Washington would likely have to bear most of the costs, and it would have to negotiate access rights and related issues with Manila.

One key US geographic advantage is that the United States controls or enjoys exclusive access to strategically located islands strewn across the Indo-Pacific, and its allies control hundreds more. Most of these islands are located within the Second Island Chain. The Second Island Chain therefore represents a highly fortified and diversified second line of defense for US military operations. The Second Island Chain will play an essential role in logistics in any military contingency in the region. The United States and its allies also enjoy access to strategic locations in the Indian Ocean, such as the United Kingdom's base at Diego Garcia. Any major conflict with China would also likely involve action in the Indian Ocean. A key question is what access, basing, and overflight (ABO) rights US forces would enjoy in South and Southeast Asia.[93]

Washington absorbed these geography lessons during the Pacific War against Japan between 1941 and 1945, a conflict that largely centered on control of the Second Island Chain. Once the United States seized Guam, it was able to use the island as a launch point for the aerial bombardment that ultimately forced Japan's surrender. After Japan's empire was dissolved in 1945, the United States decided that the First Island Chain should demarcate its Asian "defense perimeter"—territory it was prepared to go to war to defend. It also gained near-total control over the key islands in the Second Island Chain. In 1948, the Joint Chiefs of Staff advocated for a defense perimeter stretching from the Aleutian Islands through Japan, Taiwan, and the Philippines. General Douglas MacArthur convinced George Kennan that the US needed control of Okinawa, in the First Island Chain, to maintain a viable "striking force."[94] In 1950, Secretary of State Dean Acheson outlined a "defensive perimeter of the Pacific" that essentially followed the First Island Chain, though it excluded Taiwan.[95] Ever since, the US defense perimeter has included all or nearly all of the First Island Chain. (The United States maintained a mutual defense treaty with Taiwan from 1955 to 1980, terminating it as part of its political normalization with the PRC.[96]) Most analysts would argue today that formally bringing Taiwan back within the US defense perimeter would cross one of China's long-standing red lines and would likely trigger a war.[97]

US forces enjoy geographic advantages on the eastern side of the First Island Chain, but they face an acute geographic disadvantage on the western side.[98] In these enclosed seas, close to China's coasts, US surface ships could not operate safely during wartime. The PLA Navy and Air Force (PLAN and PLAAF) face the opposite problem. US assets in the First Island Chain restrict their ability to operate beyond the First Island Chain in a crisis. PLA assets are also dependent on bases inside China, since China lacks the global basing network that the United States enjoys. Nuclear propulsion, air-to-air refueling, and underway replenishment are gradually making it easier for the PLA ships and aircraft to operate far from China's shores, but they could fight most effectively along China's own coast, where they have access to dozens of naval bases, civilian ports, and airfields.[99] Unfortunately, China's rapid advances in long-range strike technology, discussed in chapter 3, increasingly hold US and allied facilities in the First Island Chain and even the Second Island Chain at risk. Transforming the Joint Force to operate and fight effectively in this contested air-naval environment will require not only more money but a new way of thinking about technology, industry, and the changing character of warfare itself.

The services today are developing new operational concepts to fight a modernized air-naval war in the Indo-Pacific. These concepts have sweeping implications for defense procurement, military strategy, and grand strategy.

- The US Navy's concept, Distributed Maritime Operations (DMO), calls for spreading out naval forces to reduce detection risk, while investing in long-range weapons to retain concentrated combat power. DMO requires integrating new communications and technologies, including aerial, surface, and underwater drones, directed-energy weapons, and integrated battle management software.[100]
- The US Air Force's concept, Agile Combat Employment (ACE), follows the same principle.[101] Today, US aircraft in the Indo-Pacific are concentrated at massive bases, most notably the Kadena Air Base in Okinawa, Japan, where the planes are potentially vulnerable to surprise Chinese missile strikes.[102] Under ACE, the Air Force is distributing its forces across many smaller airfields, building hardened facilities at civilian airstrips, acquiring decoys, and adopting new communications technologies to enable aircraft to coordinate across greater distances.[103]
- The US Marine Corps' Force Design 2030 is the most ambitious of the services' adaptation plans.[104] The Marine Corps is transforming itself into a maritime organization capable of conducting reconnaissance, drawing enemy fire away from the Navy and the Air Force, and delivering lethal force against enemy ships. Marine units are training to deploy from small ships to islands in the First Island Chain, well within China's weapons engagement range, with a light logistical footprint to avoid detection. In a conflict, the marines would force China to divert resources from attacking Taiwan or US bases and carriers.
- The US Army's concept, Multi-Domain Operations (MDO), emphasizes integrating land-based forces with air, sea, cyber, and space capabilities to create a unified combat network.[105] MDO involves deploying long-range precision fires to penetrate, disrupt, and destroy enemy anti-access and area denial (A2/AD) systems, such as layered and integrated long-range precision strike systems, littoral anti-ship capabilities, and air defenses. The Army envisions positioning forces on remote islands and ex-

peditionary bases and using cyber and electronic warfare to degrade enemy command and control. It also plans to support logistics operations for the other services.

