



Center for Strategic and Budgetary Assessments

TIGHTENING THE CHAIN

IMPLEMENTING A STRATEGY OF MARITIME PRESSURE IN THE WESTERN PACIFIC



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Cover: First land-based Naval Strike Missile launch performed at RIMPAC 2018 exercise. U.S. Army photo by David Hogan.

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CHAPTER 1

Introduction

The U.S. military has a problem in the Western Pacific: the tyranny of distance and time. Delivering military force across the vast Pacific Ocean has never been easy, even for a country as blessed in resources and ingenuity as the United States. The problem has worsened as America's chief regional rival, China, has improved its ability to harm American interests quickly with limited forewarning. China's military capabilities have increasingly matured to the point where, if directed by the Chinese Communist Party (CCP), the People's Liberation Army (PLA) could launch a rapid attack to change the status quo, including territorial seizure, before the United States could meaningfully respond, thus presenting Washington and its allies with a *fait accompli*.¹ American forces located outside the conflict area would have to penetrate China's anti-access/area-denial (A2/AD) network to restore the status quo ante, a daunting proposition.² As General Robert Neller, commandant of the U.S. Marine Corps, remarked, "We are going to have to fight to get to the fight."³ Under these circumstances, American political leaders might face the unenviable choice of doing nothing or escalating to higher levels of violence. Either way, the national interests of both the United States and its closest allies would suffer dramatically.

1 The report uses *fait accompli* in the sense of "a quick, decisive transformation of the situation" before the other side can immediately react. For definitional discussion see Ahmer Tarar, "A Strategic Logic of the Military *Fait Accompli*," *International Studies Quarterly* 60, no. 4, December 2016, pp. 743–744.

2 Following the Department of Defense (DoD), the report defines anti access (A2) as "Action, activity, or capability, usually long-range, designed to prevent an advancing enemy force from entering an operational area." It defines area denial (AD) as "Action, activity, or capability, usually short-range, designed to limit an enemy force's freedom of action within an operational area." Office of the Chairman of the Joint Chiefs of Staff (JCS), *DOD Dictionary of Military and Associated Terms* (Washington, DC: JCS, February 2019), pp. 19–20.

3 Robert B. Neller, testimony before the House Appropriations Committee—Defense, March 7, 2018, p. 4.

American policymakers are right to worry about such a scenario.⁴ History shows that deterrence is more likely to fail when an aggressor believes it can pull off a *fait accompli* successfully.⁵ Russia demonstrated as much by annexing Crimea in 2014 without provoking meaningful resistance or counterattack. Chinese military doctrine emphasizes the need to strike first to surprise the enemy, dictate the operational tempo, and achieve victory before sustaining heavy losses.⁶ If the U.S. military fails to prepare now for a potential Chinese *fait accompli* attempt, it will cede the ability to deter and, if necessary, defeat Chinese aggression.

This report proposes a military strategy of Maritime Pressure, which includes a new Inside-Out Defense operational concept, to address the *fait accompli* problem. The strategy and concept entail fielding precision-strike networks, particularly land-based anti-ship and anti-air capabilities, along the First Island Chain to contest China's ability to achieve gains through aggression quickly and without paying steep costs in blood, treasure, and reputation. Numerous analysts have proposed similar approaches over the past decade, but the report goes beyond previous studies by outlining a new operational concept, assessing potential Chinese responses, and estimating the budgetary costs of implementing it.

As a defensive-oriented denial strategy, Maritime Pressure can complement or substitute for alternative approaches such as blockade operations or punishment strikes against mainland China. Those alternatives, although potentially useful as part of a broader campaign to prevail in a protracted conflict with China, would likely not achieve success rapidly enough to thwart a *fait accompli* and could escalate the conflict beyond the risk tolerances of U.S. and allied political leaders. Without a strategy designed to prevent a *fait accompli*, the United States might lose a war before alternative approaches have time to be effective.

The Maritime Pressure strategy answers the call by the National Defense Strategy Commission to prepare for great power competition by “develop[ing] new operational concepts to achieve strategic advantage,” including “establishing a forward-deployed defense-in-depth posture” to deter Chinese aggression in the Indo-Pacific region.⁷ The strategy also capitalizes on recent policy developments, most notably the U.S. decision to withdraw from the 1987 Intermediate-Range Nuclear Forces (INF) Treaty banning ground-launched missiles with ranges from 500 to 5,500 km. Finally, the strategy builds on a decade of CSBA wargaming experience along with a recent CSBA study, *Piercing the Fog of Peace*, which explored how Chinese military

4 Elbridge A. Colby, testimony before the Senate Armed Services Committee, January 29, 2019, pp. 3–4; and U.S. Army Training and Doctrine Command (TRADOC), *The U.S. Army in Multi-Domain Operations*, TRADOC Pamphlet 525-3-1 (Fort Eustis, VA: U.S. Army, December 2018), p. v.

5 Alexander L. George and Richard Smoke, *Deterrence in American Foreign Policy: Theory and Practice* (New York: Columbia University Press, 1974), pp. 536–547.

6 Toshi Yoshihara, “Chinese Missile Strategy and the U.S. Naval Presence in Japan: The Operational View from Beijing,” *Naval War College Review* 63, no. 3, Summer 2010, pp. 53–54.

7 National Defense Strategy (NDS) Commission, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission* (Washington, DC: United States Institute of Peace, 2018), pp. 27, 34.

modernization has rendered questionable a series of strategic and operational assumptions that have undergirded U.S. force planning for years.⁸

The remainder of Chapter 1 summarizes the strategy, including its potential costs, before highlighting its advantages and situating it among previous studies. Chapter 2 sketches the strategic context by discussing concerns about China's rise, Chinese moves and American countermoves, and potential U.S. military requirements for a Sino-American conflict. Chapter 3 outlines the operational concepts, capabilities, and coordination needed to implement the strategy, along with potential Chinese responses. Chapter 4 examines illustrative budgetary costs through 2024. Chapter 5 concludes by summarizing the next steps needed to execute the strategy.

Strategy in Brief

The strategy of Maritime Pressure aims to persuade Chinese leaders that attempting military aggression in the Western Pacific will fail, thus discouraging them from trying it. The strategy gives the PLA a taste of its own A2/AD medicine, improving America's prospects in both peace and war. The strategy calls for establishing highly survivable precision-strike networks along the First Island Chain featuring increased quantities of U.S. and allied ground-based missiles backed by naval, air, electronic warfare, and other capabilities. These networks would be operationally decentralized and geographically dispersed along the archipelagos of the Western Pacific.⁹ The networks would function as an "inside" force optimized to attack the PLA from within China's A2/AD threat envelope, supported by "outside" air and naval forces able to join the fight from further afield.¹⁰ To use a football analogy, the survivable inside strike networks would act as a defensive line while the mobile outside air and naval forces would act as linebackers.¹¹

Implementing this Inside-Out Defense concept will require some U.S. forces to operate and survive within range of Chinese missiles.¹² This forward posture would differ from the current expeditionary model focused on marshaling massive combat power and then gaining dominance in all domains before counterattacking decisively. In a *fait accompli* scenario, the

8 Thomas G. Mahnken, Grace B. Kim, and Adam Lemon, *Piercing the Fog of Peace: Developing Innovative Operational Concepts for a New Era* (Washington, DC: Center for Strategic and Budgetary Assessments, 2019).

9 The geographical aspect explains why a related approach is called "Archipelagic Defense." Andrew F. Krepinevich Jr., "How to Deter China: The Case for Archipelagic Defense," *Foreign Affairs* 94, no. 2, March/April 2015, pp. 78–86.

10 Art Corbett, "Stand-In Forces: Disrupting the Current Struggle for Dominance," *Marine Corps Gazette* 103, no. 2, 2019, pp. 27–29. Together, the forces would form a "blunt" layer designed to buy time and space for additional "surge" layer forces to arrive in the theater. DoD, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge* (Washington, DC: DoD, January 2018), p. 7.

11 The "linebacker" terminology is used by Andrew F. Krepinevich Jr., *China, the South China Sea, and Archipelagic Defense* (Washington, DC: Hudson Institute, February 1, 2018), p. 22.

12 The name "Inside-Out" was inspired by Mark Gunzinger with Chris Dougherty, *Outside-In: Operating from Range to Defeat Iran's Anti-Access and Area-Denial Threats* (Washington, DC: Center for Strategic and Budgetary Assessments, 2011).

expeditionary model takes too much time. If the U.S. military does not demonstrate the ability to delay, degrade, and deny a PLA attack from the outset, the Chinese leadership might believe it can perpetrate aggression before the United States arrives in force. Making the forward posture credible will require American and allied military forces to coordinate across the Services' traditional domains. Cross-domain operations would become the norm under a Maritime Pressure strategy, to include Army and Marine Corps forces launching ground-based anti-ship missiles against targets at sea.

Land-based anti-ship, anti-air, and electronic warfare capabilities form the backbone of the Inside-Out concept. Although air and naval forces possess the advantage of strategic and operational mobility, ground and amphibious forces ashore possess the advantage of survivability. Ground forces can harden themselves and exploit terrain for concealment and dispersal, forcing the enemy to acquire precise targeting and expend many munitions to attack them successfully.¹³ Amphibious forces can create and exploit temporal and geographic uncertainty to impose costs on the enemy. For decades, America's enemies have exploited the advantages of mobile land-based forces against the U.S. military.¹⁴ It is time for the United States to turn the tables.

Land-based strike forces deployed along the First Island Chain would anchor the defense against a Chinese attack. Upon warning, the forces would move to pre-selected, dispersed positions after potentially linking up with pre-positioned equipment. Forward-based air forces would disperse to expeditionary airfields under new adaptive basing concepts. Naval forces would sortie to locations behind the First Island Chain or hug the coastlines to reduce their signatures. Using land-based forces to contest Chinese offensive operations will free up U.S. surface ships and aircraft to perform higher-priority tasks, such as striking critical nodes in China's surveillance and sustainment systems. The ships and aircraft could operate from the less-threatening environs beyond the First Island Chain. They would plug gaps in forward defenses and exploit opportunities created by land-based strike networks. Coordinated properly, the joint force could achieve the virtues of mass without the vulnerabilities of concentration by spreading its combat power over many smaller points of operation rather than focusing it in a few bigger bases.¹⁵

The highly contested communications environment might require individual commanders to lead operations without continuous connectivity with higher echelons and without information from space-based assets. Yet American combat leaders possess individual initiative second to none. If given a desired outcome and the tools to achieve it, they will find a way

13 Ground forces also can leverage internal lines of communication and sustain themselves more readily than aircraft and ships under some conditions.

14 William Rosenau, *Special Operations Forces and Elusive Enemy Ground Targets: Lessons from Vietnam and the Persian Gulf War* (Santa Monica, CA: RAND Corporation, 2001).

15 Megan Eckstein, "Marine Aviation, Weapons Upgrades Would Support Advance Base Operations," *USNI News*, January 30, 2017, available at <https://news.usni.org/2017/01/30/marine-aviation-weapons-upgrades-would-support-advance-base-operations>.

to succeed. Many PLA commanders cannot yet say the same.¹⁶ Additionally, American commanders are unlikely to fight alone; U.S. allies who are acquiring their own land-based sea- and air-denial systems will also likely be involved. Using new unmanned aerial and surface platforms, troposcatter communications, and stratospheric systems, U.S. forces would form a terrestrial command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) architecture that would degrade more gracefully than legacy systems, permitting U.S. and allied militaries to continue operations even in a contested electromagnetic environment.

Chapter 3 includes a list of numerous actions needed to implement the strategy of Maritime Pressure outlined here. Among other things, the Department of Defense (DoD) should:

- Develop this report’s approach into a joint operational concept;
- Experiment with new organizational structures for ground forces in the Pacific;
- Develop sustainment concepts to support a Maritime Pressure strategy;
- Accelerate fielding of mobile, land-based, long-range missile capabilities;
- Build a resilient multi-domain C4ISR architecture and develop and field counter-C4ISR capabilities;
- Integrate all bomber aircraft with payloads for offensive maritime missions;
- Deepen cooperation with Indo-Pacific allies and partners; and
- Reexamine Service roles and missions.

CSBA estimates that these actions would cost from \$8 billion to \$13 billion by 2024 depending on the specific investments selected by DoD. The costs represent additional spending beyond what DoD’s five-year budget plan currently contains. Longer-term costs could total \$30 billion or more depending on how extensively DoD reorganized its forces and posture in the decades ahead. Although significant, such costs are affordable—especially if DoD spends less on legacy forces unsuited to contested environments and spends more on the innovative concepts and capabilities proposed by this report.

16 Dennis J. Blasko, testimony before the U.S.-China Economic and Security Review Commission, February 7, 2019.

Advantages of a Maritime Pressure Strategy

A Maritime Pressure strategy offers distinct advantages for deterrence, war fighting, and long-term peacetime competition. Maritime Pressure involves deterrence by denial, the process of persuading an adversary that attempting to achieve gains through aggression will fail.¹⁷ Deterrence by denial is a strong form of deterrence because it uses uncertainty about success, not fear of punishment, to convince a potential aggressor not to attack.¹⁸ Resolved Chinese leaders might willingly endure punishment if they believed that they could strike quickly, achieve their military objective, and secure a political *fait accompli*. By creating doubt in their minds about executing this gambit, Maritime Pressure discourages them from attempting it in the first place.¹⁹ Forward positioning American forces in key locales will increase allies' confidence that the United States stands ready to assist them should hostilities erupt, raising the bar for their own contributions to collective defense and stiffening their resolve to push back against Chinese coercion.

The strategy of Maritime Pressure envisions fielding flexible military forces that will give the United States and its allies a warfighting advantage. The U.S. military clearly must improve its ability to repel aggression by operating more effectively in contested A2/AD environments. Maritime Pressure describes how to make such improvements starting now.²⁰ The recommended U.S. forces will complicate China's military planning in potential contingencies involving Taiwan, the South China Sea, and the East China Sea. The strategy leverages geography to America's advantage by transforming islands within the First Island Chain into defensive strong points that can withstand Chinese assaults. Mobile missiles placed on these islands will be difficult for China to locate, track, and destroy thanks to the challenges associated with finding ground-based targets amid the complexities of the earth's surface.²¹ To sustain a military campaign under these conditions, China will have to expend more materiel, incur more risk, and commit more time, undercutting the advantages it might hope to gain through a swift surprise attack. In sum, Maritime Pressure places the United States and its allies in the best possible position to withstand Chinese aggression should deterrence fail.

17 Glenn H. Snyder, *Deterrence and Defense: Toward a Theory of National Security* (Princeton, NJ: Princeton University Press, 1961), pp. 35–36; and John J. Mearsheimer, *Conventional Deterrence* (Ithaca, NY: Cornell University Press, 1983), pp. 28–66, 203–208. Snyder concludes failure can be political or operational. A significantly delayed gain may be too costly to be politically viable, making the operation infeasible.

18 For useful summaries see Edward Rhodes, “Conventional Deterrence,” *Comparative Strategy* 19, no. 3, July–September 2000, pp. 221–223; and Michael S. Gerson, “Conventional Deterrence in the Second Nuclear Age,” *Parameters* 39, no. 3, Fall 2009, pp. 36–39.

19 Such a strategy also imposes significant costs on an adversary by attriting its valuable military forces. To be clear, the report does not recommend abandoning deterrence by punishment. Rather, it recommends increasing the relative emphasis on deterrence by denial in the Western Pacific.

20 Evan Braden Montgomery, “Contested Primacy in the Western Pacific: China's Rise and the Future of U.S. Power Projection,” *International Security* 38, no. 4, Spring 2014, pp. 115–149.

21 Stephen Biddle and Ivan Oelrich, “Future Warfare in the Western Pacific: Chinese Antiaccess/Area Denial, U.S. AirSea Battle, and Command of the Commons in East Asia,” *International Security* 41, no. 1, Summer 2016, pp. 12–13.

Maritime Pressure steers the Sino-American political-military competition in a direction that should prove advantageous to the United States and its allies over the long run. Attempting to overcome American A2/AD investments could push China toward prioritizing short-range counter-A2/AD improvements over long-range power projection investments.²² Such an outcome would appeal to the United States and its allies since it would keep China ensnared in its maritime backyard within the First Island Chain. Even if the PLA eventually developed capabilities to challenge the American and allied A2/AD network, finding and engaging mobile U.S. ground forces would be time-consuming. The PLA might try circumventing the ground forces as the United States did against Japan during World War II. However, that Chinese countermove likely would fail if U.S. ground-based missiles possessed long ranges and had support from U.S. air and naval forces, as proposed in this report.

Alternatively, China might view popping the American and allied A2/AD bubble as too risky and expensive and, as a result, shift attention and resources away from its eastern maritime frontier to its western land frontier. President Xi Jinping has increased Chinese involvement in continental Asia through his Belt and Road Initiative, so Maritime Pressure might reinforce an existing preference within the Chinese government for westward expansion.

On the negative side, Maritime Pressure might encourage China to escalate horizontally by shifting the competition to other domains, including the economic or diplomatic spheres. China might exert non-military pressure to dissuade U.S. allies and partners in the region from cooperating with the United States. That would challenge Washington to preserve alliance unity. This type of tit-for-tat interaction is the nature of strategic competition. Despite the risk, a Maritime Pressure strategy represents a feasible, affordable, and sophisticated approach for responding to China's rise in the years ahead.

Contributions of the Report

Several previous studies have argued that the United States and its allies should deploy ground-based precision-strike networks in the Western Pacific. The studies use different names to describe that approach, including a Porcupine Strategy,²³ War at Sea,²⁴ Mini-A2/AD

22 Jim Thomas and Evan Braden Montgomery, "Developing a Strategy for Long-Term Sino-American Competition," in Thomas G. Mahnken, ed., *Competitive Strategies for the 21st Century: Theory, History, and Practice* (Stanford, CA: Stanford University Press, 2012), p. 262.

23 William S. Murray, "Revisiting Taiwan's Defense Strategy," *Naval War College Review* 61, no. 3, Summer 2008, pp. 12–38.

24 Jeffrey E. Kline and Wayne P. Hughes Jr., "Between Peace and the Air-Sea Battle," *Naval War College Review* 65, no. 4, Autumn 2012, pp. 35–41.

Complexes,²⁵ AirSeaLand Battle,²⁶ Maritime Denial,²⁷ Archipelagic Defense,²⁸ Active Denial,²⁹ Blue A2/AD,³⁰ Elastic Denial in Depth,³¹ and Island Forts.³² Although these studies exhibit differences, such as emphasizing the roles of various countries and critiquing alternative operational concepts to various degrees, they agree more than they disagree.³³ For example, they endorse fielding select A2/AD capabilities, such as larger inventories of ground-based missiles, to persuade the Chinese leadership that it cannot achieve quick victory through military aggression.³⁴ By denying China the benefits of easy conquest, the United States and its allies will bolster deterrence and, should deterrence fail, improve their ability to defeat Chinese aggression and restore peace on favorable terms.³⁵ The report builds on these ideas.

Whereas past studies have sketched the broad outlines of an operational concept, this report provides a more detailed roadmap for adopting a strategy of Maritime Pressure. It connects strategy, concepts, and resources, providing guidance on the recommended approach informed by more than a decade of CSBA-led wargaming and concept development workshops. Previous studies have tended to emphasize one aspect or another while sidestepping specifics, especially details about budgetary implications.³⁶ As Andrew Krepinevich noted, “Many details . . . will only become apparent after further research and analysis.”³⁷ The ques-

25 Thomas and Montgomery, “Developing a Strategy for Long-Term Sino-American Competition,” pp. 257–274.

26 Toshi Yoshihara and James R. Holmes, “Asymmetric Warfare, American Style,” *Proceedings* 138, no. 4, April 2012.

27 Aaron L. Friedberg, *Beyond Air-Sea Battle: The Debate over U.S. Military Strategy in Asia* (New York: Routledge, International Institute of Strategic Studies, 2014).

28 Krepinevich, “How to Deter China.”

29 Eric Heginbotham and Jacob L. Heim, “Deterring without Dominance: Discouraging Chinese Adventurism under Austerity,” *The Washington Quarterly* 38, no. 1, Spring 2015, pp. 185–199.

30 Terrence K. Kelly, David C. Gompert, and Duncan Long, *Smarter Power, Stronger Partners*, Volume I (Santa Monica, CA: RAND Corporation, 2016).

31 Michael A. Hunzeker and Alexander Lanoszka, *A Question of Time: Enhancing Taiwan’s Conventional Deterrence Posture* (Arlington, VA: Center for Security Policy Studies, Schar School of Policy and Government, George Mason University, 2018).

32 Joseph Hanacek, “Island Forts: Land Forces Have Value in Air-Sea Battle,” *Proceedings* 145, no. 2, February 2019, pp. 38–42.

33 Mike Pietrucha and Jeremy Renken, “Strategic Architectures,” *Leading Edge*, August 4, 2015, available at <https://leadingedgeairpower.com/2015/08/04/strategic-architectures/>; and Jan van Tol, with Mark Gunzinger, Andrew F. Krepinevich Jr., and Jim Thomas, *AirSea Battle: A Point-of-Departure Operational Concept* (Washington, DC: Center for Strategic and Budgetary Assessments, 2010).

34 Andrew S. Erickson, “Deterrence by Denial: How to Prevent China from Using Force,” *The National Interest*, December 16, 2013, available at <https://nationalinterest.org/commentary/war-china-two-can-play-the-area-denial-game-9564>.

35 David Ochmanek et al., *U.S. Military Capabilities and Forces for a Dangerous World: Rethinking the U.S. Approach to Force Planning* (Santa Monica, CA: RAND Corporation, 2017).

36 An exception is the cost estimate presented in Timothy M. Bonds et al., *What Role Can Land-Based, Multi-Domain Anti-Access/Area Denial Forces Play in Deterring or Defeating Aggression?* (Santa Monica, CA: RAND Corporation, 2017), pp. 136–147.

37 Andrew F. Krepinevich Jr., *Archipelagic Defense: The Japan-U.S. Alliance and Preserving Peace and Stability in the Western Pacific* (Tokyo: Sasakawa Peace Foundation, 2017), p. 111.

tion posed by Jeffrey Kline and Wayne Hughes—“What do the time-phased, programmatic details look like?”—remains unanswered today.³⁸ The report advances the conversation by providing some concrete next steps.

