Sea Control
Feasible, Acceptable, Suitable, or Simply Imperative

Lieutenant Colonel Michael F. Manning, USMC

Abstract: As the United States faces a rise in credible antiaccess/area-denial (A2/AD) threats, the U.S. Department of Defense (DOD) started developing counteraccess denial strategies early in the twenty-first century. Access denial strategies are not a new defensive strategy; what makes access denial challenging on the modern battlefield is the dramatic improvement and proliferation of weapons capable of denying access to or freedom of action within an operational area. Through a historical review of Japanese naval battles during the early twentieth century, a framework to model possible future contests for control of the maritime domain is possible. Control of the maritime domain is the prerequisite for assured access and sets the condition for successful Joint operations. In this article, recommendations for achieving success in this new operating environment are offered, including investing in low-cost technology that extends ranges of A2/AD capabilities.

Keywords: sea control, antiaccess/area-denial, A2/AD, Japanese naval history, defense in depth, Chinese sea denial

> For whosoever commands the sea commands the trade; whosoever commands the trade of the world commands the riches of the world, and consequently the world itself.
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> ~ Sir Walter Raleigh[1]

LtCol Michael F. Manning was commissioned in 2004 after graduating from Saint Louis University, MO. After completing The Basic School, LtCol Manning attained the military occupational specialty of ground supply officer. Manning is serving as the Fleet Marine Forces, Pacific, G-35, future operation branch head, Camp Smith, HI. He operationally deployed in support of Operation Iraqi Freedom (2003–11), and has completed Western Pacific deployments in support of the 11th and 13th Marine Expeditionary Units.

Three-quarters of the Earth's surface is covered by ocean. An adversary that is capable and willing to restrict access to any portion of the maritime domain is a threat to the prosperity of the entire international community, as demonstrated by Japan's aggressive sea-denial strategy during World War II (WWII) in the Pacific. In response, the U.S. Navy regained control of the sea through the systematic destruction of Japan's sea-denial capabilities, which allowed the United States to attack Japan's homeland and gain unconditional surrender. Access-denial strategies are not a new defensive strategy, but the United States is facing a rise in credible antiaccess/area-denial (A2/AD) threats due to the dramatic improvement and proliferation of weapons capable of denying access to or freedom of action within an operational area. To respond to increasing complexity of A2/AD, the creation of a unified U.S. strategy for the establishment of sea control is imperative because control of the maritime domain is the prerequisite for assured access, and assured access sets the condition for successful Joint operations.

During WWII, the United States' control of the sea allowed for the creation of thousands of kilometers of sea lines of communication to move and sustain Allied forces in their progress toward Japan. As Allied forces advanced through the Pacific theater, the breadth and depth of their communication lines extended, requiring greater control of the sea to protect from Japanese naval attacks. Japan's naval aim was to deny the United States access to the Western Pacific Ocean by destroying the Pacific Fleet in a decisive naval engagement. Japan, as a maritime nation, understood that control of the maritime domain prohibited its adversary from moving troops and supplies, which denied the projection of combat power into the Pacific theater.[2] Japan employed a defensive strategy of layered capabilities throughout the Pacific to keep the United States from projecting combat power capable of defeating established Japanese defenses.

In a modern maritime environment, with a persistent A2/AD threat, operational planners must focus on establishing control of the sea as a primary objective because the current counter-A2/AD concepts increase maritime planning efforts exponentially. Current access-denial threats require a combination of simultaneity, rapid operational tempo, and distributed operations to restore operational access in a contested environment.[3] These elements of operational art impact the design and execution of sea control as each element applies additional strain on the management and protection of the maritime domain. In this new era, the Department of Defense (DOD) must determine the key considerations for the geographic combatant commander regarding sea control in a maritime campaign.

The DOD increased the development of its counter access denial strategies early in the twenty-first century as a noticeable rise in credible A2/AD threats took shape throughout the world. The consistent component for the strategies

is the requirement for multiple, simultaneously distributed operations. Specifically in the Pacific region, distributed operations require large sea control efforts to ensure freedom of movement and sustainment for dispersed combat power. The sea control requirements in support of current distributed operations strategies impose a greater challenge for the Navy than previously encountered. In 2018, the Chief of Naval Operations, Admiral John M. Richardson, stated, "it has been decades since we last competed for sea control, sea lines of communication, access to world markets, and diplomatic partnerships. Much has changed since we last competed."[4]

To determine the key considerations pertaining to control of the modern maritime domain, it is imperative to start by reviewing current U.S. policy and strategy pertaining to access-denial challenges. Understanding the current policy and strategy allows for a review of the developing counter-A2/AD strategies defined by the U.S. Navy, Air Force, and Marine Corps. Once current policy, strategy, and doctrine are analyzed, a historical review of Japan's naval engagements during the Sino-Japanese War (1894–95), the Russo-Japanese War (1904–5), and the Solomon Islands campaign (1942–43) provides similarities to the current Pacific maritime domain.[5] The analysis of these naval conflicts illuminates many lessons pertaining to sea control that remain applicable in the current maritime environment. Finally, the identification that control of the maritime domain is the prerequisite for assured access, and that assured access sets the conditions for successful Joint operations, highlights potential areas of future research across the current maritime domain.

U.S. Sea Control Policy and Strategy

President Donald J. Trump's 2017 *National Security Strategy* (NSS) directed that the United States be able to defeat any adversary, retain overmatch in capabilities, and ensure the ability to deter potential enemies by convincing them that they cannot accomplish objectives through the application of force or other forms of aggression. Specific to the Pacific, the NSS states that the United States "will reinforce our commitment to freedom of the seas and the peaceful resolution of territorial and maritime disputes in accordance with international law."[6] Ensuring freedom in the maritime domain is even more complex in an era when the United States no longer has assured dominance in this domain.[7]

In the current maritime domain, the Joint Chiefs of Staff established the U.S. policy pertaining to freedom of global navigation in the *Joint Operational Access Concept*. The *Joint Operational Access Concept* defined the global commons as areas of air, sea, space, and cyberspace that belong to no one state.[8] The concept further stated that the essential access challenge for future Joint forces is the ability to project military force into an operational area and exe-

cute sustainment against a hostile and capable adversary. The *Joint Operational Access Concept* labeled the specific access challenge as "operational access." Once operational access is achieved that creates freedom of action to accomplish the mission and sustain the force, the desired end state for the Joint force is labeled as "assured access."[9]

To overcome the access challenge described in the *Joint Operational Access Concept*, the Joint Chiefs of Staff published a supportive strategy entitled *Joint Forcible Entry Operations*. The Joint Staff defined forcible entry as coordinated operations across the DOD designed to seize and hold lodgments against armed opposition. The objective of forcible entry operations is to achieve operational access by projecting combat power into an operational area allowing for maneuver space against an armed adversary.[10] The Joint forcible entry strategy provides a list of principles that are necessary for operational success. One of the principles is the superiority of the maritime domains, which the entry strategy labels as sea control. To operationalize the concept of sea control in a modern maritime environment, it is necessary to combine historical naval theories with current U.S. maritime policies.