All four operational concepts emphasize distributing forces over a broad area while retaining the ability to deliver combat power at the decisive point. In particular, they are clearly designed to help defeat a PLA amphibious fleet trying to deliver soldiers and matériel to beachheads on Taiwan. They also aim to enable US forces to break seams in China's reconnaissance network and thereafter to unleash heavy strikes against China's naval forces. All these new concepts implicitly emphasize the need to use superior technology to offset China's quantitative advantages.

Unfortunately, as we will see in the following chapters, the US defense industrial base, the DOD procurement system, and the US military's global logistics system are not yet capable of equipping the services to fully operationalize their new concepts. Even in areas where the United States enjoys a dominant technological lead, it is struggling to convert these advantages into capabilities deployed on the ground. If these new operational concepts are to enhance deterrence, the DOD needs to resource them effectively over the next five to fifteen years. That requires a historically informed overview of all the key areas of combat and consideration of how it can improve force readiness and revitalize the allied defense industrial base at a reasonable cost.

Conclusion

To deter China in the Indo-Pacific, the United States must field a force capable not only of denying a Taiwan invasion but also of decisively defeating China in an air-naval war across the region's vast maritime domain. Backstopping the force, the US and its allies need a defense industrial base capable of sustaining their cutting-edge operational concepts in a potential protracted conflict. American defense planners learned critical lessons during the Pacific War with Japan, but eight decades of land warfare dominance have left the DOD's institutional memory on air-naval operations alarmingly eroded. Historical insights into the evolving character of air-naval warfare illuminate the challenge: these conflicts are often brief and ferocious, and the side that strikes effectively first reaps cascading advantages. Over time, industrial capacity and operational range become decisive, as battles hinge on control of islands and sea lanes. This analysis underscores the rising vulnerability of US facilities in the First and Second Island Chains and the urgent need to bolster their defenses. Congress must dramatically scale up support for the Pacific Deterrence Initiative (PDI), dispersing US capabilities, hardening facilities, and deepening logistics networks in cooperation with allies.

The Navy, the Air Force, and the Marine Corps recognize these imperatives and are shifting toward more dispersed, mobile operations powered by lethal, long-range precision fires. Yet, as subsequent chapters will show, a daunting gap persists between operational concepts and the force structure required to execute them. The US military must urgently address critical shortfalls in range, reconnaissance, and data management while fortifying space-based assets vulnerable to disruption. Meeting this challenge will demand institutional agility and a large industrial expansion. It will almost certainly require burden sharing with allies.

Divesting from legacy systems and fast-tracking emerging technologies will be politically fraught and institutionally jarring. For the military, it requires a cultural and doctrinal evolution. For Congress, it means reining in spending on contractors with entrenched political clout. For the defense industry, it threatens established revenue streams, though new markets will emerge as the production of long-range munitions, satellites, and drone systems scales up dramatically. These disruptions are inevitable—it is better to confront them now than later.

The time for a bold, unified strategy is now. Key stakeholders must urgently chart a shared vision for adapting the Joint Force and the defense industrial base to sustain deterrence over the medium term while shoring up immediate readiness in the Indo-Pacific. Within the DOD, building interservice consensus around clear objectives is a critical starting point. These reforms and investments are more than technical improvements—they are fundamental to rebuilding national confidence in our ability to prevail. By developing cutting-edge technologies and revamping our defense industrial base, we can demonstrate not just the capability to fight but the ability to win by a substantial margin and at an acceptable cost.

But the hoped-for political mandate may not come, so American defense planners need a backup plan: a clear-eyed understanding of the hard choices they will face in preserving deterrence in a time of tight budgets. The following chapters look across the current force structure and defense industrial enterprise to frame the key choices and offer some historically informed perspectives, options, and in some cases, specific policy recommendations. The smaller the margin for error grows, the more important it will be to get these choices right.