The report comes at a time when the United States has committed itself to competing more effectively with China. The momentum generated by the 2018 National Defense Strategy has created a window of opportunity for policymakers to implement ideas that have been circulating among strategists for the past decade. This report offers decision makers in the Executive and Legislative branches and in allied capitals a blueprint for action to implement a strategy of Maritime Pressure.

The report outlines a joint and combined operational concept. That is, it includes recommendations tailored to the Army, Navy, Marine Corps, and Air Force, illustrating the vital role that each Service will play in the proposed approach. It also discusses the role of allies. Previous studies have tended to privilege certain Services over others. Some have argued, for example, that prioritizing ground-based missiles will help the Army acquire its fair share of the resources devoted to competing with China.³⁹ Although such arguments have a certain bureaucratic appeal, they risk spurring inter-Service conflict over problems that can only be solved cooperatively. The report offers a more balanced assessment of what the Services should contribute individually and collectively.

38 Kline and Hughes, “Between Peace and the Air-Sea Battle,” p. 39.

39 Jim Thomas, “Why the U.S. Army Needs Missiles,” *Foreign Affairs* 92, no. 3, May/June 2013, pp. 137–144.

CHAPTER 2

Strategic Context

A sound military strategy exhibits clarity about the nature of the threat, the strengths that can be marshaled against it, and the contexts in which confrontation might occur. This chapter provides that foundation. The chapter first describes four concerns about China's rise: its predatory approach to external affairs, its growing maritime geopolitical orientation, its cynical attitude toward the international status quo, and its autocratic political system. The chapter then summarizes past Chinese moves and future American countermoves in the areas of geography, alliances, technology, and doctrine. Finally, the chapter analyzes the geographic settings and campaign scenarios for a Sino-American conflict, identifying four operational challenges for the U.S. military: rapidly blunting Chinese aggression at the outset of conflict, rapidly projecting power to reinforce forward forces within A2/AD environments, protecting and sustaining forces and critical bases of operations, and gaining and maintaining information advantage while under attack. Solving the challenges becomes the goal of Chapter 3's Inside-Out concept.

What Are the U.S. Concerns About China's Rise?

Four features of China's rise concern the United States and its allies.⁴⁰ The first concern involves the CCP's approach to external affairs, which often appears both predatory and corrosive to American interests. It is axiomatic that any country's political leaders pay greater attention to domestic matters than to international affairs. That is certainly true with the CCP leadership, which is highly attentive to threats to domestic stability. Nevertheless, in recent years China has become increasingly active on the international stage. It has exerted its weight not only in its neighborhood, but also in areas far removed from the Asian continent, including the Persian Gulf and Africa. The problem with China's international activism, which includes economic investments, political agreements, and military deployments, is that it too

40 See the discussion in Thomas G. Mahnken, "The Australia-U.S. Alliance in U.S. Strategic Policy," in Peter J. Dean, Stephan Frühling, and Brendan Taylor, eds., *Australia's American Alliance* (Melbourne: Melbourne University Press, 2016).

often relies on exploitation and intimidation to achieve its purposes. For evidence look no further than Djibouti, a strategically situated nation deeply indebted to China which has had little choice but to accept all manner of Chinese intrusions, welcome or otherwise.⁴¹

The second concern involves China's geopolitical orientation. Whereas the PLA long focused on the Asian continent, in recent decades it has increasingly adopted a maritime orientation. China intends its maritime orientation to negate the traditional American strength of projecting military power from afar. It is thus the buildup of the PLA Navy (PLAN) and PLA Air Force (PLAAF), as well as other A2/AD (or, in Chinese parlance, counter-intervention) capabilities such as missiles and anti-satellite weapons, which have stimulated U.S. and allied responses, not Chinese military spending in the abstract.

A third concern, related to the previous two, stems from China's cynical attitude toward the international status quo. China's leadership has challenged the status quo both rhetorically and, increasingly, through action. Nothing illustrates this more tangibly than China's campaign of building and then militarizing new land features in the South China Sea as a means of bolstering Beijing's claim of ownership. While less dramatic than militarizing islands, other Chinese actions have also undermined the rules upheld by the United States since World War II. Those actions include launching cyber attacks against critical civilian infrastructure, pressuring foreign companies to ignore political oppression, stealing intellectual property, and using corruption networks to undermine governments.⁴² These actions are not new, and many other countries have committed them, too. But the Chinese government has done so at a scale and intensity that is deeply worrying.

A final concern revolves around China's domestic political system. China's authoritarian government and disregard for human rights and personal freedom have caused tension with the United States, its allies, and others in the region and beyond. Whatever U.S. leaders say, the CCP leadership firmly believes that the United States wants it to be overthrown.⁴³ Under Xi Jinping, the CCP has set about making the world safe for authoritarianism and establishing a Sino-centric alternative to the liberal international order. Under this model, the hallmark of American global leadership—an open system of free trade and cooperative security buttressed by alliances, institutions, and rules—would succumb to a closed system in which transactional dealings with Beijing determine the fates of nations. Such an outcome would undo 75 years' worth of steadfast U.S. commitment to a liberal rules-based order.

41 Amy Cheng, "Will Djibouti Become Latest Country to Fall into China's Debt Trap?" *Foreign Policy*, July 31, 2018, available at <https://foreignpolicy.com/2018/07/31/will-djibouti-become-latest-country-to-fall-into-chinas-debt-trap/>.

42 Thomas Wright, "The Return to Great-Power Rivalry Was Inevitable," *The Atlantic*, September 12, 2018, available at <https://www.theatlantic.com/international/archive/2018/09/liberal-international-order-free-world-trump-authoritarianism/569881/>.

43 Thomas G. Mahnken, Ross Babbage, and Toshi Yoshihara, *Countering Comprehensive Coercion: Competitive Strategies Against Authoritarian Political Warfare* (Washington, DC: Center for Strategic and Budgetary Assessments, 2018), pp. 43–50.

If these four features changed—if China became more internally focused, emphasized the Asian continent over its maritime periphery, accepted the status quo, and embraced greater pluralism—then the United States and its allies would worry less about China’s rise. Indeed, under those circumstances China might resemble today’s India, a rising power with growing economic strength. Until that day comes, however, the United States is left with little choice but to try and induce China to behave in ways that are least threatening to American interests and values. The authors contend that adopting a strategy of Maritime Pressure serves that purpose. Further discussion of the strategy’s potential impacts on Chinese behavior are deferred until after the Inside-Out concept is explained in Chapter 3. The rest of this chapter focuses on the Sino-American balance of military power.

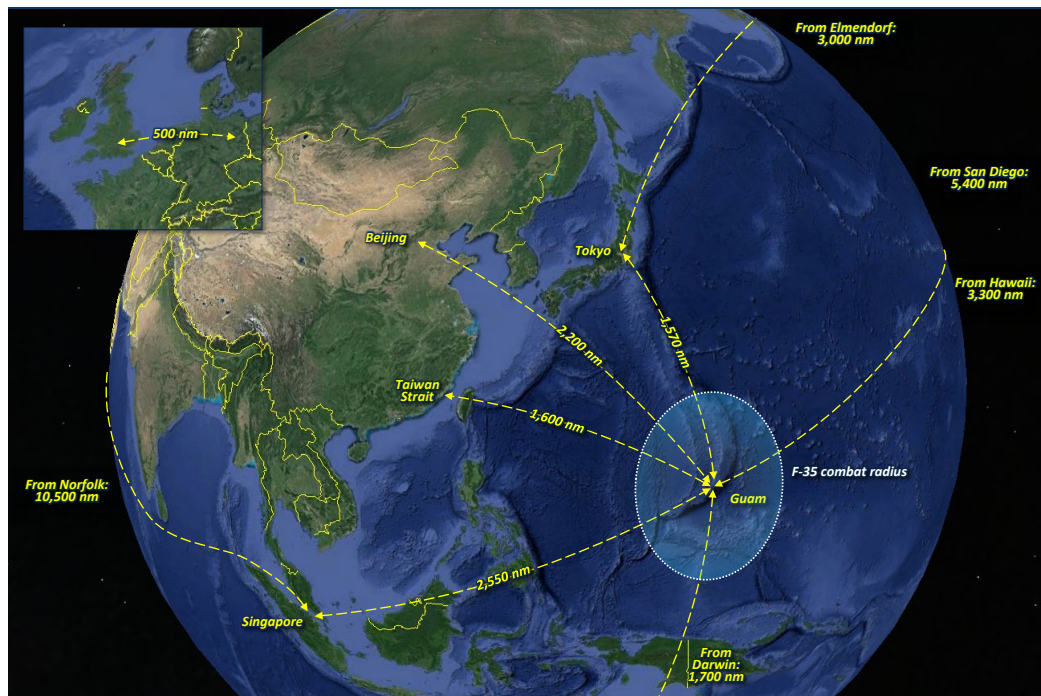
Chinese Moves and American Countermoves

China’s leadership has capitalized on several favorable asymmetries to pursue its aims. Specifically, it has attacked four underpinnings of U.S. strategy: geography, alliances, technology, and doctrine. Together, these moves comprise China’s counter-intervention strategy.

First, the Chinese leadership has exploited a geographic asymmetry. China’s primary territorial concerns—Taiwan, the South China Sea, and the East China Sea—are far closer to its mainland than they are to the United States. The United States has territory, allies, and interests in the Western Pacific but must traverse the expanse of the Pacific Ocean to defend them. Even at the maximum speed of 30+ knots, a *Nimitz*-class aircraft carrier based in San Diego would take a week to travel the 6,500 mi to Yokosuka Naval Base in Japan (Figure 1). The carrier’s various escort ships would have to refuel along the way. This example illustrates why responding quickly is the toughest problem for U.S. planning in the Western Pacific—and why China attempting a *fait accompli* is such a serious concern.

Second, the Chinese leadership has exploited a political asymmetry inherent in U.S. alliances. It has used military power in general, and A2/AD capabilities in particular, to undermine the confidence American allies and partners have in U.S. security guarantees. China has capitalized on the U.S. reliance on increasingly vulnerable forward-based forces stationed on allied territory. Chinese defense investments have simultaneously raised the cost to U.S. allies of hosting American forces and lowered allies’ faith in America’s ability to defend them.

Third, Chinese leaders have exploited a technological asymmetry. The PLA has embraced the growth and spread of precision-strike systems worldwide. It has developed and deployed a centralized, land-based reconnaissance-strike complex composed of long-range sensors, command and control networks, and precision weapons. The complex is backed by wide-area surveillance and targeting, plentiful ballistic and cruise missiles, integrated air defense systems, advanced fighter-bomber aircraft, a large submarine force, and modern surface combatants. China’s complex efficiently holds at risk U.S. and allied air bases, ports, facilities, and personnel in key areas of the Indo-Pacific region.

FIGURE 1: TYRANNY OF DISTANCE AND TIME IN THE WESTERN PACIFIC

Finally, Chinese leaders have exploited a doctrinal asymmetry. The PLA has developed a counter-intervention doctrine to stifle U.S.-style power projection, which relies upon large forward-based assets and carrier strike groups. The PLA developed this strategy after learning from the American military's performance in the 1991 Gulf War and other conflicts, dissecting U.S. exercises and operational deployments, reading U.S. joint doctrine, and conducting extensive espionage.

China's counter-intervention strategy endangers U.S. interests. It constrains U.S. options to project military power, thereby undermining U.S. credibility among allies and friends. It imposes considerable risks on U.S. armed forces as they seek to respond. It gives China momentum in the Sino-American competition, forcing the United States into a costly reactive mode.

Any U.S. strategy to counter Chinese moves should seek to reverse all these trends. It should yield an expanded set of U.S. and allied options while constraining those of China. It should impose considerable costs upon Beijing. It should give the United States momentum in the Sino-American competition, forcing China to respond to U.S. initiatives. A strategy of Maritime Pressure tackles these objectives by leveraging the same factors that Chinese strategy has attacked.

American Countermoves

China has stolen a march (or two) on the United States in the areas of geography, alliances, technology, and doctrine. But these factors remain enduring American strengths. The strategy of Maritime Pressure reclaims them on behalf of the U.S. and allied militaries. The strategy's countermoves are previewed here before unpacking them in Chapter 3 (along with possible Chinese counter-countermoves).

FIGURE 2: LITTORAL EAST ASIA FROM CHINA'S PERSPECTIVE



What applies to kings also applies to the Maritime Pressure strategy: Geography is dead, long live geography. The strategy uses geography—in particular, the barrier formed by Japan, Taiwan, the Philippines, and maritime and peninsular Southeast Asia—to constrain China's access beyond the Western Pacific during crisis or war. Looking "out" from mainland China, a natural chain of islands limits Chinese entry to the greater Pacific and Indian Oceans, save for a handful of narrow straits alongside Japan, Taiwan, the Philippines, Malaysia, and Indonesia (Figure 2). Chinese literature reveals a deeply felt insecurity about these near-seas areas and an urgent desire to control them. The PLA seeks to dictate military operations within this First Island Chain, a geographic area that holds deep symbolic value for Chinese leaders.⁴⁴ The Chinese leadership has wagered that air and sea power combined with ample land-based missiles will prevent encirclement. Maritime Pressure subverts this Chinese belief by fielding

44 Andrew S. Erickson and Joel Wuthnow, "Barriers, Springboards and Benchmarks: China Conceptualizes the Pacific 'Island Chains,'" *The China Quarterly* 225, March 2016, pp. 1–22; and Krepinevich, *Archipelagic Defense*, p. 63.

U.S. land-based precision strike networks to menace the straits that Chinese merchant and war ships must transit to exit the East and South China Seas.⁴⁵

Maritime Pressure makes full use of U.S. alliances, probably the most significant advantage in America's long-term competition with China. The strategy calls for deepening collaboration with allies on sensitive military plans, including theater strike operations. Deeper collaboration will strengthen allied resolve and improve combined effectiveness. While the United States already shares information with allies, increasing that sharing will prove mutually beneficial. Chinese leaders should perceive the strategy as credible because it entails fewer escalatory risks than more aggressive approaches, meaning American and allied leaders will not be self-deterred from using it. The strategy also strengthens crisis stability by increasing the resilience of American and allied military forces.⁴⁶ By decreasing the damage that China could hope to inflict through a surprise attack, Maritime Pressure reduces China's incentive to launch one.

In terms of technology, the strategy recommends developing and deploying countermeasures to China's precision-strike systems. It endorses fielding a U.S. and allied A2/AD network. Key American investments would include land-based anti-ship and anti-air weapons, along with counter-C4ISR capabilities. Many of these capabilities already exist and are less costly than their alternatives, especially expensive fighter aircraft and surface ships.⁴⁷ By investing more in the recommended capabilities, the United States can invest proportionately less in pricier alternatives—and thus avoid busting its budget. The United States possesses the technological capacity to field select A2/AD capabilities efficiently and effectively.⁴⁸ China, by contrast, will be hard-pressed organizationally and budgetarily to field new technologies capable of overcoming American A2/AD investments.⁴⁹ Even if they developed the right capabilities, finding and engaging mobile U.S. ground forces would be time-consuming, and circumventing them would be difficult if they possessed long-range missiles and were supported by air and naval forces.

Finally, the Maritime Pressure strategy recaptures doctrinal momentum by exploiting the weaknesses inherent in China's centralized approach to warfare, including its need to gather and process large volumes of information. Chinese military doctrine displays a strong belief

45 Toshi Yoshihara, "Chinese Maritime Geography," in Thomas G. Mahnken and Dan Blumenthal, eds., *Strategy in Asia: The Past, Present, and Future of Regional Security* (Stanford, CA: Stanford Security Studies, 2014), pp. 54–55; and Toshi Yoshihara and James R. Holmes, *Red Star Over the Pacific: China's Rise and the Challenge to U.S. Maritime Strategy*, 2nd ed. (Annapolis, MD: U.S. Naval Institute Press, 2018), chapter 3.

46 Eric Heginbotham and Richard J. Samuels, "Active Denial: Redesigning Japan's Response to China's Military Challenge," *International Security* 42, no. 4, Spring 2018, p. 168.

47 Terrence K. Kelly et al., *Employing Land-Based Anti-Ship Missiles in the Western Pacific* (Santa Monica, CA: RAND Corporation, 2013), p. 8; and Heginbotham and Heim, "Deterring without Dominance," p. 195.

48 Kelly, Gompert, and Long, *Smarter Power, Stronger Partners*, p. 219.

49 Michael Beckley, "The Emerging Military Balance in East Asia: How China's Neighbors Can Check Chinese Naval Expansion," *International Security* 42, no. 2, Fall 2017, p. 81.

that strategy is a science rather than an art. It maintains great confidence about predicting conflict outcomes.⁵⁰ Since deterrence succeeds or fails inside leaders' minds, Maritime Pressure targets beliefs held by Chinese leaders. Specifically, it aims to thwart Chinese sea control, air superiority, and information dominance, conditions viewed by Chinese leaders as essential to military victory.⁵¹ Maritime Pressure reduces the Chinese leadership's confidence in its ability to control the course and outcome of a future conflict, thus bolstering deterrence. The strategy denies the PLA leadership the type of war it has planned for decades, forcing it either to double-down on investing in anti-access capabilities or seek another approach, such as circumventing ground-based U.S. forces and weapons, which would take more time, require longer-range platforms, and result in losses along the way. Either way, changing the PLA's doctrine will cost China money and time.

What the Force Might Need to Do: Future Requirements

Developing a Maritime Pressure strategy requires being specific about the Chinese aggression that the United States seeks to deter and defeat. Considering various scenarios is one way to inject greater specificity into the planning process.

The Geographic Setting: The Western Pacific

American and allied analysts have imagined conflict with China in the Western Pacific occurring over Taiwan, in the South China Sea (SCS), or in the East China Sea (ECS).⁵² Although one hopes such an event never transpires, and China might not seek a conventional conflict anytime soon, considering it can illustrate the potential requirements for U.S. and allied military forces.

Taiwan: The United States could get drawn into a war if China attacked Taiwan and American leaders enforced their longstanding and public warning that China not attempt to change the status quo through military force.⁵³ The Chinese government's 70-year-old political conflict with Taiwan continues to risk sparking a major conflagration. While experts today disagree about China's global ambitions, virtually all agree that China has one unwavering

50 Thomas G. Mahnken, *Secrecy and Strategem: Understanding Chinese Strategic Culture* (Sydney: Lowy Institute, 2011).

51 James C. Mulvenon et al., *Chinese Responses to U.S. Military Transformation and Implications for the Department of Defense* (Santa Monica, CA: RAND Corporation, 2006).

52 If China launched multiple assaults simultaneously, say by staging an intra-theater feint to divert attention from its main objective, then conflict could unfold in multiple places. Future conflicts between the United States and China might also occur over North Korea or beyond the Western Pacific, particularly as Chinese interests and the PLA's ability to protect them through power projection grow. In such cases, the PLAN would still need to sortie from bases on China's coast through the First Island Chain. The PLA would also have to defend the Chinese homeland from attack as it conducted distant military operations. Understanding conflict scenarios in the First Island Chain is therefore essential whether war occurs there or further afield.

53 Bureau of East Asian and Pacific Affairs, "U.S. Relations With Taiwan," U.S. Department of State Bilateral Relations Fact Sheet, August 31, 2018, available at <https://www.state.gov/u-s-relations-with-taiwan/>.

goal with respect to Taiwan: to reestablish political control over the island.⁵⁴ Much of Chinese operational planning concerns Taiwan, which Chinese doctrine designates the “Main Strategic Direction.”⁵⁵ China has developed military capabilities to persuade Taipei that it will suffer enormously if it bucks Beijing and convince the United States that aiding Taiwan would be costly and ultimately futile.⁵⁶ Since Taiwanese President Tsai Ing-wen’s election in 2016, China has increased pressure on Taiwan in various ways, including by dispatching military aircraft and ships alarmingly close to Taiwan.⁵⁷ The PLA has also improved its ability to conduct the complex joint operations required to attack Taiwan.⁵⁸ Although some analysts have claimed that Taiwan can defeat a Chinese attack without U.S. assistance, that conclusion rests on overly optimistic assumptions about Taiwanese military capabilities.⁵⁹ In short, Taiwan remains vulnerable to a Chinese attack, the cross-strait balance of military power is trending in China’s favor, and the United States would likely have to intervene militarily to stave off a Taiwanese defeat.⁶⁰

South China Sea: China’s ongoing militarization of the South China Sea could trigger a conflict involving American forces. Since late 2013, China has reclaimed lands and constructed bases at sites it occupies in the Spratly and Paracel Islands. Some sites feature runways, hardened aircraft hangars, electronic jamming equipment, and anti-ship and air defense missiles.⁶¹ This infrastructure could support future Chinese offensive military operations. For example, the PLA might use it to anchor the assault and seizure of another contested feature that it does not occupy. The operation would signal military strength to the Chinese public, potentially distracting from domestic problems during an economic downturn or political scandal. China seizing any contested feature would trigger crisis, escalation, or potential war with other nations making territorial claims. Those nations would face intense political pressure at home not to accept China’s *fait accompli*. Besides attacking deliberately, Chinese militarization in the South China Sea risks inadvertent conflict since moving military and civilian assets around

54 Hunzeker and Lanoszka, *A Question of Time*, pp. 35–41.

55 Academy of Military Sciences Strategic Research Department, *Science of Military Strategy* (Beijing: Academy of Military Sciences, 2013), pp. 198–199; and Liu Haijiang and Li Zhiyuan, eds., *Research on Joint Tactical Thought* (Beijing: Lantian Press, 2012), p. 156.

56 Oriana Skylar Mastro and Ian Easton, *Risk and Resiliency: China’s Emerging Air Base Strike Threat* (Washington, DC: Project 2049 Institute, 2017); and Ian Easton, *The Chinese Invasion Threat: Taiwan’s Defense and American Strategy in Asia* (Manchester, UK: Camphor, 2017).

57 Susan V. Lawrence, *Taiwan: Select Political and Security Issues* (Washington, DC: Congressional Research Service, October 2018), p. 2.