Sea Control in a Modern Maritime Environment

Naval theorists have studied and debated the concept of dominance in the maritime domain throughout history. One of the earliest case studies is found in the Battle of Salamis (480 BCE). Through control of the sea, the smaller Greek naval force defeated the superior Persian naval force. The success of the Greek naval forces severed the Persian supply lines and ultimately contributed to the survival of Greece.[11]

Two influential naval theorists, Alfred Thayer Mahan and Sir Julian S. Corbett, established the foundational debate about sea control. Both Mahan and Corbett debated the extent that sea control is possible and the best manner for achieving it. Mahan believed that the navy's primary focus was the destruction of the enemy's fleet. Removal of the enemy's fleet established total command of the sea needed to protect sea lines of communication, secured friendly and neutral commerce, and allowed attacks on enemy trade.[12] Contrary to Mahan, Corbett believed that nations could not conquer the sea because it is not susceptible to ownership. Corbett believed that command of the sea is relative and not absolute, so Corbett favored the strategic defensive and recommended naval blockade as the primary means for sea control.[13]

Mahan and Corbett agreed that for a nation to succeed in war, it must control the maritime domain. Where their theories differ is the type, extent, and purpose of control and the way a state can gain control of the sea. While Mahan saw command of the sea as an operational end in itself, Corbett claimed that command of the sea will never win a war.[14] With both theories, once a nation

gains control of the sea, its adversaries are denied safe access to the maritime domain, which leads to a contest for control of the sea.[15]

Significant changes have occurred in naval theory, tactics, and technology since Mahan and Corbett published their theories before the start of World War I. Despite these changes, modern sea control theorists believe that Mahan and Corbett's foundational theories remain valid today. In 2013, Geoffrey Till provided a modern definition for sea control. Till's definition stated that *sea control* provides the ability to disrupt freedom of movement and narrows an adversary's strategic options.[16] In 2015, the Navy published its current maritime control philosophy in *A Cooperative Strategy for 21st Century Seapower*. Using the concepts listed in *Command and Control of Joint Maritime Operations*, Joint Publication (JP) 3-32, along with the concepts in it's a *Cooperative Strategy for 21st Century Seapower*, the Navy seeks sea control that allows naval forces to establish local maritime superiority and deny an adversary that same ability. Sea control is achieved through the employment of forces designed to destroy enemy naval forces, suppress enemy sea commerce, protect vital sea lanes, and establish local military superiority in vital sea areas.[17]

In consideration of post-WWI and II technological improvements, the Navy adjusted its definition of sea control. The Navy's current definition of sea control states that total control or denial of the sea is not sustainable for long periods. Further, in a modern maritime environment, control of the sea, in geographical terms, is more narrowly focused. The Navy defined sea control as a nation's ability to operate in the maritime domain without enemy interference.[18] Regardless of the category or focus of control, the Navy's definition remains rooted in a principle from Corbett's philosophy. Control of the sea is not an end in itself, but the United States requires control in the maritime domain as it "enables strategic sealift and facilitates the arrival of follow-on forces." The *joint operational access concept* defines the introduction of follow-on forces, projected from the maritime domain, as "cross-domain synergy." *Cross-domain synergy* is essential in the modern operating environment as the additive employment of capabilities in different domains enhances the effectiveness and compensates for the vulnerabilities of the others, which provides the freedom of action required in an access-denied theater.[19] The ability to project combat power and establish cross-domain synergy, historically, has created the conditions for a nation to be successful in war.[20]

Till carries naval theory forward from Mahan and Corbett into the modern maritime environment through his concept that the contest for control of the sea will not occur fleet-to-fleet on the open ocean, but in littoral regions facing very different challenges.[21] The concept that the contest for control is moving away from the open ocean and toward littoral regions greatly increases the challenge of gaining sea control. Nations not only have to compete with

their enemy's major air and naval capabilities but must also defend against land-based airpower; missiles; torpedoes; short-range, antisurface warfare assets; and coastal mines.

The complexity of operating in the littoral region is evident in the region's basic definition. The DOD defines the *littoral region* as one environment consisting of two components. The first component is the ocean, outward from the shore, which must be secured to support operations ashore. The second component is the land, inward from the shore, which can be supported or defended from the sea.[22] Using this definition, the boundaries of a littoral operating environment are constantly changing based on the progress of friendly naval and ground forces.

The increased potential from new threats, along with the technological improvements of all current access-denial capabilities, suggests that the ability to apply sea denial in the littoral region is less challenging while the ability to gain sea control is more complex.[23] One example of the maritime complexities encountered in a littoral region is evident in the 2006 conflict between Israel and Lebanon. As Israeli ships were enforcing a naval blockade off the coast of Beirut, Hezbollah forces fired antiship cruise missiles from the coast, damaging one of the Israeli ships. Operating in the cluttered littoral environment, the ship's reaction times were shortened and it could not effectively deploy defensive measures.[24] Had Hezbollah's forces been better trained or a fully funded state actor, they could have effectively stopped the naval blockade through its shore-based sea denial missile capability.

To prevent an adversary from projecting combat power from the maritime domain, a nation must apply sea denial along its coastline. The current terminology for strategies designed to deny an adversary access to any domain is A2/AD. The *Joint Operational Access Concept* defines *antiaccess* as actions and capabilities, usually long range, designed to prevent an opposing force from entering an operational area, and it defines *area-denial* as actions and capabilities, usually short range, designed to limit an opposing force's freedom of action within the operational area.[25]

The combination of layered antiaccess and area-denial actions and capabilities create a defense-in-depth strategy designed to attrite advancing hostile forces.[26] The attrition of advancing enemy forces ensures that adversaries are not able to mass sufficient combat power capable of achieving successful war termination. The critical component of a defense-in-depth strategy is the ability to outrange the adversary in multiple domains. The significance of this style of defense is not a new concept. The Japanese naval leadership designed its defense of the Pacific during WWII using the concept of outranging the enemy through both land-based and afloat aviation, establishing fortified island defenses, and using improved torpedo technology as the critical means of achieving success.

What makes this style of defense concerning on the modern battlefield is "the dramatic improvement and proliferation of weapons and other technologies capable of denying access to or freedom of action within an operational area."[27]

Great Power Competition in the Modern Maritime Environment

The NSS identifies China as a current near-peer adversary seeking to replace the established rules-based international order across the Pacific to dictate new international norms and behavior. As a result, Chinese access-denial capabilities are used as the pacing threat presenting the greatest challenge to U.S. sea control efforts in the modern maritime environment. China's maritime-denial strategy is developed around its short- and intermediate-range ballistic missiles, its antiship cruise missiles, and its integrated air defense systems. To create the most complex challenge, China continues to employ all weapon systems across its air, surface, and subsurface forces, allowing for multiple delivery methods.