58 Office of the Secretary of Defense (OSD), *Military and Security Developments Involving the People’s Republic of China 2018*, annual report to Congress (Washington, DC: DoD, August 2018), pp. 96–97.

59 Travis Sharp and John Speed Meyers, “Correspondence: Will East Asia Balance Beijing?” *International Security* 43, no. 3, Winter 2018/2019, pp. 194–196.

60 Scott L. Kastner, “Is the Taiwan Strait Still a Flash Point? Rethinking the Prospects for Armed Conflict between China and Taiwan,” *International Security* 40, no. 3, Winter 2015/2016, pp. 69–74.

61 Ronald O’Rourke, *China’s Actions in South and East China Seas: Implications for U.S. Interests* (Washington, DC: Congressional Research Service, August 2018), pp. 13–15.

the islands could precipitate confrontations, whether planned or unplanned, between Chinese and other nations' forces, including U.S. ships conducting freedom of navigation operations.

East China Sea: China's continued belligerence in its East China Sea territorial disputes with Japan could devolve into a war involving the United States given America's unwavering commitment to its mutual defense treaty with Japan. Since 2012, Chinese Coast Guard and Maritime Militia vessels have intruded continuously into waters near the Senkaku Islands controlled by Japan. China has flown combat aircraft through Japanese airspace near the Senkakus and other islands, forcing Japan to scramble fighters to intercept them.⁶² With military forces shadowing one another in close proximity, one mistake by a ship captain or pilot could propel the nations into a militarized crisis. In the future, China could direct its militia or military forces to harass Japan in a predatory move to spur Japanese overreaction. Or the PLA could seize territory within the Senkakus, perhaps to demonstrate resolve during an escalating feud with Japan or the United States. Worse still would be a Chinese invasion of Japan's Southwest Islands, a contingency that deeply worries Japan today. If the Chinese attack succeeded quickly, changing the status quo, Japanese and American leaders might face the difficult choice of having to escalate to restore the status quo ante.

Four Potential Chinese Operations

Understanding how the PLA plans for future wars should occupy a central role in any strategy that seeks to deter the Chinese leadership. The PLA has developed a coherent body of thought describing the joint operations that it envisions conducting, either independently or during a broader campaign. Four such operations stand out:

- Joint Firepower Strike Operations featuring air and missile strikes (strike campaign);
- Joint Blockade Operations featuring electronic and cyber attacks, missile and air strikes, naval surface and subsurface raids, and offensive mine warfare (blockade);
- Joint Attack Operations featuring amphibious and airborne assaults (amphibious assault); and
- Joint Anti-Air Raid Operations featuring attacks on American forces deployed in the Western Pacific to protect the regime in Beijing (anti-air raid operations).⁶³

These joint operations could unfold in a Taiwan, SCS, or ECS setting. The operations would feature different configurations of Chinese attackers, which in turn would require different responses by U.S. and allied defenders. The operations also would likely blur together. For example, a strike campaign would presumably precede an amphibious assault, and both

62 Edmund J. Burke et al., *China's Military Activities in the East China Sea: Implications for Japan's Air Self-Defense Force* (Santa Monica, CA: RAND Corporation, 2018), pp. 9–15.

63 Ian Easton, "China's Top 5 War Plans," *National Interest*, January 12, 2019, available at <https://nationalinterest.org/blog/buzz/chinas-top-5-war-plans-41332>.

a strike campaign and an amphibious assault might include a blockade and anti-air raid operations.

Strike campaign: One stressing scenario would involve the PLA launching a strike campaign to coerce an opponent to capitulate to China's political demands. Under this scenario, China would likely not attempt to seize territory or land troops, but instead use missiles and other weapons to inflict punishment from afar. A Chinese strike campaign against Taiwan or a SCS/ECS site would incorporate several elements. After seeking to gain information dominance, China would commence strikes using air, missile, undersea, electronic, cyber, or other assets. Offensively, the PLA would prey upon critical nodes to degrade its opponent's fighting ability. Those nodes include air bases, surface-to-air missile (SAM) radar sites, satellite ground stations, and fuel storage and delivery infrastructure. Defensively, the PLA would brandish its arsenal of land-, ship-, and aircraft-launched missiles to threaten U.S. and allied naval and air forces with destruction if they ventured close enough to release their weapons, as discussed in the anti-air raid operations subsection below.

The PLA possesses an imposing inventory of strike forces. Given its current air bases and aircraft ranges, it could muster approximately 1,000 fighter, strike, and bomber aircraft in a Taiwan scenario and about 500 in a Spratly Islands scenario.⁶⁴ These numbers could increase by shifting forces from more distant theater commands to the conflict area. The fleets would include the Shenyang J-16 strike fighter, an aircraft comparable to the U.S. F-15 and equipped with a multimode active electronically scanned array (AESA) radar ideal for tracking many enemy targets at long ranges.⁶⁵ China's missile arsenal includes 750–1,500 ground-launched short-range ballistic missiles capable of hitting targets along the First Island Chain; 270–540 ground- and air-launched land-attack cruise missiles for standoff precision strikes against critical nodes; and large quantities of modern anti-ship cruise missiles (ASCMs) deliverable via aircraft, submarines, and surface ships.⁶⁶ According to RAND, in 2017 China had 28 destroyers, 47 frigates, and 41 submarines capable of launching ASCMs.⁶⁷ China also has explored installing ASCM launchers in shipping containers located in merchant ships or civilian ports, disguising them for surprise attacks.⁶⁸

64 Eric Heginbotham et al., *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power 1996–2017* (Santa Monica, CA: RAND Corporation, 2015), pp. 75–77, 88–89.

65 Jeffrey Lin and P.W. Singer, "Chinese Air Force Takes Delivery of New J-16 Strike Fighters," *Popular Science*, May 7, 2014, available at <https://www.popsci.com/blog-network/eastern-arsenal/chinese-air-force-takes-delivery-new-j-16-strike-fighters>.

66 OSD, *Military and Security Developments Involving the People's Republic of China 2019*, annual report to Congress (Washington, DC: DoD, May 2019), pp. 47, 117.

67 Heginbotham et al., *The U.S.-China Military Scorecard*, pp. 177–181.

68 Bill Gertz, "China Building Long-Range Cruise Missile Launched from Ship Container," *Free Beacon*, March 27, 2019, available at <https://freebeacon.com/national-security/china-building-long-range-cruise-missile-launched-from-ship-container/>.

A strike campaign would present the United States and its allies with difficult political choices. If leaders received indications and warning that China was poised to attack, they would have to decide whether to launch preemptive strikes to stifle the onslaught, a move that might elicit public condemnation for drawing first blood (especially if China lied afterward about preparing to attack, or if preparations to attack were a feint). If the strike campaign commenced without preemption, U.S. and allied leaders would then have to decide whether to counterattack narrowly against China's front-line strike forces or broadly against rear-area targets enabling those forces, including targets in China's interior. The question is straightforward militarily since destroying enabling infrastructure, "the hub of all power and movement," is almost always preferable.⁶⁹ In this case, however, targeting rear areas risks escalation under the shadow of nuclear war; the Chinese regime might perceive attacking its territory as an existential threat.⁷⁰ All in all, a Chinese strike campaign would present U.S. and allied leaders with choices ranging from bad to worse.

Blockade: Another potential PLA operation involves a blockade campaign featuring maritime interdiction operations, kinetic and non-kinetic strikes, shows of force, raids, and mining operations to strangle an enemy like Taiwan into submission. The blockade would punish the victim into capitulation by severing connections to the outside world. While a blockade might transpire during a strike campaign, amphibious assault, or anti-air raid operation, it might also occur on its own at varying levels of intensity. Whereas a high-intensity blockade featuring kinetic strikes would threaten to escalate quickly, a low-intensity blockade featuring demonstrations of force might last days, weeks, or even months, defying expectations of a short conflict.⁷¹ A drawn-out, slow-burning confrontation might require greater resources than American and allied strategists assume, including the political courage to rally allies and preserve unity during a protracted coercive campaign.

A low-intensity Chinese blockade would depend heavily on maritime situational awareness and surface ship operations interfering with merchant shipping. A high-intensity blockade, essentially the modern equivalent of unrestricted submarine warfare, would depend heavily on submarines and sea mines, with surface ships, aircraft, and land-based missiles playing supporting roles.⁷² A high-intensity blockade of Taiwan illustrates the case. The PLAN would concentrate its submarine fleet on denying merchant ships access to Taiwan's ports, a grave threat to an island nation that imports much of its crude oil and food. If the PLAN dedicated all its submarines to the task, leaving itself vulnerable elsewhere, it could muster over

69 Carl von Clausewitz, with Michael Howard and Peter Paret, trans. and eds., *On War* (Princeton, NJ: Princeton University Press, 1989), p. 595.

70 Caitlin Talmadge, "Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States," *International Security* 41, no. 4, Spring 2017, pp. 50–92.

71 T.X. Hammes, *Offshore Control: A Proposed Strategy for an Unlikely Conflict* (Washington, DC: Institute for National Strategic Studies, National Defense University, 2012), pp. 3–4.

72 Michael A. Glosny, "Strangulation from the Sea? A PRC Submarine Blockade of Taiwan," *International Security* 28, no. 4, Spring 2004, pp. 125–160.

50 boats in the area of operations, including the diesel-electric, cruise missile-carrying *Yuan* and the quieted, nuclear-powered *Shang*. Besides directly interdicting merchant ships and naval vessels, PLAN submarines could seed the waters near Taiwan with naval mines. China today possess over 50,000 mines, including both older contact and influence mines and newer rocket-propelled and intelligent mines.⁷³ Together, Chinese submarines and mines could erect a formidable barrier for U.S. and allied militaries to fight through to rescue Taiwan.

Amphibious assault: An even more stressing scenario would involve the Chinese military launching a surprise attack to seize a territorial objective before the United States and its allies had time to respond, thus presenting them with a *fait accompli*. A Chinese amphibious assault against Taiwan, for example, would likely unfold in several stages. First the PLA would try to achieve information dominance through surprise, a key tenet of its doctrine.⁷⁴ It might conduct a military exercise or weapons test to disguise the massing of men and materiel. It might also use non-military coercive tools, known as “gray zone” activities, to misdirect the United States and its allies.⁷⁵ The next stage would involve Chinese strike and anti-air raid operations. The PLA would seek to establish air superiority and sea control by disarming U.S. and allied forces opposing the amphibious landing. Timing would prove essential for success. The final stage would involve the PLA landing troops on the objective and reinforcing it rapidly to withstand a counterattack by U.S. and allied forces.

Based on its current inventory of amphibious landing ships, the PLA could land approximately 20,000 troops during an initial assault wave against Taiwan, assuming it suffered 25 percent attrition along the way in accordance with plausible loss rates (which it could reinforce rapidly in subsequent waves).⁷⁶ Nonetheless, the Taiwan scenario would prove extremely challenging for the PLA due to terrain, opposition, and a lack of PLAN lift capacity. Seizing a SCS/ECS site would require fewer troops, given the smaller landmasses, but more time to get them there, given the longer transit distances. The PLA could reduce transit time by deploying troop-ferrying ships near the objective in advance, perhaps using an exercise as a ruse. Reversing the PLA’s gains would require dislodging it from its newly seized position, a daunting task politically. If the PLA seized a SCS/ECS site, for example, the United States and its allies would have to contemplate retaliating against Chinese forces that, in some people’s eyes, had done nothing besides occupy useless rocks owned by no one.

Anti-air raid operations: In several of the scenarios above, the PLA would likely conduct anti-air raid operations to prevent U.S. military intervention and protect the regime in Beijing.

73 Office of Naval Intelligence (ONI), *The PLA Navy: New Capabilities and Missions for the 21st Century* (Washington, DC: ONI, April 2015), pp. 20–21.

74 Mulvenon et al., *Chinese Responses to U.S. Military Transformation*, pp. 49–53.

75 Mahnken, Babbage, and Yoshihara, *Countering Comprehensive Coercion*, pp. 35–40.

76 Heginbotham et al., *The U.S.-China Military Scorecard*, p. 203; and Beckley, “The Emerging Military Balance in East Asia,” pp. 87–90. Losses may be higher, depending on what ships are lost in transit. Additional losses would also be incurred ashore.

Rather than pursuing coercion or territory, anti-air raid operations would focus on neutralizing U.S. and allied forces in the Western Pacific to thwart retaliation against Chinese military and political targets. The Chinese view anti-air raid operations as “defensive” in nature even though they would likely occur during a Chinese offensive campaign, thus “underscoring the ambiguity of offense and defense in PLA theory,” as DoD has noted.⁷⁷ Anti-air raid operations would involve fielding integrated air defense networks to cover the mainland, attacking enemy air bases and aircraft carriers, and expanding China’s air defenses beyond its borders with air defense systems on ships and artificial islands.⁷⁸

The Chinese capabilities required for anti-air raid operations would resemble those needed for a strike campaign. If the Chinese leadership wanted to increase pain on its adversaries gradually rather than crippling their defenses immediately, it could strike front-line operating forces, such as single ships or aircraft, perhaps using stealthy platforms such as submarines that might disguise culpability, at least initially. Even the most powerful U.S. military capabilities might not be able to stop Chinese anti-air raid operations. Though U.S. and allied submarines could slip undetected into China’s A2/AD bubble to harry PLA strike forces, launching too many strikes in quick succession might expose their positions. Similarly, while U.S. stealthy long-range bombers could penetrate Chinese A2/AD defenses to strike enabling and front-line forces, their time on target would be constrained by long flight times from distant bases. This time-to-target constraint has obvious implications, particularly during the crucial opening hours of a Chinese blitz to inflict punishment or seize territory. Chinese anti-air raid operations therefore present a thorny operational problem that no single American weapons system can solve by itself.

Four Operational Challenges

In defending against these Chinese operations, U.S. and allied military forces would face four key operational challenges:

- Rapidly blunting Chinese aggression at the outset of conflict;
- Rapidly projecting power to reinforce forward forces within A2/AD environments;
- Protecting and sustaining forces and critical bases of operations; and
- Gaining and maintaining information advantage while under attack.⁷⁹

Although challenges surely exist beyond these four, they provide a reasonable summation of the key problems absorbing American and allied planners.

⁷⁷ OSD, *Military Power of the People’s Republic of China 2009*, annual report to Congress (Washington, DC: DoD, March 2009), p. 13.

⁷⁸ Cortez A. Cooper, testimony before the U.S.-China Economic and Security Review, January 27, 2011, p. 4.

⁷⁹ NDS Commission, *Providing for the Common Defense*, p. 15.

Rapidly blunting Chinese aggression at the outset of conflict: U.S. and allied military forces must respond in force quickly to thwart a Chinese *fait accompli* attempt. In the direst scenario involving an invasion of Taiwan, the response would need to begin within a few hours. U.S. and allied forces will not have weeks or months to concentrate in mass near the theater of operations and then counterattack before China seizes a territorial objective or attrites its opponent's forces. Nor will friendly forces necessarily have time to fight their way to decisive points in the battlespace if they begin the conflict outside China's A2/AD bubble. U.S. and allied forces must inflict losses on attacking Chinese forces from the conflict's outset. Even if they only slow a Chinese advance, they will buy time for reinforcements to arrive, compel China to expend resources, and complicate the PLA's planning. Reacting rapidly requires, among other things, defending and hardening friendly forces and bases so they can absorb a Chinese first strike and retaliate afterwards.

Rapidly projecting power to reinforce forward forces within A2/AD environments: Although forward forces could help slow Chinese attacks and buy time, they would still need rapid reinforcement by forces deploying from the continental United States (CONUS) or other theaters. U.S. and allied military forces must fight through a large quantity of Chinese missiles, ships, and aircraft to halt and ultimately defeat attempted aggression by the PLA. For various strategic reasons, including its assessment of American capabilities, the PLA has dispersed its offensive striking power across many forces, greatly complicating U.S. and allied reinforcement operations.⁸⁰ U.S. reinforcements would not only need to deploy rapidly, but also do so while under kinetic and non-kinetic attack by Chinese anti-access capabilities. For example, Chinese cyber attacks could disrupt U.S. deployment networks while Chinese anti-ship and land-attack missiles could interdict forces while at sea, aerial and sea ports of debarkation, or staging areas.

Protecting and sustaining forces and critical bases of operations: Once in theater, both forward forces and reinforcements would face sustained attack by Chinese area denial capabilities. In particular, U.S. bases in the Western Pacific would be highly vulnerable to massed attacks by Chinese missiles. U.S. forces are concentrated at a handful of locations such as Kadena Air Base in Okinawa, Japan—the U.S. air base closest to the Taiwan Strait. Concentrating U.S. forces in relatively few places has resulted from several factors, including the Western Pacific's vast archipelagic geography, the historical evolution of U.S. military relations with its allies, and the post-Cold War U.S. emphasis on optimizing efficiency at the expense of resilience.⁸¹ In a conflict, China could mass large quantities of missile fires against the handful of large friendly bases. By attacking only a few bases, the PLA could decrement a significant proportion of U.S. and allied striking power. Given these prospective gains, China has an incentive to attack first against friendly forces and bases, a fact that undermines

80 Thomas G. Mahnken, "China's Anti-Access Strategy in Historical and Theoretical Perspective," *Journal of Strategic Studies* 34, no. 3, June 2011, pp. 299–323.

81 Carnes Lord and Andrew S. Erickson, eds., *Rebalancing U.S. Forces: Basing and Forward Presence in the Asia-Pacific* (Annapolis, MD: U.S. Naval Institute Press, 2014).

stability in the Western Pacific. Hardening and geographically dispersing forces could help mitigate the threat from Chinese area-denial systems. However, geographically distributed operations would create significant challenges for a U.S. logistics system designed to maximize efficiency while functioning in permissive environments. As such, distributed operations would require, at a minimum, new sustainment concepts and significant changes to sustainment capabilities and force structure.

Gaining and maintaining information advantage while under attack: The battle for information advantage will be critical in a future conflict with China and could ultimately prove decisive. Even before a conflict begins, Chinese preparatory actions below the threshold of armed conflict, supported by deception operations, could mask Chinese intentions and blur the line between conflict and peace, thereby providing China with a potentially decisive first-mover advantage. Once a conflict begins, the large inventory of Chinese front-line strike forces would place enormous stress on U.S. and allied forces' targeting cycles, the labor- and technology-intensive processes of identifying, prioritizing, prosecuting, and assessing the damage inflicted on Chinese targets. China's robust counter-C4ISR capabilities would further exacerbate this targeting challenge by degrading U.S. and allied situational awareness, hindering both coordination and command and control. At the same time, China increasingly possesses its own sophisticated, albeit highly centralized, C4ISR architecture. This C4ISR architecture greatly enhances the PLA's ability to target U.S. and allied forces throughout the battlespace, particularly if not degraded by U.S. and allied counter-C4ISR capabilities.

Conclusion

The United States must discourage the Chinese leadership from believing it can initiate a local conflict in the Western Pacific and prevail quickly on favorable terms. Unfortunately, the current U.S. military posture of concentrating forces at a handful of bases may tempt the PLA to strike quickly during a crisis, cutting off American access to its allies and partners. A new U.S. force posture that places distributed, resilient, forward-stationed strike forces on the tactical defensive along the First Island Chain would stabilize the situation. Employed properly, it would promote mutual deterrence and incentivize all parties to manage their disputes peacefully. The next chapter proposes such a posture by introducing the Inside-Out Defense concept.

CHAPTER 3

Concepts, Capabilities, and Coordination for a Strategy of Maritime Pressure

Given the strategic and operational challenges confronting the United States in the Western Pacific, implementing a strategy of Maritime Pressure will require a new operational approach. This chapter first describes a new operational concept, Inside-Out Defense, which seeks to overcome the tyranny of distance and time, frustrate China's counter-intervention strategy, and rapidly blunt Chinese aggression to prevent a *fait accompli*. It next assesses how well the U.S. military's current concepts, capabilities, and coordination meet the needs of Inside-Out Defense. It then offers recommendations to close some of these gaps. Finally, it explores potential Chinese responses to a Maritime Pressure strategy.

Solving the Problems: Inside-Out as a Point of Departure Operational Concept

To support a strategy of Maritime Pressure, CSBA offers a new operational concept, Inside-Out Defense, as a point of departure to stimulate further discussion and debate. The concept anchors the report's subsequent assessment of current activities and key recommendations. It addresses the problems of time and distance that the U.S. military faces in the Western Pacific. At risk of oversimplification, the concept does to China what China has done to the United States and its allies; namely, it exploits the Western Pacific's geography to create an A2/AD architecture capable of degrading, delaying, and denying an adversary's power projection forces.

Central Idea of Inside-Out Defense

Inside-Out Defense combines lethal and resilient “inside” forces able to fight and persist within highly contested environments with agile, long-range “outside” forces capable of fighting from standoff distances or penetrating A2/AD networks.⁸² Together, these inside and outside forces could create a responsive, yet survivable, forward defense-in-depth in the Western Pacific capable of rapidly blunting Chinese aggression at the outset of a conflict. Although Inside-Out Defense might prove insufficient on its own to enable the United States to prevail in a conflict with China, by staving off a *fait accompli*, it would buy the time necessary for other operations, such as follow-on punitive strikes or a distant blockade, to produce their intended effects. It would also help restore a more favorable escalation dynamic between China and the United States. By presenting a more formidable defensive posture, Inside-Out Defense would, in a crisis, make China choose between risking a large-scale and costly conflict or seeking an off-ramp to diffuse tensions.

Inside and Outside Forces

Inside-Out Defense involves two mutually supporting components: inside forces and outside forces.

Inside forces: During peacetime, inside forces forward postured in the Western Pacific would provide a combat credible signal of U.S. commitment and resolve, which should give Chinese leaders pause by complicating their decision calculus and undermining their confidence in their military plans. These inside forces could also help challenge Chinese coercive actions below the level of armed conflict. Inside forces employing a network of persistent air, maritime, and ground sensors could enhance situational awareness in the Western Pacific and help expose Chinese malign activities. Moreover, a persistent sensor network deployed in the Western Pacific could also improve indications and warning of potential Chinese aggression, thereby reducing China’s time-distance advantage.