China's antiaccess capabilities are focused on the long-range payload and fixed position targeting ability of ballistic missiles to target fixed infrastructure or large land forces. China's family of ballistic missiles have the capability to reach all current U.S. fixed infrastructure in the Pacific.[28] The precision and lethality of the cruise missile and integrated air defense systems that can target maritime and air forces are the focus of China's area-denial capabilities.[29]

China constantly improves its access-denial capability by expanding its ability to launch short-range ballistic missiles, intermediate-range ballistic missiles, and antiship cruise missiles from a variety of land, air, and maritime surface and subsurface platforms.[30] China's ability to launch missiles from air and maritime platforms, compared to its land-based platforms, increases the maximum range of its missiles in relation to the operating radius of the platform from which it is launched. Using multiple, diverse platforms, China increases the range and mobility of its missiles, which increases the complexity and lethality of its access-denial network. The increased range and mobility create the ability for China to engage advancing enemy forces farther from Chinese territory. The overarching principle of all access-denial strategies is to align the cost of an attack with its potential loss, such that a million-dollar missile leads to the loss of a billion-dollar ship.[31]

China is also extending the maximum range of its land-based A2/AD capabilities through the militarization of reclaimed territory in the South China Sea. The militarization of the Spratly Islands, for example, extends China's interior lines, which increases the range of its access-denial strategy. A nation operating with interior lines possesses the advantage of increased range, volume, and payload of munitions.[32] With an understanding of the Navy's current definition of sea control, it is evident that China's access-denial strategy, a layered defense in

depth operating from multiple diverse platforms, presents a challenge for the United States' policy of ensuring freedom of access to the global commons in the Pacific region.

U.S. Strategies to Counter Access Denial

To achieve the United States' political aim of ensured access to the global maritime domain, the DOD developed counter-A2/AD strategies to defeat an adversary's attempt to implement sea denial. Specifically, the Air Force, Navy, and Marine Corps developed interconnected counter-A2/AD strategies that contribute to the Joint forcible entry strategy. All of the developed strategies aim to counter or avoid the devastating effects of near-peer, long-range precision fires that can accurately target legacy forward-based U.S. infrastructure, such as large runways, deepwater ports, and major troop installations.[33]

The Air Force's 2016 strategic document, *Air Superiority 2030 Flight Plan*, defines the need for capabilities and strategies that provide options to enable Joint force air superiority in the highly contested environment of 2030 and beyond.[34] To achieve this goal, Air Force defines five capability development areas. The first area of focus is basing and logistics. Within this capability, the two pillars of *recover and reconstitute* along with *support and sustain* impact the Air Force's counter access-denial strategy within the Pacific. Both pillars target the Air Force's ability to keep fully armed and fueled planes actively engaging denial capabilities.

The Air Force developed the agile combat employment concept to achieve the desired end state of these pillars. To account for the vast distance and the water-to-land ratio of the Pacific theater, the Air Force created a rearming, repairing, and refueling capability that can operate away from large, legacy forward-based runways while creating the smallest signature possible. The agile combat concept designs task-organized, combat support packages tailored to rearm and refuel combat planes rapidly. The agile combat employment concept "operates in austere environments with minimal resources, enabling better support to continuous operations providing projection of airpower from anywhere in the Pacific." An example of a tailored support package would be the Service's Boeing C-17 Globemaster III task-organized to carry the necessary supplies and equipment for cross-trained maintenance and support personnel to rapidly rearm, refuel, and repair Lockheed Martin F-22 Raptors on an austere runway. Upon completion of replenishment actions, the Raptors and the Globemaster would depart as quickly as possible to avoid detection and targeting by the adversary.[35] Through the agile combat employment concept, both the support package and the combat airplanes operate in the adversary's denial environment while minimizing their signature on the ground to the greatest extent possible. By inserting and extracting as quickly as possible and avoiding large legacy

fixed aviation infrastructure, the agile combat employment concept keeps fully armed combat aircraft constantly airborne to engage enemy aircraft or destroy A2/AD assets.

With the Air Force focused on combating and minimizing denial capabilities in the Pacific air domain, the Navy, supported by the Marine Corps, focused on defeating maritime access-denial capabilities. Despite modern naval theorists forecasting that the contest for sea control will occur in the littoral regions, the Navy must also remain prepared to win fleet battles in the open ocean. The Navy's ability to protect freedom of navigation in the open ocean is critical because "only through enduring sea power can the United States bring the logistical sinew of the joint force to bear."[36]

In 2016, the Chief of Naval Operations published the Navy's major counter-A2/AD strategy, *distributed maritime operations* (DMO). This concept "makes geography a virtue by spreading the combat power of the fleet, holding targets at risk from multiple attack axes, and forces adversaries to defend a greater number of targets." Distributed maritime operations also "challenge an adversary's decision-making cycle and material investment methodology."[37] Under this concept, Navy ships are employed in a widely dispersed manner, operating on a common data link. Operating on a common data link allows all sensors and weapons across all ships to connect to a common tactical operating picture. A distributed fleet, operating on a common tactical operating picture, possesses a greater offensive and defensive capability against all near-peer access-denial threats. Despite DMO's focus on a fleet-on-fleet engagement in the open ocean, the Navy is equally focused on the landward component of sea control.

The distributed maritime concept allows the Navy to achieve greater working sea control, making it possible for the U.S. Army and Marine Corps to land ground forces on contested shores. Landing ground forces is vital due to the enemy's ability to support sea denial through shore-based missiles and integrated air defense systems. To defeat the land-based component of sea denial, the Navy and Marine Corps developed the littoral operations in a contested environment (LOCE) concept. The littoral operations concept calls for "a modular, scalable, and integrated naval network of sea-based and land-based sensors, shooters, and sustainers" capable of operating within and defeating the adversary's access-denial capabilities. Forces operating within this concept seek to counter the adversary's sea-denial abilities while supporting sea-control efforts to further friendly maritime power projection operations. The LOCE is vital to contesting the maritime domain as future adversaries, operating with increasingly formidable sea-denial technology, can control choke points, hold key maritime terrain, or deny freedom of action and maneuver at ever-increasing ranges.[38]

One of the supporting concepts within the littoral operations concept is the Marine Corps' expeditionary advanced base operations (EABO) concept.

The expeditionary base concept is under development as complementary to the Navy's distributed maritime operations concept. EABO employs resilient, sustainable, low-signature Navy and Marine Corps assets away from legacy fixed infrastructure, seeking to neutralize or secure adversarial sea-denial capabilities or support friendly sea-control actions. Expeditionary advanced bases can better position naval intelligence collection assets; better posture coastal defense or antiair missiles; establish forward arming and refueling points for aircraft, ships, and submarines; or provide expeditionary basing for surface screening/scouting platforms. With the publication of the Marine Corps' new force design concept, *Force Design 2030*, the Marine Corps is actively building forces and processes to implement expeditionary advanced base operations, "stand in force operations," and establish a "naval expeditionary force-in-readiness" compatible with the Navy and Joint force counter-A2/AD mentality.[39] All of the above-listed possibilities, created under the expeditionary basing concept, increase sensor and shooter capacity while complicating adversarial targeting abilities.[40]

The DMO and EABO concepts are interconnected as land forces employed on an expeditionary advanced base are designed to operate using the same common operating picture as the distributed naval vessels. When both seaward and landward forces are employed with a common operating picture, all sensors and shooters are connected regardless of location. The connection of distributed sensors and shooters, both landward and seaward, increase the efficiency and effectiveness of all systems while reducing the vulnerability of all resources. The expeditionary base concept creates a more dispersed, resilient, and hard to target forward-based element that generates the virtue of mass without the historical vulnerabilities of concentration.[41] Having reviewed the developing sea-control concepts and the current U.S. counter-A2/AD doctrine, it is imperative to review relevant historical examples of near-peer adversaries contesting sea control to identify lessons applicable to a modern maritime environment.