In the event of conflict, inside forces would exploit the region’s maritime geography by rapidly assuming a dispersed, resilient posture along and within the First Island Chain to form an initial defensive barrier that could immediately challenge Chinese military operations. These inside forces would serve three primary roles in a Western Pacific contingency. First, they would contest what Chinese doctrine has identified as necessary prerequisites for conducting a successful military campaign: air superiority, sea control, and information dominance.⁸³ Second, inside forces would attack Chinese power projection forces to delay and deny their ability to achieve objectives through aggression, such as seizing the territory of U.S. allies or partners, while blocking China from projecting power beyond the First Island Chain. Third,

82 Corbett, “Stand-In Forces.”

83 Mulvenon et al., *Chinese Responses to U.S. Military Transformation*.

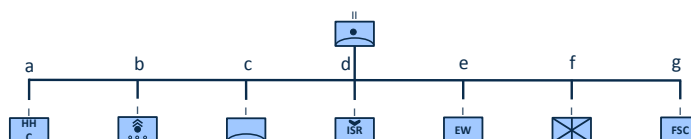
they would degrade key Chinese systems to create gaps in China's A2/AD networks that outside forces could then exploit.

Mobile and dispersed ground forces—and amphibious forces ashore—would form the backbone of these inside forces. Leveraging the inherent survivability of mobile, hard-to-find ground forces augmented with counter-detection aids, such as camouflage, concealment, and deception (CCD), the inside forces would transform the First Island Chain's archipelagos into defensive bastions bristling with multi-domain capabilities such as sensors, missiles, and electronic warfare systems.

As an illustrative example, a notional multi-domain ground unit could be organized as follows (letters correspond to the icons displayed in Figure 3):

- a) Headquarters and headquarters company (HHC) including organic signal, engineer, and medical platoons;
- b) Rocket artillery battery equipped with M142 high-mobility artillery rocket system (HIMARS) or a new multi-mission launcher capable of firing a family of land-attack and anti-ship missiles;
- c) Composite air defense battery equipped with a mix of long- and short-range surface-to-air missiles, guns, and directed energy systems to provide wide-area air denial and point defense;
- d) Military intelligence/ISR company with organic aerial and ground sensors;
- e) Electronic warfare company with both electronic attack and defensive capabilities;
- f) Motorized infantry company to provide security for dispersed forces; and
- g) Forward support company capable of sustaining distributed forces in an austere environment.

FIGURE 3: NOTIONAL MULTI-DOMAIN GROUND UNIT



During a conflict, multi-domain ground units could task-organize into smaller multi-domain elements and assume a distributed disposition over a sizeable deployment area to complicate Chinese targeting and improve survivability. Sub-surface platforms, both manned and unmanned, could operate within or near the ECS and SCS to augment these island bastions as part of the inside forces.

Given their role in peacetime competition and deterrence, including the need to blunt Chinese aggression at the start of a conflict, the core of inside forces would likely consist of units forward postured in the Western Pacific such as III Marine Expeditionary Force (MEF).

During a crisis, this initial core could be augmented by rapidly deploying forces, which would leverage stocks of pre-positioned equipment in the First Island Chain. Given the likely difficulty of resupplying inside forces, particularly early in a conflict, they would need sufficient

stocks of munitions and sustainment material to fight without resupply for an extended period of time. As a crisis or conflict progressed, additional forces surging from CONUS and other theaters, together with the outside forces, would reinforce the inside forces, particularly as Chinese A2/AD capabilities became degraded.

Outside forces: Primarily consisting of air and naval surface forces, outside forces would provide a flexible and agile element to support the inside forces arrayed along the First Island Chain. The overwhelming mass of U.S. combat power would reside in these outside forces.⁸⁴ During peacetime, outside forces could augment inside forces with additional presence in the Western Pacific. In the event of conflict, they would back up the defensive barrier established by the inside forces along the First Island Chain and provide defense-in-depth in the Second Island Chain. If necessary, outside forces could surge forward to plug any gaps in the defensive barrier of inside forces created either by lack of U.S. access to allied or partner territory or through attrition from Chinese attacks. Inside forces would likely canalize PLA operations, causing them to unfold in predictable directions. That outcome would create vulnerabilities that outside forces would exploit for counter-offensive operations.

These outside forces, employing standoff or penetrating capabilities, could exploit gaps in the Chinese A2/AD complex created by the inside forces. They could exploit these gaps to augment defensive operations with additional mass and conduct offensive operations such as strikes against targets on the Chinese mainland. Finally, outside forces could leverage their greater freedom of maneuver to conduct other priority missions, such as holding Chinese overseas assets at risk or interdicting Chinese maritime commerce.

Although the outside forces would primarily base and operate in a less lethal environment than the inside forces, they would still be within range of China's longer-range precision strike systems. Thus, they would need to adopt a resilient and distributed posture. As the conflict progressed and Chinese A2/AD capabilities suffered degradation, certain elements of the outside forces—such as small manned and unmanned surface combatants using the terrain of the First Island Chain to help mask their signatures while sheltered by mobile air defenses on the islands—could move forward and operate as part of the inside forces.

Together, inside and outside forces should allow the U.S. military, in conjunction with allies and partners, to create the virtues of mass without the vulnerabilities of concentration.⁸⁵ That is, arraying forces across the geographic breadth and depth of the battle space in a way that balances lethality and survivability, and knitting them together into an effective battle network, would enable U.S. forces to build combat power within the First Island Chain without having to physically concentrate themselves on large, close-in bases that are highly vulnerable to China's precision-strike regime.

84 Bryan Clark and Jordan Wilson, "Strategic Competition Between the United States and China in the Maritime Realm," in Tai Ming Cheung and Thomas G. Mahnken, eds., *The Gathering Pacific Storm: Emerging U.S.-China Strategic Competition in Defense Technological and Industrial Development* (Amherst, NY: Cambria Press, 2018), chapter 6.

85 Eckstein, "Marine Aviation, Weapons."

Lines of Operation

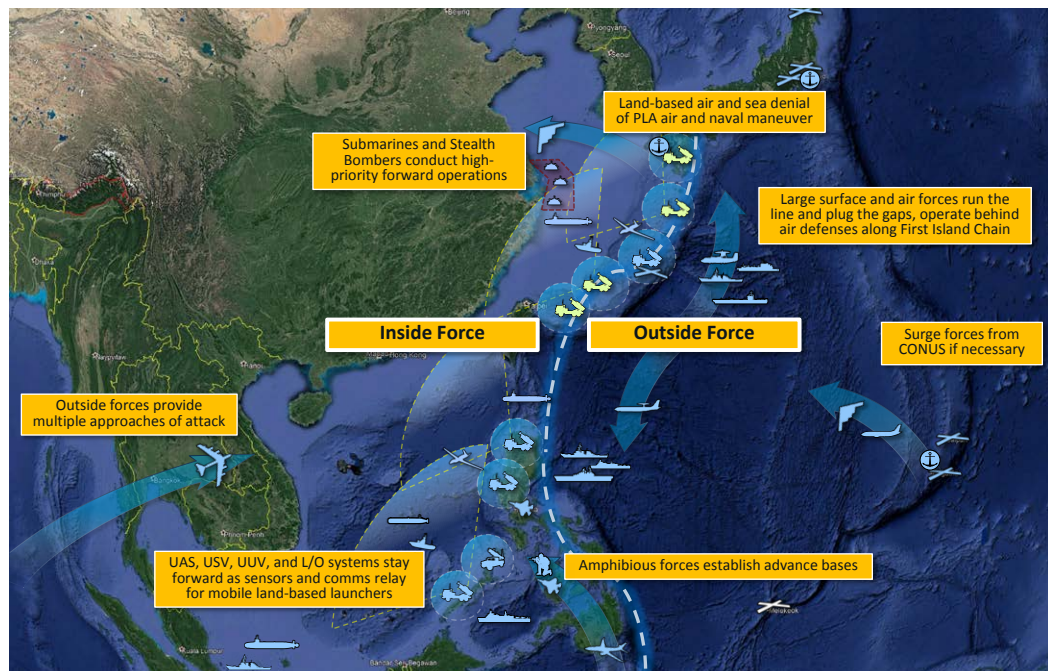
Inside-Out Defense would consist of four main lines of operation:

- Sea-denial operations in the First Island Chain to contest Chinese sea control and defeat Chinese maritime power projection forces;
- Air-denial operations in the First Island Chain to contest Chinese air superiority and defeat Chinese aerospace power projection forces;
- Information denial operations to contest Chinese information dominance and enable U.S. information advantage; and
- Land-attack operations to degrade Chinese land-based A2/AD systems and attrite Chinese power projection forces that make it ashore onto allied or partner territory.

Three supporting lines of operation would enable these efforts:

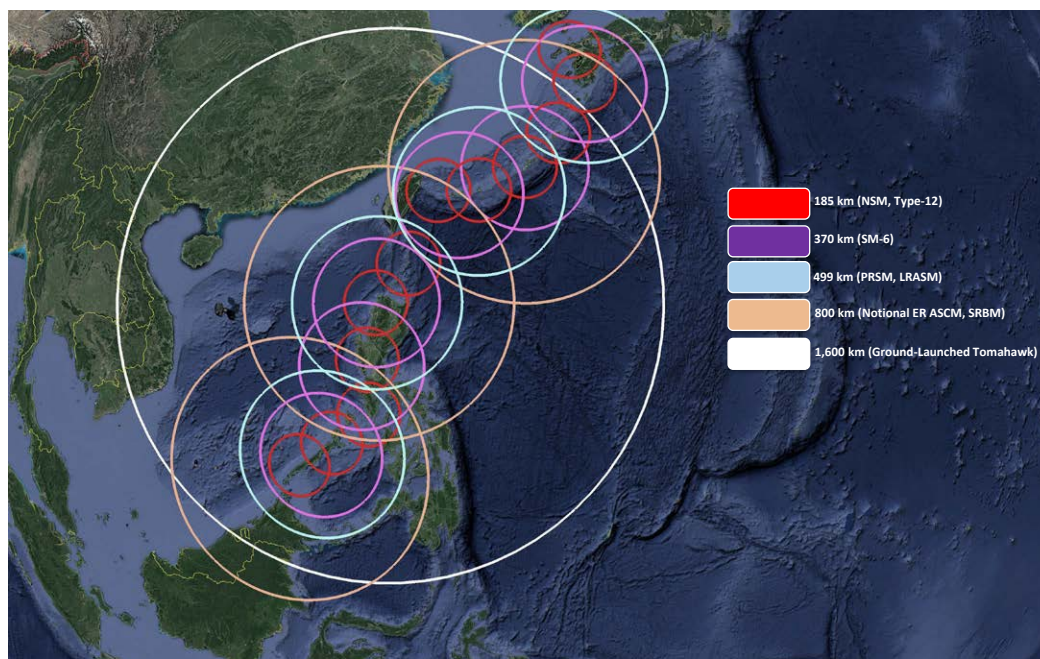
- Preserving C4ISR architectures in highly contested and degraded environments to enable U.S. information advantage;
- Defending friendly forces and bases from Chinese multi-domain attacks; and
- Sustaining distributed forces while under attack.

FIGURE 4: INSIDE-OUT DEFENSE OVERVIEW



Sea denial: Sea-denial operations would deny China's efforts to gain and maintain sea control within or near the First Island Chain, defeat Chinese maritime forces before they could land ground units on allied or partner territory, rapidly break a maritime blockade, and hinder China from projecting maritime power beyond its near abroad. From distributed positions along the First Island Chain, ground forces equipped with launchers capable of firing ASCMs or anti-ship ballistic missiles (ASBMs) could attack Chinese surface warships in general and advanced PLAN surface combatants equipped with long-range SAMs in particular. Neutralizing these ships early in a conflict would greatly inhibit Chinese efforts to establish sea control and could create gaps in China's outer air defenses that outside air forces could then exploit. In addition, such forces could hold Chinese merchant shipping at risk.

FIGURE 5: OVERLAPPING COVERAGE OF GROUND-BASED SEA-DENIAL SYSTEMS



Ranges and their proxies in parentheses serve as examples, not as specific recommendations. With additional cooperation from partner governments, similar systems could also be placed elsewhere (e.g., Vietnam and Indonesia). NSM, Type-12, and SM-6 ranges are from IHS Jane's. PrSM range is from Jen Judson, "U.S. Army to Prioritize Long-Range Missile Capability to Go After Maritime Targets," *Defense News*, March 26, 2019, available at <https://www.defensenews.com/digital-show-dailies/global-force-symposium/2019/03/26/army-to-prioritize-long-range-missile-capability-to-go-after-maritime-targets/>. LRASM range is from Oriana Pawlyk, "Live LRASM Test from F/A-18 Super Hornet Expected This Year," *DoDBuzz*, April 10, 2018, available at <https://www.military.com/dodbuzz/2018/04/10/live-lrasm-test-f-18-super-hornet-expected-year.html>. Tomahawk range is from "Tomahawk Cruise Missile," U.S. Navy factsheet, April 26, 2018, available at www.navy.mil/navydata/fact_display.asp?cid=2200&tid=1300&ct=2.

Past CSBA wargaming concluded that land-based anti-ship missiles with a range of at least 100 nautical miles (nm) (~185 km), such as the Naval Strike Missile (NSM) or Japan's Type-12 anti-ship cruise missile, would cover most potential transit routes for Chinese ships seeking to pass beyond the First Island Chain. However, this assessment assumes that U.S. forces have broad access to allied and partner territory, including states in Southeast Asia such as Vietnam and Indonesia. While ground-launched anti-ship missiles with a range of 100 nm/185 km or less could provide robust coastal defense of the First Island Chain and cover some disputed

features, they lack the range to attack Chinese maritime forces operating further out in the ECS and SCS. Equipping ground forces with a family of missiles with greater ranges (Figure 5) would hedge against more restrictive access for U.S. forces, enable ground forces to attack PLAN forces operating closer to China and in the Taiwan Strait, and provide more robust fields of overlapping anti-ship fires.

Advanced ground-launched anti-ship missiles with sophisticated seekers could enable ground forces to selectively target high-value PLAN surface combatants and amphibious ships despite PLAN kinetic and non-kinetic defenses. Since these land-based systems would likely lack the magazine depth to conduct attacks on all Chinese maritime targets, they could instead focus on contesting key sea lanes, striking high-value PLAN assets, and creating uncertainty for the PLA. Earlier CSBA studies highlighted how uncertainty can inflict virtual attrition on enemy forces, forcing them to pursue less effective and more costly courses of action.⁸⁶ To facilitate these strikes, forces could receive targeting data through a combination of organic ground and aerial sensors, over-the-horizon radars, submarines and unmanned undersea vehicles, satellites, manned and unmanned surface vessels, and penetrating manned and unmanned aircraft. These systems would require a multi-domain command and control (C2) network to link them, which does not currently exist.

Subsurface forces, including both manned and unmanned platforms, would support inside ground forces by acting as forward sensors and conducting torpedo and ASCMs strikes against Chinese ships. However, their primary responsibility would be defeating Chinese undersea forces within the First Island Chain, in particular before they can exit the SCS/ECS. As unmanned undersea capabilities continue to mature and Chinese anti-submarine warfare (ASW) forces become more capable and proficient, U.S. forces could increasingly conduct subsurface operations within the First Island Chain with unmanned platforms such as unmanned underwater vehicles (UUVs) and smart mines, allowing manned submarines to remain in less contested waters and function more as C2 nodes and missile strike platforms. Additionally, land-based fires can pair with unmanned aerial systems (UAS) to attack PLAN submarines detected by unmanned sensors. These attacks would not need to be highly lethal; they would just need to deter the submarine from exiting the SCS/ECS or compel it to evade, thereby running the risk of exposing itself to attack.

Outside forces could also contribute to sea denial within the First Island Chain by exploiting gaps created in Chinese A2/AD capabilities by inside forces. Surface combatants, 4th generation fighters, and legacy bombers, operating behind the cover of ground-based air defenses along the First Island Chain, could support sea denial operation with swarms of long-range ASCMs. Manned and unmanned stealth aircraft could penetrate Chinese A2/AD bubbles to conduct maritime strikes and act as sensing platforms for other assets such as land-based missiles.

86 John Stillion and Bryan Clark, *What It Takes to Win: Succeeding in 21st Century Battle Network Competitions* (Washington, DC: Center for Strategic and Budgetary Assessments, 2015), pp. 17, 21.

Air denial: Air denial operations would contest Chinese air superiority within the First Island Chain; neutralize airborne transports carrying assault forces before they could disembark the forces; and threaten long-range strike aircraft, such as H-6 bombers, from projecting power beyond the First Island Chain to attack friendly bases, forces, and other targets.

Given the long operating distances from airbases primarily located in the Second Island Chain and beyond, U.S. and coalition forces would not be able to generate sufficient sorties to contest air superiority continuously in the conflict area or maintain a defensive counter-air perimeter along the First Island Chain. An improved land-based integrated air and missile defense (IAMD) architecture positioned along the archipelagoes of the First Island Chain could help pick up the slack. It would impose costs and reduce the number of enemy aircraft able to carry strike weapons, forcing the PLA to devote larger portions of its air effort to suppression of enemy air defense rather than strike sorties.

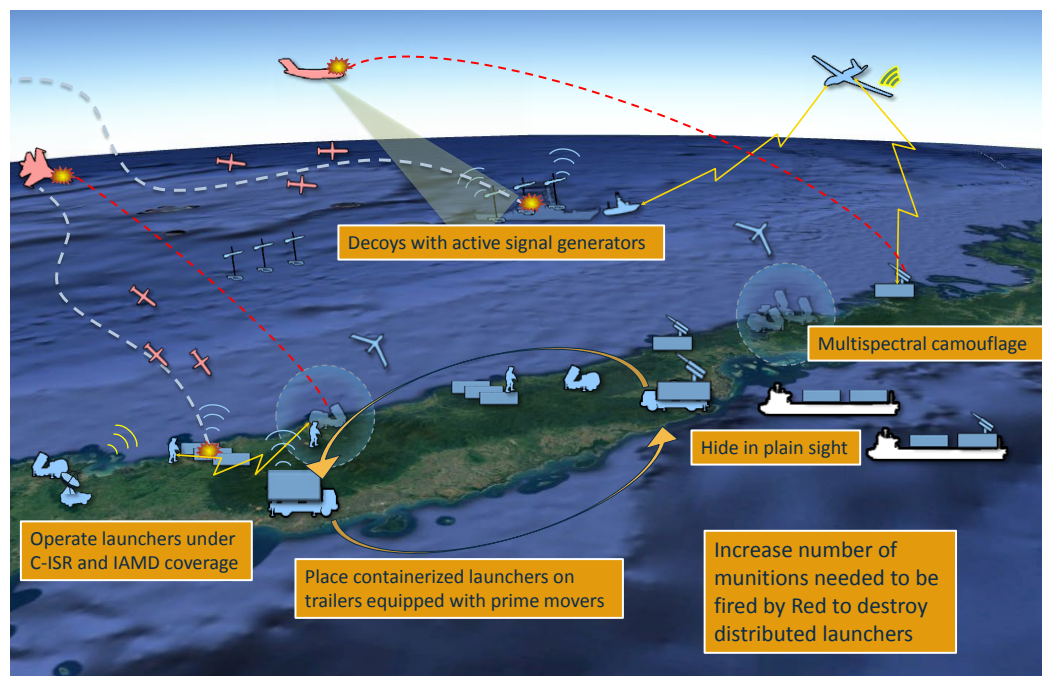
This new land-based IAMD architecture would consist of a layered defense of mobile, long-range, wide-area, and short-range point air defense systems employing a mix of missiles, guns, and directed energy capabilities such as lasers and high-power microwaves. To increase the range of these defenses over existing systems like Patriot, longer-range weapons such as the SM-6 could be adapted for ground launch—or other new weapons could be developed. However, in order to improve their survivability, the architecture cannot be too fixed, since it would be easier to find and target. The systems would be mobile, operate from austere bases, and possess organic counter-detection aids such as CCD.

These land-based inside forces would be supported by outside air forces. First, airborne warning and control aircraft and ISR platforms partially sheltered behind land-based integrated air defense systems on the First Island Chain could enhance battlespace awareness. Second, fighter aircraft could both plug limited gaps in the air defense perimeter and provide defense-in-depth beyond the First Island Chain. Third, penetrating manned and unmanned fighters could conduct periodic offensive counter-air (OCA) sweeps within the First Island Chain to contest Chinese air operations and conduct OCA strikes on PLAAF bases.