Historical Case Study of Sea Control: Japan, 1900–1945

A review of twentieth-century Japanese naval history identifies many lessons pertaining to the contest for the maritime domain between near-peer adversaries. The Japanese naval experiences during the Sino-Japanese War (1894–95), the Russo-Japanese War (1904–5), and the Solomon Islands campaign of World War II (1942–43) provide operational context for the development of Japanese naval sea control strategy and tactics. Japan's naval history was selected for this case study because in all periods reviewed, Japan sought control of the maritime domain from peer nations possessing equal or greater naval capability. This distinction creates relevance for the United States today, as post-WWII, the United States has not faced a peer threat that possessed equal or greater maritime capabilities than can be seen in the current Pacific struggle with China.

From Japan's naval history, five lessons of sea control are identified that remain relevant today for any nation aspiring for control of the maritime domain.

The first lesson is that successful maritime operations leading to control of the sea are a prerequisite for successful Joint operations.[42] Throughout the first half of the twentieth-century, Japan demonstrated its ability to establish control of the maritime domain in all three conflicts. In all three conflicts reviewed, Japan sought control of the sea by following the Mahanian principle of seeking a decisive battle in which to destroy the enemy's fleet. In both the Sino-Japanese and Russo-Japanese Wars, Japan's actions inflicted damage to both the Chinese and Russian fleets, ensuring that neither was able to contest Japan's control of the sea. Gaining control of the sea allowed Japan to project combat power ashore and inhibit China and Russia from moving their combat power into or across the theater.[43] Japan's actions allowed combat power projection into Korea, China, and Russia, while impacting their adversary's ability to project combat power onto Japanese territory. These conditions created a combat power advantage for Japan, which contributed to its success in both the Sino- and Russo-Japanese Wars.

Japan's naval actions during World War II serve as a counterpoint to the previous sentiment. During the Solomon Islands campaign, Japan's failed maritime operations allowed the United States to contest Japan's control of the Pacific maritime domain. Ultimately, the United States defeated Japan's sea-control efforts, which created conditions for the United States to establish land-based aviation in the Pacific capable of delivering two war-terminating atomic weapons. As shown by Japan's naval history, nations increase their chances of successful war termination when control of the sea creates conditions for Joint operations into other domains.

The next lesson is that control of the maritime domain is so vital that adversaries will contest control of the sea. Despite Japan's early establishment of control of the sea in both the Russo-Japanese War and the Solomon Island campaign, Russia and the United States applied resources to contest control of the maritime domain. In the Russo-Japanese War, Japan established sea control through attacks and blockades of the Russian Fleet in Port Arthur. Understanding the significance of Japanese control of the sea, Russia sent its Baltic Fleet 12,875 kilometers (km) to contest Japan's control of the sea.[44] While Russia's Baltic Fleet was ultimately defeated by the Japanese Navy, the Russian military leadership accepted the risk of losing the Baltic Fleet in attempts to defeat Japanese control of the maritime domain.

Japan designed its early maritime operations in the Pacific to establish control of the maritime domain to protect the flow of vital natural resources and to prevent the United States from projecting combat power into the Pacific theater. The United States, after recovering from the attack on Pearl Harbor,

Hawaii, contested Japan's control of the maritime domain by applying resources to a Joint Army-Navy plan of attack along a dual-axis approach to the Japanese home islands.[45] Japan sought to cut off and isolate Australia from the Allied war effort, which the United States could not allow to happen. As a result, the United States developed a campaign focused on capturing the Solomon Islands to protect Australia and create secure sea lines of communications through the southern Pacific. Throughout the Solomon Islands campaign, the United States successfully applied air, land, and maritime assets across multiple engagements to remove Japan's control of the maritime domain. The actions of Russia and the United States demonstrated the significance of sea control between near-peer adversaries and that once sea control is gained, adversaries will apply resources to contest established control.

Japan's third lesson of sea control was that control of the maritime domain is, at best, local and temporary. The Japanese naval philosophy of the early twentieth-century focused on Mahanian principles of total control of the sea through the destruction of the adversary's fleet.[46] During all three conflicts, Japan attempted to destroy the fleet of its adversary but was unsuccessful in each of its attempts to completely destroy their adversary's fleet. While the Chinese did not attempt to contest Japanese control of the sea during the Sino-Japanese War, both Russia and the United States did challenge Japanese control of the sea throughout the conflict.

In the Russo-Japanese War, Japan's local control of the Yellow Sea and the Sea of Japan did not prevent Russia's Baltic Fleet from traveling to and attacking into Japanese-held waters. Russia's Baltic Fleet was ultimately unsuccessful in its attempts to defeat the Japanese Navy, but their actions demonstrated that the Japanese Navy only controlled the maritime domain in relation to the Korean theater. During the Solomon Islands campaign, for six months, the United States and Japan fought for control of the maritime domain surrounding Guadalcanal. Throughout these six months, both the United States and Japan possessed what is defined today as "control in dispute."[47] Japan could not control enough of the maritime domain to prevent American forces from projecting combat power ashore in August of 1942 to counter Japanese ground forces emplaced on Guadalcanal. Until February 1943, both nations operated in the waters around Guadalcanal with significant risk as neither side possessed credible sea control.[48] Both the Russo-Japanese War and the Solomon Islands campaign demonstrate that absolute control is a theoretical extreme and may not be attainable in a near-peer maritime conflict.

With the advances in naval weapons technology, Japan's focus on improving their ability to out-range adversaries was the next impactful lesson. During the interwar period between WWI and II, stemming from the restrictions in the naval treaties, Japan understood they could not compete with peer navies

in battles of capital ships.[49] As a result, Japan prioritized the technological development of weaponry with longer ranges, such as torpedoes, reconnaissance and attack aircraft, and submarines.[50] The contest for the maritime domain around Guadalcanal during the Solomon Islands campaign demonstrated this lesson. Japan successfully used torpedo attacks from airplanes, submarines, and destroyers to defeat U.S. capital ships. Japan then coupled these torpedo attacks with night tactics to increase its effectiveness against U.S. ships poorly trained in night tactics. These torpedo attacks and night tactics allowed Japan to not only defeat Navy ships, but it also allowed Japan to land or resupply combat forces on Guadalcanal despite the United States' sea-control efforts.[51] A secondary benefit of torpedo improvement for Japan was the financial investment. The cost of improving and producing the advanced torpedo was far less than what was required to produce larger, more advanced capital ships. As a result, Japan gained an advantage over the United States by producing an effective weapons capability of threatening, and when successful even inflicting, great damage to the United States' expensive capital ships.

To increase the effectiveness of out-ranging the enemy, the use of interior lines provided considerable benefit to the belligerent possessing the ability to reinforce or concentrate its elements faster than the enemy force can reposition. In the Russo-Japanese War, Japan defeated Russia's Baltic Fleet after the Baltic Fleet sailed 12,875 km prior to engaging Japanese naval forces possessing interior lines.[52] During the Solomon Islands campaign, the United States defeated Japanese naval forces after Japan overextended its interior lines attempting to isolate Australia. The capability to out-range an adversary allows a nation to blunt the combat power of an advancing adversary. When supportive interior lines increase a nation's ability to out-range its adversary, a smaller nation can reduce an unfavorable balance in combat power.