Information denial: The PLA views information dominance as the most critical condition necessary for military victory. As such, counter-C4ISR and information denial operations could have outsized effects in deterring and, if necessary, defeating Chinese aggression. Information denial operations would focus on complicating Chinese ISR, disrupting Chinese communications networks, and ultimately paralyzing China's centralized decision making. Both inside and outside forces could employ a variety of land-attack, anti-ship, and anti-air weapons to strike Chinese sensors and key nodes to partially blind its C4ISR networks. Forces employing electronic warfare, counter-space, and cyber capabilities such as false emitters and jammers, augmented by passive measures such as CCD and tactical mobility, could confuse the remaining Chinese sensors, degrade communications, and overwhelm Chinese information processing and decision-making. As defenders, ground forces would also use the complicated ground environment to their advantage. Together, these actions could increase Chinese demands for persistent targeting, deprive decision-makers of critical battlespace

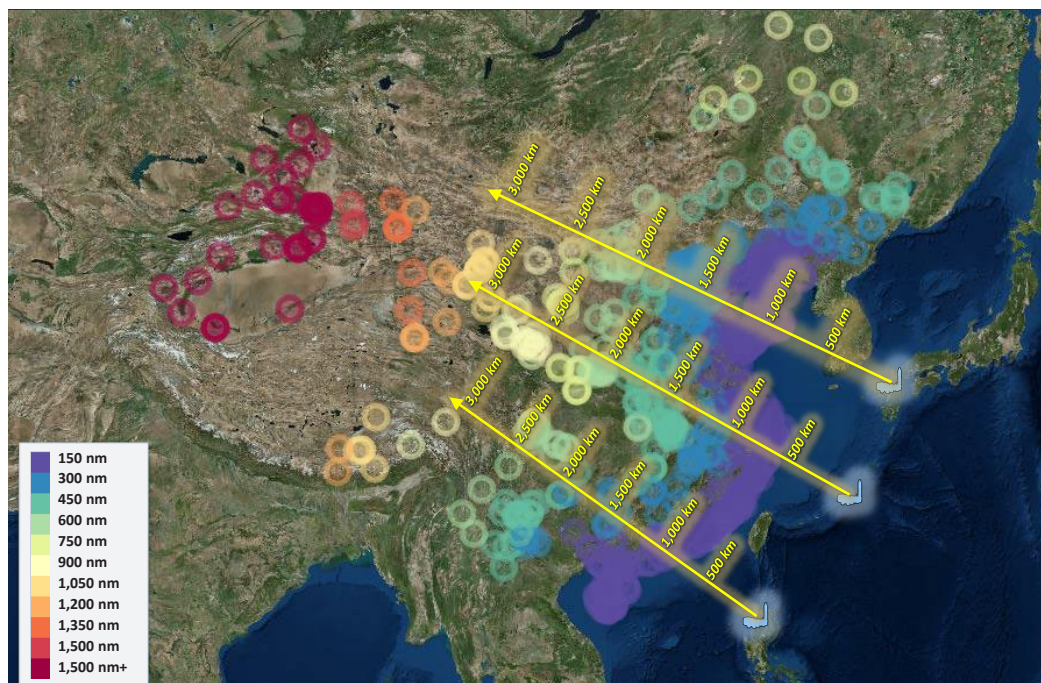
situational awareness, and inhibit their ability to make centralized decisions for their forces. They could also drive the PLA to escalate a conflict to eliminate ground-based capabilities. With more potential targets to engage and uncertainty about their disposition, the PLA would have to mount a much larger initial operation. This would very clearly exceed the gray zone activities with which Chinese leaders seem most comfortable.⁸⁷

FIGURE 6: MEASURES TO IMPROVE RESILIENCY OF INSIDE FORCES



Land attack: Land attack operations would degrade Chinese land-based A2/AD systems—including sensors, long-range missile launchers, aircraft on the ground, and SAM systems—to create gaps that outside forces could exploit. In the event the PLA successfully conducts an amphibious or airborne assault on disputed features within the ECS/SCS or Taiwan, a combination of systems positioned along the First Island Chain could conduct strikes to disrupt and attrite these forces ashore. As with sea denial operations, land-based strikes could be augmented by land-attack cruise missile strikes delivered by submarines, outside air and naval forces conducting standoff attacks with long-range missiles, and stealth aircraft staging attacks from closer in.

87 Bryan Clark, Mark Gunzinger, and Jesse Sloman, *Winning in the Gray Zone: Using Electromagnetic Warfare to Regain Escalation Dominance* (Washington, DC: Center for Strategic and Budgetary Assessments, 2017).

FIGURE 7: LAND-BASED LONG-RANGE STRIKE

Past CSBA wargames used a notional target set depicting the depth and concentration of Chinese military facilities, mobile weapons systems, air-bases, and other sites of military value. Approximately 70 percent of the target set's 50,000 aimpoints are located within 250 nm of the coastline of mainland China. The deepest aimpoints (red circles) indicate locations of known or suspected space installations, anti-satellite weapons sites, and other high-value targets.

Current and planned ground-launched land-attack munitions developed in accordance with INF Treaty range restrictions have a maximum range of 499 km. This range would be sufficient to strike some disputed and Chinese-held islands in the ECS and SCS from the First Island Chain. However, strikes by land-based systems against all possible targets within the First Island Chain, as well as targets on the Chinese mainland, would require either extended-range versions of current munitions or new munitions that would likely require new launch platforms.

The PLA has long enjoyed an advantage over the United States and its allies in land-based long-range precision fires, including intermediate- and medium-range conventional cruise and ballistic missiles. If unconstrained by the INF Treaty with Russia, the United States could seek to regain these land-based long-range strike capabilities, forcing China to devote more resources to air and missile defenses. Although not always cost-effective for delivering large salvos, they have considerable value in promptly striking time-sensitive targets such as aircraft on the ground, missile launchers, massed formations, capital ships in port, and critical C4ISR nodes. Mobile systems of this sort can be placed on large islands such as Luzon, Mindanao, Palawan, Okinawa, and Kyushu, where they can more easily hide.⁸⁸

⁸⁸ Jacob Cohn, Timothy A. Walton, Toshi Yoshihara, and Adam Lemon, *Leveling the Playing Field: Reintroducing U.S. Theater-Range Missiles in a Post-INF World* (Washington, DC: Center for Strategic and Budgetary Assessments, 2019).

Preserving C4ISR: Attacking China's C4ISR architecture alone would be insufficient to gain and maintain allied information advantage in a Western Pacific contingency. The U.S. military would also need to preserve friendly C4ISR in the face of Chinese counter-C4ISR capabilities. A friendly C4ISR architecture that stitches together geographically disparate and disaggregated forces into a theater-wide multi-domain battle network would support the concept of Inside-Out Defense. This battle network would ideally enable the fusion of data from a variety of sensors on multiple platforms and pass information to the best available assets for action. Scouting and targeting data for land-based launchers arrayed along the First Island Chain could, for example, come from a variety of sensors such as 5th generation aircraft, penetrating UAS, or even space assets communicating via thin-line radio frequency low probability of intercept/low probability of detection (RF LPI/LPD) communications. The inside force could also provide the distributed ground terminals used with new low earth orbit (LEO) space sensor and communication programs. Overall, decoupling the sensor and shooter could increase the range and survivability of both. This concept would enable, for example, a space asset or F-35 using passive sensors to detect a PLAN surface ship in the Taiwan Strait and then pass that targeting information to ground-based missile launchers via multiple sea or elevated nodes acting as relays.⁸⁹

The United States and its allies should anticipate China employing counter-C4ISR capabilities, particularly those that break the communications links among disaggregated sensors, deciders, and shooters. The U.S. military should thus seek to improve the resiliency of its C4ISR architecture to mitigate the impact of Chinese attacks. Potential measures could include hardening sensors and communications against jamming; creating mutually supporting and overlapping sensing layers; improving information processing to mitigate Chinese CCD, spoofing, and other counter-ISR efforts; and developing redundant communications pathways.

Although efforts to harden C4ISR architecture would be worthwhile, given China's vast and sophisticated counter-C4ISR capabilities, the U.S. military likely could not prevent some disruption to its networks. Therefore, the U.S. military must be careful not to build an overly centralized theater battle network that must be protected from any significant degradation to function. Rather, the U.S. military should accept that highly contested and degraded information environments will be the norm in future warfare and develop its approaches accordingly.

The U.S. military should build a federated battle network in the Western Pacific. That is, the U.S. military should ensure that its theater battle network consists of multiple levels of regional and local networks, with each operating in decentralized fashion when necessary and possessing its own sensors, deciders, and shooters. These regional and local battle networks would continue to operate even in a highly contested environment where communications

⁸⁹ U.S. passive sensors may need to get close to enemy platforms to detect them. Achieving this proximity at acceptable risk may require penetrating UAS or expendable payloads such as missiles to carry passive sensors. Bryan Clark and Mark Gunzinger, *Winning the Airwaves: Regaining America's Dominance in the Electromagnetic Spectrum* (Washington, DC: Center for Strategic and Budgetary Assessments, 2017), pp. 19–27.

links have been severely degraded or severed. Rather than doubling down on a potentially critical vulnerability, this approach would leverage the inherent strength of the joint force to overcome adversity. More significantly, a federated “battle network of battle networks” would enable the U.S. military to confront China’s highly centralized system designed to operate under the optimal conditions of information dominance with a more resilient U.S. C4ISR system able to continue fighting despite degraded information conditions.

Defending forces and bases: China’s counter-intervention strategy emphasizes attacking U.S. forces and bases across the Western Pacific with simultaneous long-range precision strikes. Since the United States cannot completely hide the force or perfectly defend it, forward forces and bases must withstand the initial salvo of a Chinese attack, forcing China to increase the salvo size needed to engage all potential targets in a short period of time. There are four critical aspects to defending forces and bases from massed precision attacks by Chinese missiles:

- Counter-C4ISR to disrupt and complicate Chinese targeting;
- Air and missile defense to limit the number of munitions that reach their target;
- Hardening to mitigate the impact of the munitions that strike their targets; and
- Recovery to enable forces to get back into the fight after a successful attack.

Today’s sea- and shore-based air defenses typically engage incoming missiles as far away as possible with their longest-range, most-expensive interceptors first, followed by short-range interceptors as a last resort. Past CSBA wargaming and studies have concluded that adopting an air defense concept focused on short-and medium-range (10–30 nm) engagements could give defenders greater capacity for base and ship defense at less cost.⁹⁰ For sea forces employing this concept, more Vertical Launch System (VLS) magazine space can be devoted to offensive weapons. For land-based defenses, prioritizing high-capacity point defenses, including directed energy weapons and electromagnetic railguns, could drastically improve defense against massed cruise missile salvos. The Chinese would need either to spend more time to clarify the target picture or use more weapons for a faster attack.

Hardening key nodes at air facilities such as communications hubs, fuel stores, and aircraft shelters would help improve the resiliency of U.S. forces in the face of a PLA first strike and increase the number of Chinese munitions required to achieve effects. Recovery assets such as rapid runway repair capabilities could better enable forces to overcome damage inflicted. Dispersal of ground and air forces to numerous locations along the First and Second Island

⁹⁰ Interceptors in these ranges, such as the Evolved SeaSparrow Missile (ESSM), are smaller and can be carried in larger numbers. For instance, four ESSMs can fit in one VLS cell. Shorter-range line-of-sight defense systems such as directed energy and guns have nearly unlimited magazines. For more information, see Mark Gunzinger and Bryan Clark, *Winning the Salvo Competition: Rebalancing U.S. Air and Missile Defenses* (Washington, DC: Center for Strategic and Budgetary Assessments, 2016).

Chains would minimize the loss of any large single location; properly networked, these positions would be mutually reinforcing. Distributed ground launchers such as transporter erector launchers and trailer-mounted containerized launchers would practice passive and active organic defense measures such as disaggregation, tactical mobility, and CCD while operating under the umbrella of air defenses to degrade enemy targeting. Decoys would need to be deployed near real platforms, be covered by the same defenses, and be transported in the same manner to ensure believability.

CSBA has long written about a future battlespace where “finders” will generate an unparalleled level of global transparency. The ubiquity of sensors—including advanced sensors but also commercial imagery, an increasingly mature “Internet of Things,” and an unparalleled level of processing power to absorb and analyze data—will make it harder for forces to hide and avoid being targeted. Under a Maritime Pressure strategy, U.S. forces will need to recover the atrophied skills of camouflage and deception to create an obscured cross-domain problem. However, since the disposition of forces cannot always be concealed in an increasingly transparent battlespace, the distributed posture recommended under Inside-Out Defense would allow U.S. and coalition forces to hide in plain sight, increasing adversary costs and demands for persistent targeting while masking the intent for how the forces will be used.

Sustaining forces: Inside-Out Defense would require sustaining highly geographically distributed forces operating in austere environments, all while under attack. Current U.S. sustainment methods are focused on optimizing efficiency while operating in permissive environments. As such, new sustainment concepts and approaches are needed for the highly contested battlefields of the future. Ground forces arrayed along the archipelagos of the First Island Chain could sustain themselves for some time, particularly if they leveraged pre-positioned stocks of munitions and supplies. However, they will eventually need to be resupplied. A combination of small air and sea assets could work together to resupply and add mobility to these small, dispersed formations. For example, in the near term, offshore support vessels could provide logistical support. In the future, extra-large UUVs—with a payload capacity of 2,000 cubic feet—could transport roughly 8 tons of cargo to units operating near the coast-line.⁹¹ Unmanned surface vessels and dracones could provide additional attritable cargo transport and refueling capabilities.⁹² From the air, rotary wing and tactical transport aircraft could operate from austere island and sea bases to transport cargo and assist with moving

91 “Echo Voyager: Extra Large Unmanned Undersea Vehicle,” Boeing factsheet, 2017, available at https://www.boeing.com/resources/boeingdotcom/defense/autonomous-systems/echo-voyager/echo_voyager_product_sheet.pdf. The United States only intercepts 25 percent of the homemade submarines carrying narcotics across the Caribbean into the United States from Colombia. Logisticians should incorporate lessons gleaned from these smuggling operations into future sustainment concepts for heavily monitored and contested environments. Joe Gould and David B. Larter, “In America’s Opioid Crisis, Military Lets Drug Shipments Go By,” *Defense News*, February 15, 2018, available at <https://www.defensenews.com/congress/2018/02/16/in-americas-opioid-crisis-military-lets-drug-shipments-go-by/>.

92 Dracones are large fuel or water bladders that can be towed into position. For more on sustaining maritime operations in highly contested areas, see Timothy A. Walton, Ryan Boone, and Harrison Schramm, *Sustaining the Fight: Resilient Maritime Logistics for a New Era* (Washington, DC: Center for Strategic and Budgetary Assessments, 2019), pp. 46–47.

troops. Seaplanes could perform a similar role, moving forces and supplies to dispersed locations along the archipelagoes.

Another challenging aspect of sustainment would involve providing tanker support for air operations around the First Island Chain from bases in the Second Island Chain and beyond. Conducting these operations over the vast distances in the Pacific theater is nonetheless a necessity, due to the untenable nature of large close-in air bases and the highly contested air environment within the First Island Chain. The inside force could assist greatly by helping create sheltered areas behind the First Island Chain in which tankers could operate. Previous CSBA wargaming developed another potential concept for mitigating these challenges. It called for larger manned tankers such as the KC-135 and KC-46 to shuttle fuel from more secure airbases such as Guam and Northern Australia to smaller UAS tankers or manned theater tankers orbiting at designated points just outside the First Island Chain. Penetrating bombers would also take the opportunity to refuel at that point. From there the smaller tankers would refuel combat aircraft and other ISR and battle management C2 platforms inside the contested environment and return to the designated safe points to refuel again, completing the cycle.⁹³

Allied and Partner Forces

This report so far has focused on U.S. concepts and capabilities. However, the United States never fights alone, and one of its enduring advantages vis-à-vis China is the ability to form a coalition of allies and partners to support operations. Ideally, Maritime Pressure would be a combined strategy that incorporates regional allies and partners to varying degrees. In that case, Inside-Out Defense could serve as a combined rather than just a U.S. joint operational concept.

In a combined Inside-Out Defense concept, regional allies and partners could play three critical roles. First, they could provide basing and access in their territory to U.S. forces during both peacetime competition and in a conflict. In fact, because the United States lacks any territory in the First Island Chain and possesses only limited territory in the Second Island Chain, both Maritime Pressure and Inside-Out Defense would depend on robust basing and access for U.S. forces in the region. Second, allied and partner forces could lead efforts to counter Chinese coercive action below the level of armed conflict. These efforts could include both using their territory and forces to maintain a persistent surveillance network to help detect and expose Chinese activities and shouldering the brunt of confronting Chinese forces conducting these actions. For example, Japan is deploying sensors to its Southwest Islands to monitor Chinese maritime activities and has conducted vigorous operations with its coast guard to counter the aggressive actions of China's maritime militia in disputed waters. Third, allies and partner military forces could augment those of the United States in a military

93 Mark Gunzinger et al., *An Air Force for an Era of Great Power Competition* (Washington, DC: Center for Strategic and Budgetary Assessments, 2019), pp. 113–115.

conflict with China. In the case of frontline states located along the First Island Chain, this could include capabilities and forces that complement the U.S. military as part of the inside force, such as coastal defense cruise missile batteries and UAS. For highly capable allies such as Japan and Australia, contributions could also include high-end air and naval capabilities such as 5th generation aircraft and advanced surface combatants and submarines that could bolster the U.S. outside forces.

Two primary challenges exist that complicate realizing this vision for a combined regional strategy and operational approach. First, there is no equivalent of NATO for the Pacific. America's alliances in the Indo-Pacific are bilateral, and every ally and partner would contribute differently to a diverse set of contingencies involving China. Moreover, since there is no regional collective security agreement that would make the involvement of U.S. allies and partners automatic, the United States should not take for granted military contributions or even access. As such, the United States should not bet the success of its strategy on single points of failure regarding access to allied or partner territory. Second, with varying generations of equipment operating on differing standards, as well as security concerns, achieving high levels of interoperability and cohesion with all allies and partners remains difficult.

The subsection below focuses on the role that three U.S. treaty allies—Japan, the Philippines, and Australia—could play in Inside-Out Defense. Other regional actors, including Taiwan and U.S. partners in Southeast Asia, would also contribute to the concept, often in significant ways. Readers interested in those actors' roles and capabilities should refer to existing reports analyzing the relevant issues.⁹⁴

Japan: As one of the closest and most capable U.S. allies, Japan could serve as the northern anchor of a Maritime Pressure strategy. Japan is unique in the constellation of Indo-Pacific allies and partners because it is a frontline state near China and possesses a highly capable military. As part of an Inside-Out Defense concept, the Japan Self-Defense Force could operate alongside U.S. forces as part of both the inside and outside forces.

Japan's most recent National Defense Program Guidelines (NPDG) represents a positive step in enhancing Japan's defensive posture to counter Chinese aggression.⁹⁵ If properly resourced and executed, the NPDG would greatly improve Japan's ability to support a strategy of Maritime Pressure. The NPDG directs the Self-Defense Force to rebalance the existing force to make better use of its finite manpower. More specifically, the document shifts away from a heavy ground force originally designed to counter the Soviet Union to the north and instead moves toward the aerospace and maritime threats posed by China.

94 See, for example, Jim Thomas, John Stillion, and Iskander Rehman, *Hard ROC 2.0: Taiwan and Deterrence through Protraction* (Washington, DC: Center for Strategic and Budgetary Assessments, 2014); and Evelyn Goh, "Great Powers and Hierarchical Order in Southeast Asia: Analyzing Regional Security Strategies," *International Security* 32, no. 3, Winter 2007/2008, pp. 113–157.

95 Japan Ministry of Defense (MOD), *National Defense Program Guidelines for FY 2019 and Beyond* (Tokyo: Japan MOD, December 18, 2018), available at http://www.mod.go.jp/j/approach/agenda/guideline/2019/pdf/20181218_e.pdf.

Japan is fielding or plans to field many capabilities that would make sound contributions to a U.S.-led strategy of Maritime Pressure.⁹⁶ In addition to new ballistic missile interceptors and two Aegis Ashore installations, Japan is currently procuring advanced air-delivered and ground-launched anti-ship cruise missiles, coastal radars, F-35As, RQ-4 Global Hawks, Amphibious Assault Vehicles, C-2 transport aircraft, P-1 maritime patrol aircraft, KC-46A refueling and transport aircraft, V-22 tilt-rotor aircraft, and new classes of submarines and destroyers. There are reports that Japan is planning to procure another 5th generation strike fighter, the EA-18G Growler, hypersonic weapons, and transport ships for the Ground Self-Defense Force; it also plans to retrofit its helicopter carriers into aircraft carriers. Although these capabilities would add immense credibility to a Maritime Pressure strategy, any combination of them comes with a big price tag. In addition to growing maintenance costs for these systems, personnel costs are also expected to grow. As a result, Japan may want to explore lower-cost options in several areas, such as persistent ISR that can help address targeting challenges currently facing its systems. Japan's capabilities and contributions to a strategy of Maritime Pressure would greatly improve if they were integrated at the tactical level into the future multi-domain C2 network that the United States should develop for its own systems.

Japan provides critical basing and access for U.S. forces, but U.S. presence inside Japan is highly concentrated and increasingly vulnerable inside the range of China's A2/AD networks. Roughly 75 percent of all U.S. forces in Japan are located on Okinawa, well within the densest areas of coverage China's precision strike regime can range. The United States should work with Japan to erect agreements that would allow aircraft to shift away from untenable bases in Okinawa during a crisis to operate from a more distributed posture on Japanese territory. This includes both air forces operating from a broader set of bases across the home islands and ground forces operating along the arc of the Ryukyus.

Philippines: Faced with Chinese encroachment and coercion against SCS features controlled by the Philippines, Manila has taken some steps to pursue military modernization. Indeed, the Duterte government approved plans to procure new defense equipment under its Second Horizon modernization program which has been allocated approximately \$5.6 billion for a range of platforms.⁹⁷ However, it is still unclear what exactly will be procured, in what quantities, and in what sequence.

For example, the Philippine Navy (PNA) issued a preliminary request for proposals for at least two submarines. At the same time, a PNA report stated that it also requires new corvettes, amphibious assault vehicles, anti-submarine helicopters, fast-attack craft, medium-lift helicopters, and additional frigates and multirole vessels. Requirements from the Philippine Air

⁹⁶ Japan MOD, *Medium Term Defense Program (FY 2019–FY 2023)* (Tokyo: Japan MOD, December 18, 2018), available at https://www.mod.go.jp/j/approach/agenda/guideline/2019/pdf/chuki_seibi31-35_e.pdf; and Michael J. Green and Jeffrey W. Hornung, "Is Japan's New Defense Plan Ambitious Enough?" *War on the Rocks*, December 6, 2018, available at <https://warontherocks.com/2018/12/is-japans-new-defense-plan-ambitious-enough/>.

⁹⁷ Jon Grevatt, "Philippines Moves Ahead with 'Second Horizon' Modernization," *Jane's Defence Weekly*, June 21, 2018, available at <https://www.janes.com/article/81234/philippines-moves-ahead-with-second-horizon-modernisation>.

Force include radars, fixed-wing transport aircraft, heavy-lift helicopters, attack and utility helicopters, UAS, long-range patrol aircraft, and new fighter aircraft. Desired procurements by the Philippine Army include towed and self-propelled howitzers, rocket launchers, armored recovery vehicles, fire-support vehicles, tactical radios, ground mobility equipment, firearms, and night-fighting equipment.

The Armed Forces of the Philippines should emphasize cost-effective capabilities that would complicate Chinese efforts to gain sea control in the SCS and enable the Philippines to raise the cost of a PLA assault on its territory. Assets such as UAS and other ISR systems, patrol ships, coastal defense cruise missiles, mobile air defenses, and electronic warfare systems would give Philippine forces cross-domain capabilities to monitor maritime approaches and defend the archipelago.