The final lesson gained from these three conflicts was the contribution ground forces provided to sea-control efforts. During all three conflicts, Japan sought immediate control of the sea to allow for the delivery of combat power onto hostile shores or to claim undefended territory. During the Sino-Japanese and Russo-Japanese Wars, the Japanese ground forces focused on defeating the enemy's army to achieve victory. During the Russo-Japanese War, after the successful Japanese naval blockade of Port Arthur, Japanese ground forces contributed to control of the maritime domain by using siege weapons to complete the destruction of the Russian Fleet anchored in the harbor.[53] The destruction of Russia's Port Arthur Fleet achieved Japan's Mahanian goal of absolute control of the waters in the Yellow Sea as well as the Sea of Japan. Without the direct contribution from ground forces, Russia's Port Arthur Fleet might have remained intact, which would have complicated Japan's control of the maritime domain once the Baltic Fleet arrived.

Another aspect regarding ground-based forces that is critical to sea-control efforts is the impact of land-based aviation assets. With the advancement of technology and the development of airplanes, during the interwar period both Japan and the United States identified the superiority of land-based aviation to carrier-based aviation. While carrier-based aviation revolutionized fighting in the maritime domain, the advantage in range and payload provided by land-based aviation far outstripped carrier-based aviation.[54] Henderson Field, established on Guadalcanal during the Solomon Island campaign, provided critical land-based aviation support to the United States' contest for control of the sea during the Solomon Islands campaign. The projection of ground forces can support or enhance a nation's sea-control capability either through the extended range of land-based aviation or through direct ground force action against an adversary's sea-control capabilities.

Japan, in all three conflicts, understood that control of the sea was critical for its ultimate success as control of the maritime domain set the conditions necessary for a favorable balance of combat power. In the Sino-Japanese and Russo-Japanese Wars, Japanese leadership set their initial military aim on establishing control of the sea to allow for the projection of combat power necessary to achieve their political aim. During WWII, however, Japanese leadership set their initial military aim on establishing control of the sea to deny the United States from projecting combat power into the Pacific theater. During the Russo-Japanese War and the Solomon Islands campaign, both Russia and the United States viewed Japan's control of the sea as sea denial, which required both nations to contest Japan's control. Russia and the United States demonstrated that a willing adversary, capable of contesting established sea control, ensures control of the sea is temporary or localized. Finally, the Japanese naval leadership learned that the critical capabilities for gaining control of the maritime domain are the ability to out-range the enemy and the ability to project ground forces capable of supporting sea-control efforts.

Historians claim that Japan was successful in both the Sino-Japanese and Russo-Japanese Wars, not because of its great military strategy and action but because China and Russia failed in their respective military strategies and actions. S. C. M. Paine claims that Japan developed its flawed WWII naval strategy from the theory of "victory disease" as Japan was successful in the two previous conflicts due to poorly executed naval strategy and tactics by China and Russia.[55] The contest for sea control in the Pacific theater demonstrated that a significant component of grand strategy between peer nations must be control of the maritime domain.

Recommendations for Further Research

The creation of a unified U.S. strategy for the establishment of sea control is im-

perative because control of the maritime domain is the prerequisite for assured access, and assured access sets the condition for successful Joint operations. A unified strategy, published by 2022 with an executive agent identified within the DOD, ensures that all Services work in concert to develop mutually supporting concepts, applicable to as many domains as possible, while avoiding redundant technology, systems, or processes. Ideally, this unified strategy would create areas applicable to interagency and international partners to further increase the effectiveness and reduce waste. Specific to the maritime domain, as the Navy cannot maintain sea control of the entire globe, international partners operating from a common sea-denial strategy provide the combat power needed to ensure global freedom of the maritime domain. Based on the historical lessons identified from the review of near-peer adversaries contesting sea control, and the access-denial capabilities of current near-peer adversaries, the following recommendations are provided for further research and review.

The primary effort should be the development of a unified DOD counter-A2/AD strategy applicable across all domains. Specific to the maritime domain, the strategy must holistically balance the logistical requirements arising from the multitude of distributed operations designed to defeat access-denial capabilities. Small forces dispersed across the maritime geography require an extensive logistical network to ensure all forces remain combat effective. While the DOD is working to make units as self-sufficient as possible, certain classes of supply, such as munitions, are still required to be resupplied. A logistical network, including the distribution of assets, to sustain a theater of dispersed ships and forces does not currently exist. Ensuring a logistical focus will avoid the failure Japan encountered when it overextended its interior lines during WWII.

The strategy should also focus on the expansion and integration of concepts that directly apply ground combat forces, either land-based aviation or combat troops, into a contested environment to defeat adversarial sea denial and support friendly sea control. The agile combat employment, expeditionary advanced base operations, littoral operations in a contested environment, and distributed maritime operations concepts reduce vulnerability for small elements while achieving the benefit of dispersed, coordinated lethality. These concepts create the conditions for control of the sea and assured access allowing for the follow-on of large land forces necessary to end wars. All developed concepts that are designed to defeat access-denial capabilities require coordination within the DOD to ensure efforts are not unnecessarily redundant, or worse—counterproductive. Japan demonstrated the benefit of ground troops directly supporting sea denial during the destruction of Russia's Port Arthur Fleet in the Russo-Japanese War.

Two critical components of any concept that applies ground forces to support control of the maritime domain are delivery platforms and technology

supporting access to a common operating picture. The Navy's current inventory of amphibious ships, which are considered capital ships, are too lucrative a target to operate inside an access-denied environment to deliver dispersed sea-control capabilities.[56] Smaller, less expensive delivery platforms are required to transport the numerous ground units necessary to support control of the sea. Once all forces are delivered, they must be connected to a common operating picture to coordinate command and control as well as execute effective fires. All Services must operate on the same operating picture to maximize all distributed forces and ensure dispersed forces do not become isolated. The requirement for access to a common operating picture can be a critical weakness if an adversary possesses the ability to impact cyberspace and communications technology.[57] The significance of this critical weakness will require specific manpower and equipment augmentations to protect it, or it will require more cyber warfare training for all ground forces to ensure they can protect themselves.

The final recommendation for further review is the research and investment in rapidly produced, low-cost technology that extends the range of counter-A2/AD capabilities. Capital ships and fifth-generation aircraft are expensive but necessary in the modern maritime environment. However, as the Japanese torpedo demonstrated during WWII, a low-cost, well-designed, long-range weapon that can damage or destroy a capital ship is equally valuable. Each domain is challenging, and when combined, an operating environment becomes immensely complex. Modern military technology that is required to compete with a technologically advanced peer is expensive. A unified counter-A2/AD strategy must balance the financial requirements necessary to be competitive across all domains.

Investments in portable antiship and antiair missiles; command and control technology; amphibious troop delivery platforms; and intelligence; surveillance; target acquisition; and reconnaissance equipment all extend the effectiveness of ground-based, sea-control assets. Ground forces that can employ, remotely guide, or provide targeting information for antiship and antiair missiles have a direct positive impact on sea-control efforts. Investments in smaller amphibious platforms that can autonomously deliver troops, distribute supplies, or carry missile systems across the archipelagic waters of the Pacific are needed. Last, the continued investment in unmanned aircraft systems to support intelligence, surveillance, target acquisition, and reconnaissance capabilities contributes to the increased effectiveness of sea-control troops.

To depict the suggested strategy, the below fictional description is offered. A violent struggle occurs between China and its neighbors for control of parts of the Pacific. The United States enters the conflict after hostilities have begun and must support its Asian alliances in disrupting China's established sea-denial strategy. To defeat the established defense in depth and execute Joint forcible

entry operations, the United States and allies will have to execute distributed operations in a coordinated and simultaneous manner to create and maintain rapid operational tempo to off-balance Chinese forces. Employing all Services, the Joint Force Maritime Component Commander (JFMCC), as the unified commander, will seek to reestablish sea control that will make forcible-entry operations and assured access in the theater possible. The JFMCC will employ all forces and assets to identify and attack critical vulnerabilities throughout the theater to pose multiple dilemmas to the adversary and ensure the enemy knows they are at risk across their entire defense in depth. The JFMCC will combine current concepts from all Services to spread out Chinese combat power and overwhelm the sensor-to-shooter network allowing U.S. forces to execute forcible-entry operations that will create lodgments allowing for follow-on forces required to end the conflict. This strategy will be the opposite of the Soviets' interwar period deep operations concept that was designed to create a gap in the enemy's front line sufficient to allow second-echelon forces enough space to rapidly penetrate deep into the enemy's rear area.

The JFMCC and their staff will operate from a single common operating picture that all Services have access to. Navy ships, deployed using the distributed maritime operations concept, allow the JFMCC to control the open ocean creating secure sea lines of communication, employ long- and medium-range maritime missiles, provide amphibious aviation capabilities, and create an afloat forward-staging base for Marine Corps operations while ensuring U.S. capital ships are less vulnerable to attack. Air Force aircraft, operating under the agile combat employment concept, contribute to the JFMCC's requirement for air superiority and provide intelligence, surveillance, target acquisition, and reconnaissance capabilities to Navy and Marine Corps forces seeking to destroy enemy naval and coastal forces. Marine Corps forces executing stand-in force operations, actively disrupt adversarial A2/AD capabilities, or transmit known locations to either Navy or Air Force assets via the common operating picture can then disrupt or destroy A2/AD capabilities.[58] The U.S. Army's multidomain task forces are employed in coordination with Marine Corps forces to disrupt and destroy adversarial A2/AD capabilities and assets. The multidomain task forces contribute to the overall common operating picture while also augmenting Space Force capabilities and concepts to control and defend all aspects of the JFMCC's cyber domain. All Services will operate in a coordinated manner, under a single unified commander, to identify, create, and exploit multiple gaps in the enemy's sea-denial architecture, thereby gaining the benefits of mass without suffering the negative historical impacts encountered by large massed formations.

To ensure success against an established Chinese defense in depth that is built on credible and lethal A2/AD assets and capabilities, all U.S. forces must

be distributable, resilient, tailorable, interconnected, and able to sustain while producing a minimal signature. The above concept requires an investment strategy as described in the previous recommendations. Of significance, all Services need to invest in interoperability for communications across all platforms, weapons systems, and networks. Only through interoperability will the common operating picture allow for a distributed network of assets that are part of a rapid and accurate kill chain. Coupled with advancements in automation and artificial intelligence, an interconnected kill chain across the Services will threaten any A2/AD strategy. To augment and support Marine Corps and Army distributed elements, the Navy needs to invest in small autonomous crafts that can rapidly transport and relocate troops and supplies across the maritime domain while maintaining a minimal signature. Finally, Marine Corps and Army forces need to invest in low-cost weapons systems that can deliver damaging effects to large, expensive adversarial assets. As an example, they need to identify and develop weapons analogous to a maritime rocket-propelled grenade or a maritime improvised explosive device.

Conclusion

In the current operating environment, Joint operations are required to create the conditions for successful war termination. Through control of the maritime domain, the projection of combat power from the sea has historically been the prerequisite to successfully ending wars. In the modern maritime domain, which includes the open ocean as well as the littoral region, a force that can control the sea possesses a combat power advantage.

As stated in the *Joint Operational Access Concept*, sea control establishes the foundation for assured access that enables Joint operations. Through the historical review of Japanese naval conflicts, five lessons are identified that operational planners can apply to military plans seeking control of the maritime domain. To illustrate these lessons in a current maritime environment, China's access-denial strategy and capabilities were provided as an example that U.S. sea control plans can be modeled against.[59] China's continued advancement of its A2/AD capability, coupled with its actions in the South China Sea, pose an obstacle to the United States' political aims in the Pacific region. China's developing access-denial strategy, similar to Japanese development during the interwar period, seeks to establish control of the sea by creating a layered defense-in-depth strategy. China's strategy is focused on the destruction of the advancing combat power of an adversary attempting to contest China's control of the maritime domain. China's strategy aims to prevent its adversaries from achieving Joint operations that have historically proven necessary to successfully end wars. China's access-denial developments focus on increasing the maximum range of its access-denial capabilities through advancements in its missile arsenal and

militarization of reclaimed territory. The combined landward and seaward capabilities, distributed across multiple platforms, including a new domestically built aircraft carrier, ensures adversarial attempts to control or deny the sea are temporary and narrowly focused. More importantly, China's access-denial network is equally capable of denial across both elements of the maritime domain: the open ocean as well as in the littoral region.

The key considerations for the geographic combatant commander regarding sea control in any campaign involving the maritime domain are clear. Access denial, a layered defense in depth, is designed to prevent an advancing force from massing combat power in any domain. To penetrate this style of defense and establish operational access, dispersed forces must conduct rapid, simultaneous operations that are coordinated across a common operational picture. Once operational access is restored, ground forces can be projected into hostile territory to support gaining control of the sea. Control of the maritime domain is the prerequisite to setting the conditions for assured access. Assured access is required for the projection of large-scale, follow-on ground forces that have historically ended wars. Specific to the Pacific region, rapid, simultaneous, distributed operations require a large amount of sea control, either in time or geographic area. Large amounts of sea control require coordinated concepts and approaches across all Services as the manpower and resource requirements are considerable. Finally, the personnel, resources, and concepts required to gain control of the Pacific maritime domain have not been exercised in either a holistic or coordinated manner in decades, yet our named pacing threat has been improving its strategies and capabilities. The DOD needs a unified counter-A2/AD strategy with a matching investment strategy to ensure success in future violent conflicts over control of the sea.

Endnotes

1. Sir Walter Raleigh, "A Discourse of the Invention of Ships, Anchors, Compass, &c.," in *The Works of Sir Walter Ralegh, Kt.*, vol. 8 (Oxford, UK: University Press, 1829).
2. *Joint Operations*, Joint Publication 3-0 (Washington, DC: Joint Chiefs of Staff, 2017), VIII-15. Due to the limited scope of this study, the focus on the maritime domain is not intended to exclude the importance of any other domain or ignore the interconnected nature of all domains. *Joint Operations* defines the operational environment as encompassing the physical areas of the air, land, maritime, and space domains; the information environment (which includes cyberspace); as well as the electromagnetic spectrum (EMS). *Joint Operations* then defines mission success in large-scale combat as full-spectrum superiority; the cumulative effect of achieving superiority in the air, land, maritime, and space domains; the information environment; and the EMS.
3. *The Operations Process*, Army Doctrine Publication 5-0 (Washington, DC: Department of the Army, 2019), 2-21. All terms related to operational art, such as *simultaneity*, are defined within this publication.
4. *A Design for Maintaining Maritime Superiority: Version 2.0* (Washington, DC: U.S. Navy, 2018), 3.