Most important to the strategy of Maritime Pressure, though, is reliable U.S. access to the Philippines as a regular presence, as well as to airstrips, ports, and other installations for the stockpile of defense equipment and supplies. Access to the territory of the Philippines would enable U.S. ground forces with multi-domain capabilities positioned there to contest Chinese military operations across much of the SCS, the Luzon Strait, and potentially even the Taiwan Strait. They could also defend the southern approaches to Guam and the Second Island Chain.

Efforts to stockpile U.S. equipment and supplies in the Philippines began under the 2014 Enhanced Defense Cooperation Agreement. The United States will build facilities on five Philippine military bases: Basa Air Base (Luzon), Fort Magsaysay (Luzon), Mactan-Benito Ebuen Air Base (Cebu), Antonio Bautista Air Base (Palawan), and Lumbia Air Base (Mindanao). From these sites, U.S. and Philippine forces arriving from disparate locations could link up with pre-positioned equipment and disperse to their predetermined deployment areas. Exercising this maneuver should be practiced—and publicly demonstrated—regularly, much like the NATO REFORGER exercises during the Cold War.

Despite these promising plans, five years later only one site has opened.⁹⁸ The construction of these facilities should be expedited. One obstacle is that as a precondition for continuing the agreement, the current government has insisted that no arms be stored at these sites, only disaster relief supplies and fuel for aircraft.⁹⁹ There is no indication so far that barracks, hangars, storage for other defense equipment and materiel, or any of the other infrastructure to support a robust U.S. rotational presence will be allowed. Although the United States should continue to seek to strengthen the alliance and pursue greater access to the territory of the Philippines, in light of these challenges, it should not adopt a strategy that succeeds or fails

98 Seth Robson, "Facility for U.S. Forces Opens on Philippines' Main Island; Another Slated for Palawan," *Stars and Stripes*, January 31, 2019, available at <https://www.stripes.com/news/facility-for-us-forces-opens-on-philippines-main-island-another-slated-for-palawan-1.566695>.

99 Marlon Ramos, "Duterte OKs U.S. facilities in PH camps," *Philippine Daily Inquirer*, February 8, 2017, available at <https://newsinfo.inquirer.net/869269/duterte-oks-us-facilities-in-ph-camps>.

based on access to the Philippines. As such, the United States should consider ways to mitigate a potential lack of access to the Philippines during a conflict.

Australia: The United States and Australia have fought together in every major conflict since World War I. Much like Japan, it is one of the closest and most capable allies of the United States. Australia could serve as the southern anchor of a Maritime Pressure strategy. In peacetime, its robust ISR capabilities could enhance situational awareness in the SCS and the greater region, helping neighboring states counter Chinese malign behavior below the level of armed conflict and increase indications and warning of potential Chinese aggression. In a conflict, Australia's highly capable air and surface naval forces could augment U.S. outside forces, while its growing submarine forces could operate as part of the inside forces. Australia could also deploy long-range ISR and land-based precision strike capabilities to its Northern Islands to help contest the Savu and Timor Seas and stiffen the First Island Chain defensive barrier in the southern SCS. Moreover, Australia might leverage its strong relationships with Southeast Asian states to build their capabilities and, potentially, gain access for its forces. If so, this would mitigate the risk of access being denied to U.S. military forces at critical times.

In a conflict with China, the U.S. ability to operate from Australia would be invaluable. Australia could also act as a marshalling area for any NATO allies that might support the United States with military forces in a conflict. Its northern airbases are close enough for U.S. bomber, refueling, maritime patrol, and unmanned ISR aircraft to support SCS contingencies, yet far enough from most of the PLA air and missile threat. Even if threatened by a small number of capable systems, the scale and intensity of Chinese attacks would be relatively manageable, with less impact on air operations.

Many past CSBA wargames have examined the operational utility of basing U.S. assets in northern Australia. Although the games found that U.S. air operations from bases like Royal Australian Air Force (RAAF) Darwin and Tindal would be critical in a conflict with China, they also highlighted the fact that the facilities' fuel storage and resupply infrastructure are insufficient to support sustained, large-scale U.S. air operations. In addition, whereas all airbases in northern Australia can support fighters, only a couple (RAAF Darwin and Learmonth) have runways to support sustained operations by heavy tankers and bombers.

Australia has already publicly committed to taking steps to address this concern. In its 2016 Defence White Paper, the Australian Government pledged to improve its fuel resilience and capacity to transport bulk fuel to support its bases and operations, including a rail link to RAAF Tindal and additional airbase fuel storage.¹⁰⁰ Australia also recently began a project to improve the Tindal runway to accept the KC-30A tanker and larger U.S. military aircraft.¹⁰¹

100 Australia MOD, *2016 Defence White Paper* (Canberra: Australia MOD, February 2016), pp. 43–44, available at <http://www.defence.gov.au/WhitePaper/Docs/2016-Defence-White-Paper.pdf>.

101 Chris McLennan, "Tindal Upgrade Goes to Tender," *Katherine Times*, November 23, 2017, available at <https://www.katherinetimes.com.au/story/5075677/tindal-upgrade-goes-to-tender/>.

DoD should work with the Government of Australia to expand and harden airbase fuel stores, establish a regional Defense Fuel Support Point (DFSP) in northern Australia comparable to already established Pacific DFSPs, and enhance resupply lines to airbases. These upgrades would alleviate the current logistical challenges with conducting air operations from northern Australia and distribute U.S. air operations from their current reliance on more vulnerable airbases in Japan and Guam. Overall, this would significantly enhance the U.S. warfighting posture in the Indo-Pacific and more credibly support a strategy of Maritime Pressure.

Another area where Australia can work with the United States is in joint-base development. U.S. Vice President Mike Pence recently announced plans to develop a new naval base on Papua New Guinea's Manus Island jointly with Australia.¹⁰² The specific development plans have not been revealed, but Australia and the United States should also pursue basing rights to the nearby Momote airfield. Commanding a position north of mainland Papua New Guinea and flanking the approaches to maritime East Asia and the sea lines of communication to eastern Australia, New Zealand, and beyond, Manus is a sound location for allied air and naval assets to support a strategy of Maritime Pressure.

What the Force Is Doing: Current Activities

Having outlined the Inside-Out concept, this section now assesses the current activities of U.S. and allied forces to illuminate where changes are needed most urgently. The assessment is divided into concepts, capabilities, and coordination to reflect Maritime Pressure's emphasis on the United States pursuing countermoves in the areas of doctrine, technology, and allies, respectively.¹⁰³

This assessment yields two findings. First, although the U.S. military Services have developed useful concepts and capabilities for fielding precision-strike networks along the First Island Chain, their efforts appear both disjointed and riddled with common pitfalls, including single-Service solutions, inflexible combat formations, and resource-intensive large weapons platforms. With tighter coordination and greater receptivity to new approaches, the U.S. military will progress more rapidly toward improving the military balance with China. Second, although U.S. and allied militaries have improved coordination for precision-strike operations, budgetary and political constraints continue to impede progress. Painful tradeoffs still

102 Jonathan Barrett, "U.S. Joins Australian Plan to Develop New Pacific Naval Base," *Reuters*, November 17, 2018, available at <https://www.reuters.com/article/u-s-apec-summit-port/u-s-joins-australian-plan-to-develop-new-pacific-naval-base-idUSKCN1NM06X>.

103 The current activities assessment is limited primarily to the missiles and sensors the authors recommend fielding in precision-strike networks along the First Island Chain. The authors acknowledge that the networks would contain many capabilities besides missiles and sensors. They also recognize that prevailing against China will require more than precision-strike networks. Previous CSBA research has explored other necessary capabilities in detail; interested readers should consult those studies for more information. For the present section, however, the authors have chosen to focus on the strike forces forming the backbone of a Maritime Pressure strategy.

lie ahead if the United States and its allies hope to use a Maritime Pressure strategy to check China's burgeoning military influence.

Concepts

Over the last several years, the Army, Navy, Marine Corps, and Air Force have developed new warfighting concepts that fit comfortably within a strategy of Maritime Pressure. Although the concepts are impressive, the Services still devote too much attention to preserving the traditional American approach to power projection in the Western Pacific.¹⁰⁴ Furthermore, Service concept development efforts are relatively disjointed and uncoordinated from one another, and joint operational concept development is currently lacking within DoD.¹⁰⁵

The Services will operate together during any plausible conflict with China. However, they have not settled on a specific unifying operational challenge to guide force development efforts. Whereas the Army and Air Force have embraced Multidomain Operations (MDO) as an organizing idea, the Navy has resisted it because, according to naval leaders, the Navy already operates in multiple domains on its own, so the concept is nothing new.¹⁰⁶ For its part, the Marine Corps appears increasingly receptive to precision-strike concepts.¹⁰⁷

Army: The concept of MDO—formerly known as Multidomain Battle—is guiding the Army's modernization priorities, including its advances in long-range precision fires, a next-generation combat vehicle, vertical lift, air-and-missile defense, and soldier lethality.¹⁰⁸ Hard-pressed to fill these gaps after a decades-long counterinsurgency campaign, the Army has identified the need for the joint force to converge capabilities across all domains rapidly and continuously. In particular, the Army's Cross-Functional Team for Fires has pursued new tactical, operational, and strategic surface-to-surface fires. To support these efforts, the Army created a Multidomain Operations Task Force built around an artillery brigade. The Task Force participated in the Pacific Pathways program, deploying to countries of interest. In the 2018 Rim

104 David M. Edelstein, "Competition with China and the Future of the Asian International Order," *War on the Rocks*, February 6, 2019, available at <https://warontherocks.com/2019/02/competition-with-china-and-the-future-of-the-asian-international-order/>.

105 NDS Commission, *Providing for the Common Defense*, p. viii.

106 Sydney J. Freedberg Jr., "All Services Sign on To Data Sharing—But Not to Multi-Domain," *Breaking Defense*, February 8, 2019, available at <https://breakingdefense.com/2019/02/all-services-sign-on-to-data-sharing-but-not-to-multi-domain/>.

107 Shawn Snow, "Marines Seize an Airfield and Small Island While Testing Tactics for Fight against China," *Marine Corps Times*, March 21, 2019. The Marine Corps previously resisted efforts to transform Marine riflemen into precision-fire controllers. In the 1996 Hunter Warrior experiment, for instance, Marines in dispersed squads directed missile strikes against enemy forces. Marine leaders criticized the exercise for abandoning the Service's competencies of close combat, maneuver operations, amphibious warfare. See Thomas G. Mahnken, *Technology and the American Way of War since 1945* (New York: Columbia University Press, 2008), pp. 198–199.

108 TRADOC, "Multi-Domain Operations," *Stand-To!* October 4, 2018, available at <https://www.army.mil/standto/2018-10-04>.

of the Pacific (RIMPAC) exercise, it successfully struck a ship with a truck-launched NSM.¹⁰⁹ However, MDO has thus far focused primarily on a conflict with Russia in Europe. Adapting the concept to the Pacific theater—along with identifying the associated capability, posture, and force structure implications—remains a future project.¹¹⁰ Moreover, MDO primarily seeks to defeat A2/AD networks to enable joint freedom of maneuver and roll back an adversary's gains after the fact, rather than to blunt aggression at the start of a conflict to prevent a *fait accompli*.¹¹¹

Navy: In 2015, the Navy released a concept known as Distributed Lethality, calling for individual or small groups of platforms, organized into Surface Action Groups, to be distributed over a wide area in contested environments.¹¹² By spreading out networked forces capable of defending themselves, the concept seeks to complicate an adversary's targeting and facilitates engaging enemy threats rapidly. Also in 2015, the Navy adopted Electromagnetic Maneuver Warfare, a concept designed to use the electromagnetic spectrum to deny or degrade the enemy's ability to target naval forces.¹¹³ In 2017, the Navy debuted a new concept titled Distributed Maritime Operations (DMO), defined as "a central, overarching operational concept that will weave together the principles of integration, distribution and maneuver to maximize the effectiveness of the fleet Maritime Operations Centers to synchronize all-domain effects."¹¹⁴ Navy watchers expect DMO to serve as a linchpin of the Service's force development efforts in the years ahead. It has also begun experimenting with unmanned surface vehicles and possible roles they could contribute to as part of the fleet in the DMO concept.¹¹⁵

Marine Corps: The Marine Corps Operating Concept (MOC) provides a framework for how the Marine Corps and Navy team will organize, train, fight, and win in future conflicts.¹¹⁶ Within the MOC framework, subordinate operating concepts include Littoral Operations

109 David B. Larter "The U.S. Navy's New Anti-Ship Missile Scores a Hit at RIMPAC, But There's a Twist," *Defense News*, July 20, 2018, available at <https://www.defensenews.com/naval/2018/07/20/the-us-navys-new-anti-ship-missile-scores-a-hit-at-rimpac-but-theres-a-twist/>.

110 TRADOC, *The U.S. Army in Multi-Domain Operations*, p. 7.

111 While the MDO concept does discuss contesting enemy maneuver forces early in a conflict, it is one subcomponent of one phase. The vast majority of the document is focused on dismantling A2/AD networks to enable decisive operations.

112 Thomas Rowden, Peter Gumataotao, and Peter Fanta, "Distributed Lethality," *Proceedings* 141, no. 1, January 2015.

113 Mark Coffman, "Advancing Electromagnetic Maneuver Warfare," Navy Warfare Development Command, *NEXT* 3, no. 2, Summer/Fall 2015, available at <https://www.nwdc.navy.mil/NeXT%20Assets/current/NeXTw2016.aspx>.

114 "CNO Visits Navy Warfare Development Command," U.S. Navy Warfare Development Command, April 13, 2017, available at http://www.navy.mil/submit/display.asp?story_id=99893.

115 David B. Larter, "With Billions Planned in Funding, the U.S. Navy Charts Its Unmanned Future," *Defense News*, May 6, 2019, available at <https://www.defensenews.com/digital-show-dailies/navy-league/2019/05/06/with-billions-planned-in-funding-the-us-navy-charts-its-unmanned-future/>.

116 U.S. Marine Corps, *The Marine Corps Operating Concept: How an Expeditionary Force Operates in the 21st Century* (Washington, DC: Headquarters U.S. Marine Corps, September 2016), available at <https://www.mcwl.marines.mil/Portals/34/Images/MarineCorpsOperatingConceptSept2016.pdf>.

in Contested Environments and Expeditionary Advanced Base Operations.¹¹⁷ These subordinate concepts emphasize using hard-to-target forward bases, a wider range of maritime platforms, cross-domain fires, distributable units, and lighter and more agile forces for offensive operations in support of sea control. The Marine Corps has expressed interest in new strike capabilities to defend expeditionary advanced bases, including a shore-based anti-ship missile; it recently awarded a contract to integrate the NSM into its force structure.¹¹⁸ At the same time, the Marines also remain committed to large F-35B and CH-53K buys and a two-Marine Expeditionary Brigade Joint Forcible Entry Operations construct that will require larger amphibious ships.¹¹⁹

Air Force: The Air Force has joined the Army in endorsing MDO as a centerpiece of its force development efforts. Whereas the Army has emphasized the concept's demand for long-range precision fires, the Air Force has highlighted the critical importance of battlespace connectivity, historically one of the Service's core concerns.¹²⁰ The Air Force has prioritized leading the Multidomain Command and Control (MDC2) concept to manage the expanding battlespace.¹²¹ Under this concept, interconnected systems and sensors would communicate with each other, allowing the Air Force to execute operations in multiple domains.¹²² It is also continuing to develop a concept it calls Adaptive Basing to increase the resiliency of its airbases and forces.¹²³

117 "Littoral Operations in a Contested Environment," U.S. Marine Corps Concepts and Programs, September 2017, available at <http://www.candp.marines.mil/Concepts/Subordinate-Operating-Concepts/Littoral-Operations-in-a-Contested-Environment/>; "Expeditionary Advanced Base Operations," U.S. Marine Corps Concepts and Programs, September 2017, available at <https://www.candp.marines.mil/Concepts/Subordinate-Operating-Concepts/Expeditionary-Advanced-Base-Operations/>; and Justin Reynolds, "Multi-Domain Command and Control Is Coming," Headquarters U.S. Air Force Strategic Integration Group, September 25, 2018, available at <https://www.af.mil/News/Article-Display/Article/1644543/multi-domain-command-and-control-is-coming/>.

118 Paul McLeary, "Marines Want Missile to Sink Ships from Shore, and They Want Them Fast," *Breaking Defense*, January 17, 2019, available at <https://breakingdefense.com/2019/01/marines-want-missiles-to-sink-ships-from-shores-and-they-want-them-fast/>; and Sam LaGrone, "Raytheon to Arm Marine Corps with Anti-Ship Missiles in \$47M Deal," *USNI News*, May 8, 2019, available at <https://news.usni.org/2019/05/08/raytheon-to-arm-marine-corps-with-anti-ship-missiles-in-47m-deal>.

119 Neller, testimony before the House Appropriations Committee—Defense.

120 Sydney J. Freedberg Jr., "A Computer That Happens to Fly": USAF, RAF Chiefs on Multi-Domain Future," *Breaking Defense*, April 16, 2018, available at <https://breakingdefense.com/2018/04/a-computer-that-happens-to-fly-usaf-raf-chiefs-on-multi-domain-future/>.

121 Colin Clark, "Army Unveils Multi-Domain Concept; Joined at Hip with Air Force," *Breaking Defense*, October 10, 2018, available at <https://breakingdefense.com/2018/10/army-unveils-multi-domain-concept-joined-at-hip-with-air-force/>.

122 Mark Pomerleau, "The Air Force Wants to Make a Multidomain Moonshot," *C4ISRNET*, September 27, 2018, available at <https://www.c4isrnet.com/c2-comms/2018/09/27/the-air-force-wants-to-make-a-multidomain-moonshot/>.

123 David Dammeier, Meka Toliver, and Logan Smith, "Overcoming a Power Projection Problem," *CE Online*, Spring 2016, available at <https://www.afcec.af.mil/News/CE-Online/Article-Display/Article/1004470/overcoming-a-power-projection-problem/>.

Capabilities

The Services have started developing new capabilities and adapting existing capabilities in ways consistent with a Maritime Pressure strategy. On the one hand, most of the programs are technologically sound and present relatively limited programmatic risk. They should reach initial operational capability on schedule within the next few years. On the other hand, although the U.S. defense budget has increased markedly since the Trump administration entered office, with a few exceptions the relevant capabilities have mostly plodded along at virtually the same pace as before the budget increase.¹²⁴ Since neither technological risks nor industrial constraints caused the inertia, it can be inferred that DoD's leadership has failed to prioritize the programs as highly as they could have. This conclusion, if accurate, illustrates the organizational barriers facing any new strategy attempting to move the U.S. military away from its traditional priorities.

Sea denial: After decades of neglect, the U.S. armed forces have begun to improve their ability to attack enemy surface ships with long-range missiles, a necessary condition for halting Chinese aggression. The Navy plans to procure the Long-Range Anti-Ship Missile (LRASM), a new stealth cruise missile with a range greater than 200 nm designed to target high-value naval vessels in contested environments. Slated to be launched from F/A-18E/F Super Hornets, the missile can also be launched from deck launchers and the Mark 41 VLS deployed widely onboard the Navy's surface ships, options that would greatly increase the missile's operational flexibility. The Air Force is also procuring LRASM to be carried by the B-1B. The F-35 represents another possible launch platform. Meanwhile, the Marine Corps has considered a ground-based LRASM variant launched via HIMARS.

The Navy has asked Raytheon to retrofit its Tomahawk missile with a new sensor system to optimize its performance in an anti-ship role with an estimated range of 900 nm (over 1,600 km). The upgraded missile, known as the Maritime Strike Tomahawk, should enter service in the mid-2020s. In April 2018, the Navy awarded Raytheon and Norway-based Kongsberg a contract for the NSM, a highly survivable munition with more than a 100 nm (185 km) range intended for service aboard the Littoral Combat Ship and future frigate (FFG-X). Finally, in December 2018 the Navy announced a program to refurbish and recertify Harpoon anti-ship missiles for service aboard *Los Angeles*-class attack submarines.¹²⁵

Despite this concrete progress, the inventory of American anti-ship missiles remains too small given the quantity and diversity of Chinese forces discussed in Chapter 2. Both DoD and industry leaders indicate that anti-ship missile production could accelerate if the Services requested it. Moreover, fielding a variety of anti-ship missiles in different

¹²⁴ A notable exception includes accelerating the new Precision Strike Missile (PrSM) to enter service in 2023 rather than 2027. Sydney J. Freedberg Jr., "Army Building 1,000-Mile Supergun," *Breaking Defense*, October 11, 2018, available at <https://breakingdefense.com/2018/10/army-builds-1000-mile-supergun/>.

¹²⁵ Paul McLeary, "Navy to Begin Arming Subs with Ship-Killer Missile," *Breaking Defense*, December 18, 2018, available at <https://breakingdefense.com/2018/12/navy-arms-subs-with-ship-killer-missile-harpoon/>.

configurations—aboard ships, delivered by aircraft, and deployed ashore—would inject uncertainty into Chinese planning, forcing the PLA to honor the threat of anti-ship missiles stashed on ships or ashore. The PLA would have to alter its operations accordingly. The resulting threat-avoidance dynamic would impose costs on China while providing the United States with the ability to disarm high-value Chinese naval assets and other targets in a conflict’s opening phase.