5. John Prados, *Islands of Destiny: The Solomons Campaign and the Eclipse of the Rising Sun* (New York: Penguin, 2012), 260–362. The Solomon Islands campaign (1942–43) was an amphibious campaign fought between Japan and the United States seeking control of the Solomon Islands chain in the South Pacific. Throughout this campaign, fighting occurred in the air, land, and maritime domain, demonstrating the critical interconnectedness of cross-domain actions and support.
6. *The National Security Strategy of the United States of America, December 2017* (Washington, DC: White House, 2017), 28, 47.
7. *The National Security Strategy of the United States of America*, 3; *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge* (Washington, DC: Department of Defense, 2018), 3–6; and *Description of the National Military Strategy, 2018* (Washington, DC: Joint Staff, 2018), 2.
8. *Joint Operational Access Concept (JOAC): Version 1.0* (Washington, DC: Department of Defense, 2012), ii.
9. *Joint Operational Access Concept (JOAC)*, 1.
10. *Joint Forcible Entry Operations*, JP 3-18 (Washington, DC: Joint Chiefs of Staff, 2018), vii. The forcible entry concept defines a *lodgment* as a designated area in a hostile or potentially hostile operational area (such as an airhead, a beachhead, or combination thereof) that affords continuous landing of troops and materiel while providing maneuver space for subsequent operations.
11. Sam J. Tangredi, *Anti-Access Warfare: Countering A2/AD Strategies* (Annapolis, MD: Naval Institute Press, 2013), 11; and Barry Strauss, *The Battle of Salamis: The Naval Encounter that Saved Greece—and Western Civilization* (New York: Simon and Schuster, 2004), 73–107. Themistocles, the leader of the Greek alliance, developed a plan to abandon the Greek cities and fight from ships. At the Battle of Salamis, the Greeks established their battle plan in the narrow channel between the island of Salamis and the Athenian territory, allowing the Greeks to win a decisive battle against the superior Persian naval force. The Persian defeat allowed the Greeks to eventually control the supply lines supporting the Persian forces.
12. Capt Alfred T. Mahan, *The Influence of Sea Power Upon History, 1660–1783* (Boston, MA: Little, Brown, 1890), 138. Alfred Thayer Mahan (1840–1914) was a U.S. naval officer and his two most noted writings are *The Influence of Sea Power Upon History, 1660–1783* and *The Influence of Sea Power Upon the French Revolution and Empire, 1793–1861*. Mahan experienced combat as a Union naval officer during the American Civil War. He commanded the USS *Wachusett* (1861). During his career, he served as an instructor at the U.S. Naval Academy and president of the U.S. Naval War College. Mahan's tactical focus was the concentration of the fleet executing an aggressive offensive at critical points to achieve victory in decisive battles.
13. Julian S. Corbett, *Some Principles of Maritime Strategy* (Annapolis, MD: Naval Institute Press, 1911), 15, 91. Sir Julian Corbett (1854–1922) was a British naval historian and his most noted writing is *Some Principles of Maritime Strategy*. After earning his law degree, he began lecturing at the Royal Naval College and later served as secretary of the Cabinet Historical Office. Corbett categorized sea control as general or local, temporary, or permanent, therefore he favored the strategic defensive and recommend naval blockade as the primary means for sea control above physical destruction or capture of enemy warships.
14. Everett Carl Dolman, *Pure Strategy: Power and Principle in the Space and Information Age* (New York: Routledge, 2005), 40.
15. David C. Gompert, *Sea Power and American Interests in the Western Pacific* (Santa Monica, CA: Rand, 2013), 2.
16. Geoffrey Till, *Sea Power, A Guide for the Twenty-First Century*, 3d ed. (London: Routledge, 2013), 331. Geoffrey Till is a naval historian, an emeritus professor of maritime studies, and director of the Corbett Centre for Maritime Policy Studies.
17. *A Cooperative Strategy for 21st Century Seapower* (Washington, DC: Department of

Defense, 2015), 22–23; and *Command and Control of Joint Maritime Operations*, JP 3-32 (Washington, DC: Department of Defense, 2018), 23–27.

18. Stansfield Turner, "Missions of the U.S. Navy," *Naval War College Review* 27, no. 2 (March–April 1974): 6. The categories of sea control are absolute, working, and control in dispute. *Absolute control* occurs when one side has complete freedom to operate without interruption by the enemy as the enemy is unable to operate at all. *Working control* occurs when one side has the general ability to operate with a degree of freedom as the enemy can only operate with high risk. *Control in dispute* occurs when each side operates with considerable risk while establishing working control for limited portions for a limited time to conduct specific operations.
19. *Joint Operational Access Concept (JOAC)*, 14–23.
20. Tangredi, *Anti-Access Warfare*, 157. "The forces that achieved a greater degree of cross-domain synergy were indeed victorious, but it must be admitted that such is the case in all combined arms warfare."
21. Till, *Sea Power*, 36.
22. *Command and Control of Joint Maritime Operations*, x.
23. Till, *Sea Power*, 150; and Gompert, *Sea Power and American Interests*, 9.
24. Phillip E. Pournelle, "The Deadly Future of Littoral Sea Control," U.S. Naval Institute *Proceedings* 141, no. 7 (July 2015): 26–31.
25. *Joint Operational Access Concept (JOAC)*, i.
26. *Joint Operations*, JP 3-0 (Washington, DC: Joint Chiefs of Staff, 2017). *Defense in depth* is a defensive strategy that layers multiple supporting engagements across time and space that increase the probability for success in the defeat of any adversaries' advancements.
27. *Joint Operational Access Concept (JOAC)*, ii.
28. "Missiles of China," Missle Threat, Center for Strategic and International Studies, 14 June 2018; and *Military and Security Developments Involving the People's Republic of China, 2019: Annual Report to Congress* (Washington, DC: Department of Defense, 2019), 45.
29. Maj David S. Rainey, USMC, *Expeditionary Advanced Base Operations in the Indo-Pacific Command Area of Responsibility* (Fort Leavenworth, KS: School of Advanced Military Studies, 2019), 13. An integrated air defense system is designed to limit an adversary's use of the air domain by combining antiair detection capabilities and antiair weapons systems that operate under a common command and control network.
30. *Military and Security Developments Involving the People's Republic of China, 2019*, 31–47.
31. Capt Sam J. Tangredi, "Breaking the Anti-Access Wall," U.S. Naval Institute *Proceedings* 141, no. 347 (May 2015): 40–45.
32. *Joint Planning*, JP 5-0 (Washington, DC: Joint Chiefs of Staff, 2017), IV-28. *Joint Planning* defines *interior lines* as a central position where a friendly force can reinforce or concentrate its elements faster than the enemy force can reposition. A force operates on interior lines when its operations diverge from a central point. With interior lines, friendly forces are closer to separate enemy forces than the enemy forces are to one another. Interior lines allow an isolated force to mass combat power against a specific portion of an enemy force by shifting capabilities more rapidly than the enemy can react.
33. Arthur Corbett, *Expeditionary Advanced Base Operations (EABO) Handbook: Considerations for Force Development and Employment* (Quantico, VA: Marine Corps Warfighting Lab, 2018), 15.
34. *Air Superiority 2030 Flight Plan: Enterprise Capability Collaboration Team* (Washington, DC: U.S. Air Force, 2016), 2.
35. SrA Isaac Johnson, "Airmen Exercise Agile Combat Employment at Red Flag Alaska," Kadena Air Base, 16 August 2019.
36. Corbett, *Expeditionary Advanced Base Operations*, 21.
37. *Surface Force Strategy: Return to Sea Control* (Washington, DC: Department of the Navy, 2017), 10.

38. *Littoral Operations in a Contested Environment, 2017* (Washington, DC: Department of the Navy, 2017), 9.
39. Gen David H. Berger, *Commandant's Planning Guidance: 38th Commandant of the Marine Corps* (Washington, DC: Headquarters Marine Corps, 2019); and *Force Design 2030* (Washington, DC: Headquarters Marine Corps, 2020).
40. *Littoral Operations in a Contested Environment, 2017*, 13; and Corbett, *Expeditionary Advanced Base Operations*, 22–25.
41. Corbett, *Expeditionary Advanced Base Operations*, 25; and *Littoral Operations in a Contested Environment, 2017*, 13. Expeditionary advanced bases may also control, or at least outpost, key maritime terrain to improve the security of sea lines of communication and choke points or deny their use to the enemy and exploit and enhance the natural barriers formed by island chains.
42. Tangredi, *Anti-Access Warfare*, 243. "In defeating anti-access warfare, successful maritime operations are a prerequisite for joint operations. Not an add-on, not yet another domain, not just one of a number of equal claims on resources."
43. S. C. M. Paine, *The Japanese Empire: Grand Strategy from the Meiji Restoration to the Pacific War* (Cambridge, UK: Cambridge University Press, 2017), 35, 52–57. In the Sino-Japanese War, Japan's military strategy prioritized control of the sea to allow for the movement of roughly 100,000 troops to mainland Asia. In the Russo-Japanese War, Japan conducted a surprise night attack against the anchored Russian squadron in Port Arthur, which ensured the squadron remained unable to impede the movement of Japanese combat power, compounded Russia's burden to move combat power due to the damage of the Trans-Siberian railway, and denied Russia the ability to project combat power onto the Japanese home islands.
44. Julian S. Corbett, *Maritime Operations in the Russo-Japanese War: 1904–1905* (Annapolis, MD: Naval Institute Press, 1994). On 15 February 1904, the Russian minister of war defined the war efforts for Russia. Of the five war efforts described, "command of the sea" is the first and most critical war effort. Russia's fifth and final war effort was to land Russian troops in Japan to defeat Japanese forces and end the war on their terms.
45. Edward S. Miller, *War Plan Orange: The U.S. Strategy to Defeat Japan, 1897–1945* (Annapolis, MD: Naval Institute Press, 1991), 335.
46. David C. Evans and Mark R. Peattie, *Kaigun: Strategy, Tactics, and Technology in the Imperial Japanese Navy, 1887–1941* (Annapolis, MD: Naval Institute Press, 1997), 70. Akiyama Saneyuki studied in the United States reviewing U.S. Naval War College course material and personally interacting with Alfred T. Mahan about naval theory. Akiyama also spent time on an American vessel as a foreign observer during the Spanish-American War. Upon his return to Japan, Akiyama blended his Western studies with his historical research on Eastern philosophers of war, such as Sun Tzu, to create a unique Japanese naval theory. A principle that Akiyama embedded in his theory, like Ardant du Picq, was the power of the unique Japanese will. His impacts on naval tactics merged modern tactical maneuvers, such as night attacks and fleet formations, with classic principles of deception, concentration, and indirect attacks. Akiyama's enhanced methods of instruction, along with the new tactics and theory of naval warfare, were responsible for creating a new generation of Japanese naval officers that would fight many of the world's great naval powers before the country's ultimate defeat in World War II.
47. Turner, "Missions of the U.S. Navy," 6. *Control in dispute* refers to when each side operates with considerable risk. This involves the need to establish working control for limited portions for a limited time to conduct specific operations.
48. Prados, *Islands of Destiny*, 350–62.
49. Evans and Peattie, *Kaigun*, 194–96, 233–37. The United States proposed a 10-year moratorium on capital ship construction and a schedule for the scrapping of specific warships in each of the five largest navies to reach stabilized limitation in total tonnage. The limits focused on total tonnage per country, maximum tonnage, and ordnance per class of ship and a nonfortification clause for all Pacific powers. Japan agreed to a 70

percent ratio in heavy cruiser tonnage while maintaining the right to build an unlimited number of cruisers, destroyers, and submarines.

50. Evans and Peattie, *Kaigun*, 130, 218, 270, 307.
51. Richard B. Frank, *Guadalcanal: The Definitive Account of the Landmark Battle* (New York: Penguin, 1990), 598–618, 637–46.
52. Evans and Peattie, *Kaigun*, 116–29. After sailing for eight months, the ships and sailors of the Baltic Fleet were in poor condition. With the loss of the port at Lushun, upon arriving in the Far East, the fleet had no safe harbor to recover and refit in. Japanese ships spotted the advance screen of the Baltic Fleet and the Battle of Tsushima took place between 26 and 28 May 1905. Through good tactics, excellent internal communication, and some advantageous weather the Combined Fleet was able to destroy the entire Baltic Fleet while sustaining minimal causalities.
53. Evans and Peattie, *Kaigun*, 110–16. By December 1904, with an established position above the port allowing unobstructed visibility of the squadron, Japanese forces were able to apply direct fire from siege guns, damaging or destroying all anchored Russian ships.
54. Evans and Peattie, *Kaigun*, 334–40.
55. Paine, *The Japanese Empire*, 369; and H. P. Willmott, *Sea Warfare: Weapons, Tactics, and Strategy* (Strettington, UK: Antony Bird Publications, 1981), 32.
56. The term *capital ship* is not a doctrinal term. Historically, the term has been used to refer to the largest, most expensive, and most powerful ship a navy possesses, such as battleships or aircraft carriers. For the purpose of this project, capital ship is used to denote the significant cost and capability of U.S. Navy amphibious assault shipping. Economically, each amphibious assault ship, excluding Navy and Marine Corps personnel and combat equipment, is an investment of billions of dollars. When fully loaded with a Marine Corps combat power projection capability, manpower, and equipment, a single amphibious assault ship provides a considerable landward and seaward sea-control capability. The loss of a single amphibious assault ship, in terms of economic resources and capability, would be impactful to the Department of Defense. The U.S. Navy amphibious assault class includes the following categories: landing helicopter assault (LHA), landing helicopter dock (LHD), landing platform dock (LPD), and the landing ship dock (LSD)
57. This study did not discuss the impact of the information environment, which includes cyberspace or the electromagnetic spectrum due to the scale and scope of this project. By no means does this omission ignore the importance of this domain in the modern operating environment. The ability to attack and protect friendly aspects in this domain are critical to the success of distributed forces operating on a common data link.
58. Berger, *Commandant's Planning Guidance*, 10. "Stand-in Forces are designed to generate technically disruptive, tactical stand in engagements that confront aggressor naval forces with an array of low signature, affordable, and risk-worthy platforms and payloads optimized to operate in close and confined seas in defiance of adversary long-range precision 'stand-off capabilities'."
59. Precision analytical modeling using China's A2/AD strategy and capabilities is beyond the scope of this research project. Conceptually, China's continued advancement of its A2/AD technology and increased posturing actions throughout the South China Sea are the critical components for comparison to Japan's actions during the interwar period.