Air denial: Both the U.S. Army and U.S. Marine Corps have begun to rebuild their air defense capabilities after years of divestment and neglect. The U.S. Army has included air and missile defense as one of its six modernization priorities and is currently developing several new air defense missile, radar, and C2 systems including maneuver short-range air defense (MSHORAD), Indirect Fire Protection Capability (IFPC), Lower Tier Air Defense, Integrated Air Missile Defense Battle Command System (IBCS), and directed energy air defense systems.¹²⁶ The U.S. Marine Corps is developing its own family of air defense systems called Ground Based Air Defense. However, these systems are primarily short-range systems designed to protect its forces and bases rather than to deny airspace over a wide area and at range. Patriot, the only current or planned land-based system capable of providing wide-area, longer-range defense against air threats, remains vulnerable to a mass Chinese ballistic and cruise missile attack because it is semi-fixed, lacks replacements radars, and is not supported by protection aids such as decoys or false emitters. Even if several batteries were positioned to defend a critical facility such as Kadena Air Base, the sheer number of Chinese ballistic and cruise missiles would be overwhelming.¹²⁷ Moreover, although the Army has announced an objective of increasing its inventory of SHORAD battalions from nine to eighteen, including ten in the active force, as well as adding an IFPC battery to each Patriot battalion, the decision to resource these objectives has yet to be made.¹²⁸

Land attack: The Army’s Long-Range Precision Fires team has pursued several new ground-based missiles and cannons to attack enemy ground targets (Figure 8). Although planners typically envision using these capabilities in an Eastern Europe scenario involving Russia, they would also prove useful against China in the Western Pacific, particularly for suppressing movement ashore and conducting country-battery fire. Secretary of the Army Mark Esper said developing the capabilities was his Service’s number one priority pending U.S. withdrawal from the INF.¹²⁹

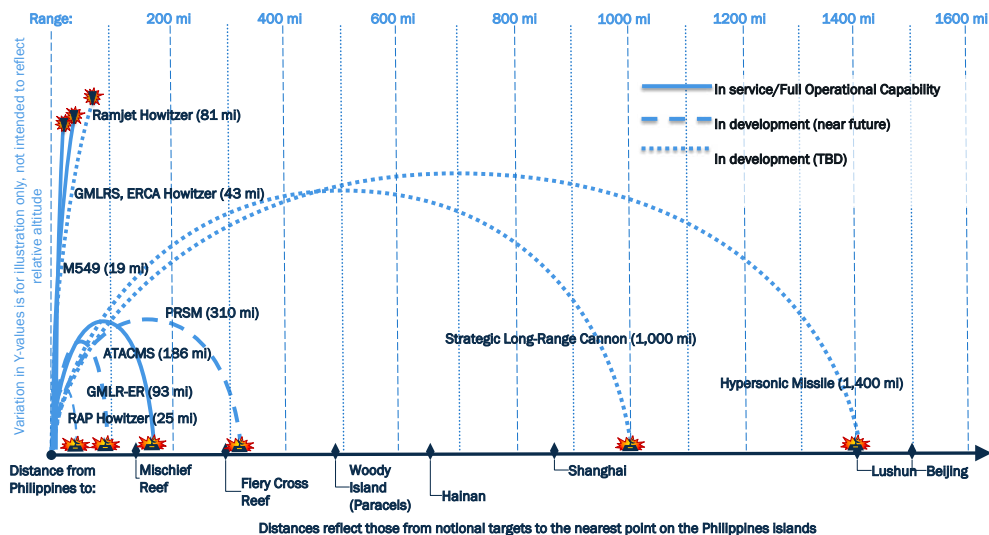
126 U.S. Army Space and Missile Defense Command (SMDC), *Army Air and Missile Defense 2028: Air and Missile Defense Vision 2028* (Huntsville, AL: U.S. Army, March 2019), pp. 10–13, available at https://www.smdc.army.mil/Portals/38/Documents/Publications/Publications/AMD_2028_0319.pdf.

127 Thomas Shugart and Javier Gonzalez, *First Strike: China’s Missile Threat to U.S. Bases in Asia* (Washington, DC: Center for a New American Security, 2017), p. 13.

128 U.S. Army SMDC, *Army Air and Missile Defense 2028*, pp. 13–14.

129 Natalie Johnson, “Long-Range Firing Capabilities Army’s No. 1 Priority After INF Withdrawal,” *Washington Free Beacon*, November 9, 2018, available at <https://freebeacon.com/national-security/long-range-firing-capabilities-armys-no-1-priority-inf-withdrawal/>.

FIGURE 8: CURRENT AND FUTURE U.S. ARMY GROUND-LAUNCHED SYSTEMS



The longest-range system in the Army's current inventory, the Army Tactical Missile System (ATACMS), extends only about 186 mi (300 km). For longer-range fires, the Army wants a hypersonic weapon with a notional range of 1,400 mi, a capability the Services are developing jointly.¹³⁰ The Army version would use a ground-based launcher that is the most technically straightforward, meaning the Army might "get there the fastest," as one leader claimed, and deploy its hypersonic weapon before the other Services.¹³¹ While a weapon like this would be expensive, and thus hard to field in large quantities, it would hold at risk high-value Chinese targets. The Army also wants the so-called Strategic Long-Range Cannon (SLRC) to strike targets up to 1,000 mi away using a projectile that will cost far less per shot than the exquisite option represented by a hypersonic missile.¹³² The new relocatable cannon would leverage technologies the Army already possesses. If it is an electromagnetic railgun, it will require a large power source and be more expensive; if the projectile is a glider or UAS that flies long-range after launch, it will be less costly.

To complement these long-range weapons, the Army wants to replace or upgrade numerous short-range howitzers and medium-range systems, to include fielding the new extended-range mobile Guided Multiple-Launch Rocket System (GMLRS-ER) that shoots twice as far as the existing system and the new mobile Precision Strike Missile (PrSM) that extends the range of ATACMS by almost 70 percent (310 mi/499 km), putting it just under the 500 km limit

130 Jason Sherman, "DOD Eyes Common Hypersonic Glide Body for Use Across Army, Navy, Air Force," *Inside Defense*, September 13, 2018, available at <https://insidedefense.com/daily-news/dod-eyes-common-hypersonic-glide-body-use-across-army-navy-air-force>.

131 Freedberg, "Army Building 1,000-Mile Supergun."

132 Sydney J. Freedberg Jr., "Army Seeks 1,000-Mile Missiles vs. Russia, China," *Breaking Defense*, September 10, 2018, available at <https://breakingdefense.com/2018/09/army-seeks-1000-mile-missiles-vs-russia-china/>.

stipulated in the INF Treaty.¹³³ The Army is working on a seeker that would give the PrSM an anti-ship capability in addition to its standard ground-attack function.¹³⁴

Resiliency and sustainment: Over the past five years, the U.S. military has invested in hardening and improving Pacific air bases, developing additional air fields to support distributed air operations, and enhancing the survivability of the carrier strike group. For example, the Air Force is further developing its Rapid Raptor program, which is designed to deploy four F-22s with C-17 support, fuel, and weapons anywhere in the world within 24 hours. However, apart from the Army and Marine Corps future vertical lift programs, there are not many tactical aircraft smaller than the C-130 or C-17 in the U.S. inventory which can operate from the shorter, rougher, or improvised airfields required for the distributed operations called for under the Inside-Out concept. For its part, the Navy is currently working on the Pipefish concept, an unmanned system designed to bring fuel to forces afloat or ashore.¹³⁵

DoD is also pursuing numerous new communication systems and improvements of existing capabilities to sustain the bandwidth, range, and latency needed for future operations. The proliferation of new and improved systems, however, threatens to reduce interoperability between capabilities. Moreover, efforts to improve communications are often not considered in the context of existing or future C2 approaches, which include new operational concepts using distributed forces, large numbers of unmanned systems, and actions across multiple domains.¹³⁶

All the concepts being pursued by the Services still require assured access to the electromagnetic spectrum, and investments in advanced electronic warfare capabilities to complicate Chinese C4ISR have been lacking, particularly for ground forces. This is beginning to change in earnest after decades of lower-intensity counterinsurgency operations. For example, the Army recently constituted an Intelligence, Information, Cyber, Electronic Warfare, and Space (I2CEWS) battalion at Fort Lewis, WA as part of the Multi-Domain Operations Task Force. It plans to augment formations at multiple echelons with Cyber and Electromagnetic Activities elements. The Services have also invested in a handful of systems like the F-35 with a multi-function AESA radar, the Navy's Next Generation Jammer and Marine Corps' Intrepid Tiger II pod for the Navy's EA-18G electronic warfare aircraft, and an Air Force replacement for EC-130H Compass Call electronic attack aircraft. Additionally, the Army and Marine Corps are investing in new spectrum management tools and long-endurance UAS with electronic warfare systems, modernizing radio battalions to incorporate electronic intelligence and cyber capability, and limiting emissions through better signature management. Overall, though, the

¹³³ Ibid.

¹³⁴ Sydney J. Freedberg Jr., "Army Will Field 100 Km Cannon, 500 Km Missiles: LRPf CFT," *Breaking Defense*, March 23, 2018, available at <https://breakingdefense.com/2018/03/army-will-field-100-km-cannon-500-km-missiles-lrpf-cft/>.

¹³⁵ Walton, Boone, and Schramm, *Sustaining the Fight*, pp. 46–47.

¹³⁶ David G. Perkins, "Multi-Domain Battle Driving Change to Win in the Future," *Military Review* 97, no. 4, July-August 2017, p. 6–12.

Services have lost much of their expertise in electromagnetic spectrum operations since the end of the Cold War. It will take time for DoD to regain that intellectual capital and recreate a dedicated electronic warfare community.

Coordination

In recent years, U.S. and allied militaries have made several moves consistent with a strategy of Maritime Pressure. Notable activities include new investments, exercises, and arms sales to operate more effectively in highly contested A2/AD environments. Despite this progress, long-standing budgetary and political constraints have prevented the United States and its allies from maximizing their preparedness. Finding new, creative solutions to these perennial problems will allow the allies to project a unified front to China, bolstering deterrence in peace and defense in war.

Allied and partner forces: Allied militaries in the Western Pacific have improved their readiness for a potential confrontation with China. Japan and Australia have led the way. Japan's 2018 National Defense Program Guidelines endorsed several themes tied to a Maritime Pressure strategy, including joint multi-domain operations, persistent ISR, standoff firepower, and air and missile defense.¹³⁷ To make this declaratory policy reality, Japan agreed to buy two Aegis Ashore batteries worth over \$2 billion to defend against air and missile attacks.¹³⁸ It also started developing an extended-range, air-launched ASCM and a hypersonic missile.¹³⁹ Japanese officials previously expressed interest in other standoff weapons including LRASM.¹⁴⁰ In late 2018, Japan announced that its defense budget would grow by 1.3 percent, the seventh consecutive annual increase since 2012.¹⁴¹

Australia's 2016 Defence White Paper committed the nation to an ambitious modernization program. It pledged to spend at least 2 percent of GDP on defense and to double the size of the submarine force from six to twelve boats.¹⁴² So far, the government has upheld these commitments. The latest Australian budget remained on track to reach the 2 percent target in 2020–2021.¹⁴³ In February 2019, the government signed a \$35 billion contract with France's Naval Group for 12 new Attack-class submarines, Australia's biggest-ever defense contract.¹⁴⁴

137 Japan MOD, *National Defense Program Guidelines for FY 2019 and Beyond*, pp. 21–22, 26–27.

138 Franz-Stefan Gady, "U.S. State Department Approves \$2.15 Billion Aegis Ashore Sale to Japan," *The Diplomat*, January 30, 2019.

139 "Japan Announces Longer-Range Cruise Missile Development," *Kyodo News*, March 19, 2019; and Elizabeth Shim, "Japan to Develop Hypersonic Missile for 'Defense Purposes,'" *UPI*, September 19, 2018.

140 Mike Yeo, "Japan Confirms Long-Range Missile Interest in an About-Face," *Defense News*, December 11, 2017.

141 Mari Yamaguchi, "Japan Cabinet OKs Record Defense Budget Bill, U.S. Arms Buys," *Associated Press*, December 21, 2018.

142 Australia MOD, *2016 Defence White Paper*, pp. 24, 90–91.

143 Katherine Ziesing, "Defence Budget 2018 at a Glance," *Australian Defence Magazine*, May 8, 2018.

144 Christina Mackenzie, "Naval Group Clinches \$35 Billion Australian Submarine Deal," *Defense News*, February 11, 2019.

The United States, Japan, and Australia have used military-to-military engagements to develop the operational concepts supporting these capabilities. Foremost among these is RIMPAC, the world's largest maritime exercise hosted biennially by the United States in and around Hawaii. The most visible allied demonstration of RIMPAC 2018 involved an exercise in which the three militaries attacked and sank the *Racine*, a decommissioned landing ship.¹⁴⁵ The U.S. Army fired an NSM from a palletized truck-mounted launcher. Japan's Ground Self-Defense Force fired its own truck-mounted Type 12 anti-ship missiles. Australia used its new P-8 Poseidon maritime patrol aircraft to hit the hulk with an AGM-84 Harpoon anti-ship missile. Finally, a U.S. submarine fired a Harpoon and a Mark 48 torpedo, which broke the ship's keel and sent her below. The exercise was the closest the countries have come to demonstrating operations under a Maritime Pressure strategy.

Despite such achievements, challenges remain for allied military planners. In Japan, barriers to inter-Service cooperation and joint operations remain.¹⁴⁶ There is also domestic political resistance to fielding any capabilities that have offensive potential, such as standoff missiles. Meanwhile, leading observers in Australia have questioned whether Canberra is investing enough in long-range strike capabilities.¹⁴⁷

Recommended Changes to Concepts, Capabilities, and Coordination

Concepts

Develop this report's approach into a joint operational concept to support a strategy of Maritime Pressure in the Western Pacific. The Services continue to develop new warfighting concepts, but these efforts are uncoordinated and lack joint integration. A joint operational concept to support a Maritime Pressure strategy in the Western Pacific could provide Service efforts a framework that would facilitate deeper integration and coordination. The Joint Staff should take Inside-Out Defense as a point of departure and develop a new joint operational concept.

Experiment with new organizational structures for ground forces in the Pacific. Given that it is forward stationed in the Western Pacific, III MEF and its subordinate units could form the core of the inside forces in an Inside-Out Defense concept. III MEF would also likely need to be augmented as inside forces with U.S. Army units located in the Pacific Theater such as the 25th Infantry Division, which is primarily based in Hawaii. However, both formations are maneuver warfare-centric organizations best suited for traditional amphibious

145 William Cole, "U.S. and Japan Fire Missiles to Sink Ship During RIMPAC," *Honolulu Star-Advertiser*, July 15, 2018. Of note, the exercise was not intended to test how fast they could sink the ship, but rather to test the force's ability to coordinate an attack across Services and weapons systems.

146 Dennis Blair, "Chairman's Message: What Japan's Third National Defense Program Guidelines Should Have Said," Sasakawa Peace Foundation USA, February 1, 2019, available at <https://spfusa.org/chairmans-message/chairmans-message-what-japans-third-national-defense-program-guidelines-should-have-said/>.

147 Malcolm Davis, "ADF Gap to Fill for Deterring Powerful Foes," *The Australian*, October 3, 2017.

or ground combat operations. The Marine Corps and Army should experiment with alternative force designs that take advantage of novel combinations of C2, fires, air defense, security, ISR, engineering, electronic warfare, and sustainment capabilities to permit distributed, multi-domain fires in highly contested environments along the First Island Chain.

Develop sustainment concepts to support a Maritime Pressure strategy.

Supporting distributed operations along the First Island Chain in a heavily contested environment requires new concepts for sustaining the joint force across great distances while under attack. Planners should explore innovative approaches to support distributed units, including greater use of pre-positioned stocks of munitions and sustainment materiel, manned and unmanned air and sea assets for mobility and resupply, and emerging technologies such as 3D printing to fabricate replacement parts.

Capabilities

Accelerate fielding of mobile, land-based, long-range missile capabilities. Ground force contributions to sea denial, air denial, and land attack operations along the First Island Chain require sharper and longer teeth. Current efforts of the Army and Marine Corps to develop and field longer-range, land-based anti-ship and land-attack fires should be accelerated and should incorporate weapons with ranges in excess of 500 km, pending final dissolution of the INF Treaty. The Army and Marine Corps should also develop more mobile and longer-range land-based air defense systems to provide wide-area air denial along the First Island Chain with sufficient survivability for inside forces to fight and persist within China's A2/AD network.

Build a resilient multi-domain C4ISR architecture and develop and field counter-C4ISR capabilities. In a future conflict in the Western Pacific, the battle for information advantage would likely be critical and could potentially prove decisive. Organic ISR capabilities such as those provided by UAS are likely to be crucial to the success of such operations. Moreover, such platforms may be capable of serving as communications links to support dispersed operations. The U.S. military should also undertake efforts to make its C4ISR architecture more resilient while developing and fielding active and passive counter-C4ISR capabilities such as jammers and CCD.

Integrate all bomber aircraft with payloads for offensive maritime missions. DoD should integrate anti-ship missiles and air-dropped mines into its fleet of bombers. Although anti-surface warfare would be a new mission for these platforms, it would be a return to form for the bomber community that played important maritime roles during World War II and the Cold War. These capabilities are currently being fielded with several aircraft such as the B-1B, but integrating them with platforms possessing comparable ranges and greater survivability would give the United States the capability to attack enemy surface combatants and other high-value maritime targets in highly contested environments that other anti-surface warfare platforms may not be able to reach. For example, the B-2 is already integrating the JASSM-ER missile on which the LRASM is based, and has a capable AESA radar system with a maritime

mode that has so far gone unused. The same aircraft could penetrate deep into enemy territory and lay mines in ports, rivers, and other areas to slow down enemy operations and channel enemy vessels in specific directions.

Coordination

Deepen cooperation with Indo-Pacific allies and partners. Allies and partners will be critical in a Maritime Pressure strategy, both in terms of accessing their territory and the capabilities and forces they contribute. The U.S. military should engage closely with Indo-Pacific allies and partners to form enhanced access agreements for both peacetime and war, as well as gain a better understanding of what roles each ally and partner may be willing to perform and with what forces in each potential contingency. The U.S. military should also work to deepen interoperability among U.S. and allied and partner forces, particularly regarding the most capable Indo-Pacific allies such as Japan and Australia. DoD should work with Japan and Australia to develop combined concepts of operations.

Reexamine Service roles and missions. As new concepts for warfighting in the Western Pacific continue to mature, so too should existing Service roles and missions. For example, Inside-Out Defense envisions both Army and Marine forces playing a larger role in anti-surface warfare missions. But key questions remain, such as whether they would provide similar or distinct capabilities for those missions and whether they would perform the missions in separate or overlapping geographic areas. Answering questions like these will help harmonize ongoing efforts to develop new concepts and capabilities across the Services. As such, the U.S. military should review roles and missions to ensure emerging efforts are integrated and complementary rather than disjointed and needlessly duplicative.

Anticipating Chinese Reactions

Any evaluation of a candidate strategy should consider whether it provides an expanded set of options for the United States and its allies while constraining those available to China; whether it puts the United States and its allies on the right side of the cost equation; and whether it yields the initiative, forcing competitors to respond. At first blush, the strategy of Maritime Pressure described above would appear to be promising. However, strategy is by its nature interactive. As a result, it is worth thinking through how China might react to the concepts, capabilities, and coordination described above. Although predicting Chinese responses remains difficult, at least three distinct, although not mutually exclusive, responses appear plausible, although they may take years to manifest themselves. Other responses are of course possible and deserve thorough consideration.

First, the implementation of an allied Maritime Pressure strategy might cause the PLA to double down on its investments in A2/AD capabilities. In particular, the PLA might seek to increase its ability to find and strike ground-based mobile systems by improving its targeting capabilities and expanding its already large inventory of ground-based missiles. It could also

seek to target the sensors and networks that would be needed to support distributed ground operations. Chinese scholars have floated such an option, and it appears consistent with the PLA's existing doctrine and organizational culture.¹⁴⁸ Chinese domestic politics might drive this response. If the Chinese leadership were to abandon A2/AD, the PLA and the CCP leadership might leave themselves open to criticism for squandering massive resources in pursuit of a failed strategy.¹⁴⁹ To avoid such embarrassment, Chinese leaders instead might resolutely press ahead with A2/AD advancements in response to a U.S. Maritime Pressure strategy.

Whatever political dynamic ensues, attempts to find, target, and strike dispersed, ground-based forces operating in complex terrain will likely prove challenging for the PLA. Such forces, once lodged in the First Island Chain, would be difficult if not impossible to root out. Even the possible introduction of such forces into the First Island Chain will produce uncertainty as to the capabilities facing China. Once such uncertainty has been introduced, it would be difficult if not impossible to eliminate. Even a massive effort to find and destroy dispersed units in the First Island Chain is unlikely to yield certainty that the threat posed by such forces has been eliminated. Trying to circumvent dispersed ground forces, as the United States did against Japan during World War II, would also prove difficult, especially if the ground-based missiles had long range and were backed up by air and naval forces, as is proposed in this report. Assuming Chinese advancements do not negate the survivability of dispersed, ground-based U.S. strike forces, the resulting competitive dynamic would benefit the United States. Every yuan spent on Chinese A2/AD improvements that do not appreciably alter the balance of power is a yuan not spent on Chinese power projection, nuclear weapons, or other capabilities that more seriously threaten U.S. and allied interests.

A second potential response to a Maritime Pressure strategy would be for Beijing to re-focus its attention away from its maritime flanks and toward the Asian continent, accelerating a trend that is already apparent in Xi Jinping's Belt and Road Initiative. Facing greater push-back in the Asian littoral, the Chinese leadership might seek to redouble its efforts to build economic, political, and military influence in Central Asia and beyond, a development that would be less threatening to the United States and its allies. It is also possible that perceived failure on the maritime front, complete with public criticism of Chinese A2/AD investments, could cause the CCP to worry about regime stability, premised as it is on nationalism and foreign policy success. The CCP might then be compelled to devote more resources toward inward-looking activities, including internal security and related efforts.

Third, because the deployment of U.S. and mobile ground-based forces likely poses such a nettlesome problem, China can be expected to devote considerable effort to preventing it. Perhaps the best option for China would be using a mixture of political and economic

148 Jacob Stokes, *China's Missile Program and Potential U.S. Withdrawal from the Intermediate-Range Nuclear Forces (INF) Treaty*, Staff Research Report (Washington, DC: U.S.-China Economic and Security Review Commission, 2019), p. 5.

149 The authors thank an anonymous reviewer for suggesting this possibility.

pressure and inducements to dissuade allies and partners in the region from cooperating with the United States. Beijing could harness its considerable political warfare capabilities in the service of slowing or stopping such a strategy by, for example, portraying U.S. and allied capabilities as offensive and destabilizing. Pursuing political action would prove attractive to China because, if conducted prudently, it would avoid some of the escalatory risks inherent in responding militarily. China might impose economic or trade sanctions against countries like Japan that joined the American strategy. It might also pursue a messaging campaign to portray the United States and its allies as aggressors, hoping to win sympathy in the court of international public opinion. The United States must thus stand ready to compete with China across the wide spectrum of grand strategy if it chooses to implement a strategy of Maritime Pressure.

CHAPTER 4

Potential Costs

A Maritime Pressure strategy appears quite promising. However, a strategy that ignores costs is no strategy at all. Whereas past studies have generally avoided assessing the resource implications of fielding precision-strike networks along the First Island Chain, this chapter estimates how much the United States might spend implementing such an approach. It focuses only on budgetary costs to the United States, omitting non-budgetary and non-U.S. costs.¹⁵⁰ It considers some specific initiatives that DoD could pursue to satisfy Chapter 3's general recommendations.

Pursuing the strategy described in this report could cost an estimated \$8 billion to \$13 billion through 2024, plus sustainment costs for each year thereafter, depending on the specific investments DoD selected.¹⁵¹ This estimate represents additional spending beyond the plans reflected in the fiscal year (FY) 2020 budget request. Longer-term costs could grow higher, totaling \$30 billion or more, depending on how extensively DoD reorganized its forces and adjusted its posture.

DoD could resource the strategy in one of two ways. It could add the costs of the strategy to current plans without altering those plans substantially. In that case, the defense budget topline would increase by an amount equal to the strategy's cost. Alternatively, DoD could adopt the strategy in lieu of current plans. Under that scenario, the topline would increase by an amount less than the strategy's cost. The topline might even decrease if the strategy replaced more than \$8–13 billion worth of current plans. To offer but a few examples, DoD could save enough money to finance the strategy by forgoing or cutting four infantry brigade

¹⁵⁰ Other studies have addressed aspects of those topics. On Taiwan, for example, see Hunzeker and Lanoszka, *A Question of Time*, pp. 76–77.

¹⁵¹ The estimate focuses on costs through 2024 to align with the future years defense program.

combat teams, three LHA-6 amphibious assault ships, one Ford-class aircraft carrier, or 130 F-35A aircraft.¹⁵²

Estimated Costs through 2024

This section estimates the costs that might accompany Chapter 3’s recommendations for concepts, capabilities, and coordination (Table 1). The costs represent order-of-magnitude approximations. They neither reflect every line item required to execute the strategy nor derive from new parametric models. Rather, they attach an illustrative price tag to the study’s ideas.

TABLE 1: COSTS OF MARITIME PRESSURE STRATEGY, 2020–2024

	Illustrative Costs 2020–2024
Concepts	\$982–1,555 M
Develop this report’s approach into a joint operational concept	\$20 M
Experiment with new organizational structures for ground forces in the Pacific	\$72–645 M
Develop sustainment concepts to support a Maritime Pressure strategy	\$890 M
Capabilities	\$7,525–11,525 M
Accelerate fielding of mobile, land-based, long-range missile capabilities	\$3,100–6,500 M
Build a resilient multi-domain C4ISR architecture and develop and field counter-C4ISR capabilities	\$4,225–4,725 M
Integrate all bomber aircraft with payloads for offensive maritime missions	\$200–300 M
Coordination	\$145 M
Deepen cooperation with Indo-Pacific allies and partners	\$140 M
Reexamine Service roles and missions	\$5 M
Total	\$8,652–13,225 M

Notes: Discretionary budget authority in nominal dollars

Concepts

Develop this report’s approach into a joint operational concept to support a strategy of Maritime Pressure in the Western Pacific. The Joint Staff and other stakeholders will need time and facilities to push Inside-Out through DoD’s concept development process.¹⁵³ On the one hand, the cost ought to remain negligible initially because government employees and facilities will be funded regardless of whether or not DoD pursues

152 Congressional Budget Office (CBO), *The U.S. Military’s Force Structure: A Primer* (Washington, DC: CBO, July 2016), p. 32; CBO, *An Analysis of the Navy’s Fiscal Year 2019 Shipbuilding Plan* (Washington, DC: CBO, October 2018), p. 19; and Gunzinger et al., *An Air Force for an Era of Great Power Competition*, p. xii.

153 JCS, “Guidance for Developing and Implementing Joint Concepts,” CJCSI 3010.02E, August 17, 2016.

Inside-Out.¹⁵⁴ On the other hand, the cost could grow if DoD requires contractor services, staff travel, or research support, expenses that often accompany concept development initiatives.

Potential costs can be estimated by considering hypothetical adjustments to the Joint Staff's analysis budget. The FY 2020 budget requested \$13 million to support joint capability experimentation—a new program element introduced in response to the 2019 National Defense Authorization Act (NDAA).¹⁵⁵ The budget includes no funds for the program during FY 2021–2024. If DoD funded it at the \$13 million level for one additional year to experiment with Inside-Out, additional costs through 2024 would total \$13 million. The FY 2020 budget also requested \$4.2 million for analytical support, a figure reflecting the 25 percent reduction to management headquarters activities mandated by the 2016 NDAA.¹⁵⁶ If DoD increased funding by \$1.5 million per year starting in 2020, restoring the program to its previous level, additional costs through 2024 would total \$7.5 million. Together, adding \$13 million for experimentation and \$7.5 million for analytical support would provide the Joint Staff with approximately \$20 million in additional funds through 2024 to develop Inside-Out and other concepts recommended by this report, including those discussed below.¹⁵⁷

Experiment with new organizational structures for ground forces in the Pacific.

The strategy of Maritime Pressure envisions reconfiguring U.S. ground forces in the Western Pacific. Achieving that goal will require preparatory analysis. That analysis could draw on the \$20 million earmarked for Inside-Out concept development (see above). Beyond analysis, DoD could experiment with new concepts using existing formations. One option for conducting such tests is the Army's Multi-Domain Task Force, an organization created to spur innovation.

To evaluate Inside-Out's feasibility, the Army could try forward stationing the Multi-Domain Task Force in the Indo-Pacific region. The unit currently is home based at Joint Base Lewis-McCord, Washington, and deploys rotationally to the Indo-Pacific. Calculating the cost differential between forward stationing versus rotationally deploying units remains a challenging task fraught with imperfect data and debatable assumptions. However, authoritative work by the Army War College's John Deni finds that forward stationing costs roughly 11 percent less than rotationally deploying in terms of annual recurring expenses per unit.¹⁵⁸ If

154 Using government manhours and facilities represents an opportunity cost because DoD could dedicate them to something else.

155 OSD, Comptroller (OSD[C]), *Department of Defense (DoD) FY 2020 Budget Estimates: The Joint Staff, Research, Development, Test & Evaluation, Defense-Wide*, Justification Book Volume 5 (Washington, DC: DoD, March 2019), pp. 25–28 available at https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/budget_justification/pdfs/03_RDT_and_E/11_0400_TJS_PB2020.pdf.

156 Ibid., pp. 49–56.

157 For simplicity, the estimate assumes that only the Joint Staff receives research funds. In practice other defense organizations likely would receive them, too.

158 John R. Deni, *Rotational Deployments vs. Forward Stationing: How Can the Army Achieve Assurance and Deterrence Efficiently and Effectively?* (Carlisle, PA: U.S. Army War College, Strategic Studies Institute, 2017), p. 22.

that is correct, then forward stationing the Multi-Domain Task Force could save DoD money in the long run. Of course, DoD might need to make other investments to realize that outcome. It might incur military construction expenses, for example, preparing an overseas location to receive the task force. Extrapolating from Deni's analysis, construction expenses could total anywhere from \$72 million to \$645 million in additional funding through 2024 depending on the location selected.¹⁵⁹

If experimentation led the Army or Marine Corps to reorganize their forces permanently, the long-term costs would add up quickly through 2024 and beyond. This chapter excludes such long-term costs, instead emphasizing near-term investments. Yet they nevertheless merit brief consideration. Past transformation initiatives provide a rough benchmark for forecasting potential longer-term costs. In 2004, the U.S. Army debuted the modularity initiative to reorganize its forces from the old structure built around divisions to the current structure built around brigade combat teams. The Army predicted initially that the initiative would cost approximately \$30 billion in today's dollars.¹⁶⁰ The actual cost grew because the initiative's scope expanded to include restructuring the Army's division and corps headquarters units as well as support units. According to the Congressional Budget Office, the initiative eventually cost \$80 billion in today's dollars.¹⁶¹ The modularity initiative reshaped the entire Army, whereas this report's recommendations would transform only select Army forces. Still, the price tag for modularity highlights how much a major reorganization might cost in the decades ahead.

Develop sustainment concepts to support a Maritime Pressure strategy. The U.S. military must develop new sustainment concepts to support the dispersed operations advocated by a Maritime Pressure strategy. The concepts must reflect that sustainment in the Western Pacific will likely occur while U.S. forces are under attack. One part of the task is intellectual, involving analysis, wargaming, and consultations with allies. Those activities could be funded from the \$20 million slated for developing Inside-Out into a joint operational concept (see above). The other part of the task is material, involving investments in assets that improve sustainment capacity today.

Sealift ships represent one area deserving near-term investment.¹⁶² Executing the Maritime Pressure strategy requires possessing enough sealift to transport personnel and cargo to key positions along the First Island Chain. The sealift fleet should include both larger assets that

159 The estimate scales down Deni's minimum and maximum military construction estimates by 43 percent to represent the size differential between the task force (~2,000 personnel) and an armored brigade combat team (~4,700 personnel).

160 CBO, *An Analysis of the Army's Transformation Programs and Possible Alternatives* (Washington, DC: CBO, June 2009), p. ix; and OSD(C), *National Defense Budget Estimates for FY 2020*, Green Book (Washington, DC: DoD, May 2019), Table 5-6, p. 60, available at https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/FY20_Green_Book.pdf.

161 The \$80 billion figure excludes expenses for increasing the Army's size and developing Future Combat Systems. CBO, *An Analysis of the Army's Transformation Programs and Possible Alternatives*, p. 33.

162 Walton, Boone, and Schramm, *Sustaining the Fight*, pp. 107–108.

transport supplies into theater and smaller assets that move supplies within theater. The importance of sealift cannot be overstated: In a war with China, the sealift fleet would transport up to 90 percent of Army and Marine Corps equipment.¹⁶³ Unfortunately, the fleet faces severe capacity challenges in the years ahead.

To improve inter-theater transport, DoD could buy 26 used foreign-built transport vessels to replace Ready Reserve Force ships nearing the end of their service lives, a recommendation made recently by the Defense Science Board (DSB).¹⁶⁴ The DSB estimated that the 26 ships altogether would cost approximately \$880 million, an amount slightly exceeding the cost of one U.S.-built large, medium-speed roll-on/roll-off ship. While the ships would be susceptible to attack in contested environments, their lower cost and larger numbers would make any losses less costly in military terms. DoD could spread out the 26-ship investment over the next decade to ease pressure on other Navy programs, meaning the cost through 2024 would total \$440 million. To strengthen intra-theater transport, DoD could spend approximately \$450 million buying two additional Expeditionary Fast Transport (EPF) ships by 2024, bringing the total inventory to 16 vessels.¹⁶⁵ Altogether, strengthening the sealift fleet by buying 26 used transport vessels for \$440 million and two additional EPFs for \$450 million would require \$890 million in additional funding through 2024.¹⁶⁶

Capabilities

Accelerate fielding of mobile, land-based, long-range missile capabilities. Land-based, long-range missile capabilities are the lifeblood of the Inside-Out concept. The Army and Marine Corps have spent an admirable amount of energy crafting new solutions, but an infusion of additional resources would speed things along. There are several promising areas for additional investment.

The Army and Marine Corps unfunded priority lists provide one set of options. The Army's FY 2020 list contains several programs tied to land-based precision fires. The programs include a low-Earth orbit capability to extract tactical imagery in contested environments, a prototype hypersonic weapons system, a joint air-to-ground seeker for the ATACMS missile, an

163 David B. Larter, "The US Navy Will Have to Pony Up and Race the Clock to Avoid a Sealift Capacity Collapse," *Defense News*, October 20, 2018.

164 Defense Science Board (DSB), *Task Force on Survivable Logistics: Executive Summary* (Washington, DC: DoD, November 2018), pp. 5–6, available at <https://apps.dtic.mil/dtic/tr/fulltext/u2/1064537.pdf>.

165 U.S. Navy, *Department of Defense Fiscal Year (FY) 2020 President's Budget Estimate Submission: Shipbuilding and Conversion, Navy*, Justification Book Volume 1 (Washington, DC: DoD, March 2019), p. 245, available at https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/SCN_Book.pdf. An EPF's annual operation and support cost varies based on its workload. For unit cost targets within Military Sealift Command's service support ships program, which includes EPFs, see U.S. Navy, *Department of the Navy Fiscal Year (FY) 2020 Budget Estimates: Navy Working Capital Fund (NWCF)*, Justification Of Estimates (Washington, DC: DoD, March 2019), p. 213, available at https://www.secnav.navy.mil/fmc/fmb/Documents/20pres/NWCF_Book.pdf.

166 Beyond 2024, DoD could follow the investment plan outlined in Walton, Boone, and Schramm, *Sustaining the Fight*, to include procuring additional U.S.-built roll-on/roll-off ships starting in FY 2025.

extended-range AN/TPQ-53 radar for counterfire target acquisition, and readiness improvements for multi-domain operations in the Pacific.¹⁶⁷ Funding these five priorities would require approximately \$300 million in additional funds in FY 2020. If the Army identified a similarly sized investment package each year, additional funding through 2024 would reach \$1.5 billion. The Marine Corps FY 2020 list identifies several investments applicable to the Inside-Out concept, including programs to preserve C2 in contested environments and strengthen air defense.¹⁶⁸ Supporting those programs would cost approximately \$135 million in FY 2020 and, again, assuming an equivalent-sized annual investment in the outyears, \$675 million in additional funds through 2024. Combining the Army and Marine Corps increases of \$1.5 billion and \$675 million, respectively, yields a total of \$2.175 billion through 2024.

Another set of options involves developing and deploying new ground-launched missiles.¹⁶⁹ Here the report considers what DoD could do by 2024, focusing on two lines of effort related to developing capabilities.¹⁷⁰ The first line of effort involves pursuing new land-based missiles such as a successor to the 1980s-era Pershing II medium-range ballistic missile (“Pershing III”) or an extended-range version of the new PrSM short-range ballistic missile. If DoD started developing a new Pershing III in FY 2020, total additional R&D costs through 2024 could reach \$900 million based on Army plans for roughly comparable initiatives.¹⁷¹ If DoD procured 144 PrSMs during FY 2023 and 2024 for use by either Army or Marine Corps fires units, following the current program timeline and assuming no additional funds are required beyond those already planned for research and development (R&D) and launcher procurement, then additional spending could total \$72–120 million through 2024.¹⁷²

167 U.S. Army, “PB20 US Army CSA Unfunded Priority List,” March 25, 2019, available at https://insidedefense.com/sites/insidedefense.com/files/documents/2019/mar/03252019_army.pdf.

168 U.S. Marine Corps, “Fiscal Year 2020 Marine Corps Unfunded Priority List,” March 25, 2019, available at <https://news.usni.org/2019/03/25/fiscal-year-2020-navy-unfunded-priorities-list>.

169 These choices and costs are examined in Cohn, Walton, Yoshihara, and Lemon, *Leveling the Playing Field*, pp. 33–39.

170 Determining the inventories required for each capability lies beyond this section’s scope. Future research could adjust the unit costs presented here relatively easily.

171 For the FY 2020–2024 period, the Army requested \$900 million for its new mobile medium-range missile. This amount represents a rough-but-reasonable approximation for a Pershing III development effort. U.S. Army, *Department of Defense (DoD) FY 2020 Budget Estimates: Army, RDT&E, Budget Activity 4*, Justification Book Volume II (Washington, DC: DoD, March 2019), pp. 634–639.

172 The 144-missile quantity is based on a notional fires unit organized into three batteries of six launchers with each launcher holding two missiles and stockpiling four ammunition sets, one initial and three reloads (i.e., three batteries x six launchers per battery x two missiles per launcher x four ammunition sets = 144 missiles). The estimate assumes each PrSM will cost from \$500,000 to \$836,000 (i.e., \$500,000 x 144 missiles = \$72 million; \$836,000 x 144 missiles = ~\$120 million). The smaller figure comes from historical DoD data based on industry claims that PrSM will be “less than half the cost” of ATACMS. The larger figure comes from the Government Accountability Office. “DeepStrike Missile,” factsheet, Raytheon, September 28, 2018, available at https://www.raytheon.com/capabilities/products/deepstrike_long_range_precision_fires; Cohn, Walton, Yoshihara, and Lemon, *Leveling the Playing Field*, p. 35; and Government Accountability Office (GAO), *Weapon Systems Annual Assessment: Limited Use of Knowledge-Based Practices Continues to Undercut DOD’s Investments* (Washington, DC: GAO, May 2019), p. 92.

The second line of effort involves adapting air- and ship-launched missiles for ground launch. NSM, LRASM, and Tomahawk represent viable options. For each of the three programs, missile adaptation R&D could total \$200–400 million based on existing estimates.¹⁷³ Launcher R&D and procurement could potentially add another \$200–400 million per program depending on whether new launchers were required.¹⁷⁴ Then comes missile procurement. Assuming a 144-missile buy through 2024 to maintain consistency with the PrSM calculations, NSM procurement could cost \$200–274 million;¹⁷⁵ LRASM procurement could cost \$375–430 million;¹⁷⁶ and Tomahawk procurement could cost \$160–230 million.¹⁷⁷ Altogether, then, after combining missile adaptation R&D, launcher R&D and procurement, and missile procurement, adapting NSM for ground launch could cost \$600 million–\$1.074 billion; LRASM could cost \$775 million–\$1.230 billion; and Tomahawk could cost \$560 million–\$1.030 billion.

Having explored the various options, this subsection's estimates can be summed into a single bottom line. At the low end of the cost spectrum, assuming minimum unit costs, with approximately \$3.1 billion in additional investment through 2024, DoD could support unfunded Army and Marine Corps long-range fires priorities, develop the Pershing III, and procure 144 PRSMs for use by either Army or Marine Corps fires units.¹⁷⁸ At the high end of the cost spectrum, assuming maximum unit costs, with approximately \$6.5 billion in additional investment through 2024, DoD could support the unfunded priorities, develop the Pershing III, and outfit Army or Marine Corps fires units in the Pacific with 144 missiles of each type (i.e., PRSMs, NSMs, LRASMs, and Tomahawks), equaling 576 missiles in total.¹⁷⁹

¹⁷³ The range parameterizes existing estimates from Bonds et al., *What Role Can Land-Based, Multi-Domain Anti-Access/Area Denial Forces Play*, p. 137; and Cohn, Walton, Yoshihara, and Lemon, *Leveling the Playing Field*, p. 35.

¹⁷⁴ Ibid.

¹⁷⁵ The estimate assumes each NSM will cost \$1.4–1.9 million (i.e., \$1.4 million x 144 missiles = ~\$200 million; \$1.9 million x 144 missiles = ~\$274 million). The smaller figure comes from industry estimates of the smaller unit cost at larger procurement quantities. The larger figure comes from the FY 2020 budget request. OSD(C), *Department of Defense (DoD) FY 2020 Budget Estimates: Navy, Weapons Procurement*, Justification Book Volume 1 (Washington, DC: DoD, March 2019), pp. 219–225.

¹⁷⁶ The estimate assumes each LRASM will cost \$2.6–3 million (i.e., \$2.6 million x 144 missiles = ~\$375 million; \$3 million x 144 missiles = ~\$430 million). The smaller figure comes from industry and DoD estimates of the smaller unit cost at larger procurement quantities. The larger figure comes from the FY 2020 budget request. U.S. Navy, *DoD FY 2020 Budget Estimates: Navy, Weapons Procurement*, pp. 209–218.

¹⁷⁷ The estimate assumes each Tomahawk will cost \$1.1–1.6 million (i.e., \$1.1 million x 144 missiles = ~\$160 million; \$1.6 million x 144 missiles = ~\$230 million). The smaller and larger figures come from industry estimates for the Block IV and Block V, respectively, assuming smaller unit costs at larger procurement quantities.

¹⁷⁸ The figure is calculated as follows: \$2.175 billion unfunded priorities + \$900 million Pershing III + \$72 million PrSM = \$3.147 billion.

¹⁷⁹ The figure is calculated as follows: \$2.175 billion unfunded priorities + \$900 million Pershing III + \$120 million PrSM + \$1.074 billion NSM + \$1.230 billion LRASM + \$1.030 billion Tomahawk = \$6.529 billion. DoD could distribute the missiles to units such as III MEF's 12th Marine Regiment forward stationed in Okinawa.

Build a resilient multi-domain C4ISR architecture and develop and field counter-C4ISR capabilities. Building a resilient C4ISR architecture is probably the report’s most ambitious and complex recommendation. The technical and classification issues involved with protecting information networks are enormous. Merely choosing which programs fall under the banner of “C4ISR architecture” presents great difficulties. Many experts have studied the problems but few have produced convincing answers, particularly regarding programmatic specifics. For all these reasons, providing a cost estimate for C4ISR improvements remains challenging, to say the least.

Network resilience and a new Marine Corps ISR platform illustrate C4ISR investments consistent with a Maritime Pressure strategy. In a 2013 report, the DSB studied the resilience of military systems against advanced cyber threats.¹⁸⁰ The report’s scope did not include all aspects of the C4ISR problem, but it did cover one important part. The report estimated that, roughly speaking, DoD must spend at least \$750–850 million per year to keep progressing toward achieving information assurance in contested environments. While DoD has adopted some of the DSB’s recommendations, the continuously evolving nature of information operations suggests that a similarly sized annual investment would still prove beneficial today. By 2024, an investment of that size would total \$3.75–4.25 billion in extra spending.

As for Marine ISR, under the Inside-Out concept DoD could equip Marine Expeditionary Units (MEUs) with new ISR assets, something the Corps has explored actively. Larger UASs would provide the MEU with airborne early warning and expeditionary ISR support. While the RQ-21A small tactical UAS performs admirably in its current role, it lacks the range and endurance required to scout far-off enemy targets and optimize operations with Marine F-35B strike fighters. The MQ-9 Predator B and the experimental “MUX” UAS program ought to perform those tasks better.¹⁸¹ Accelerating development of these systems would cost around \$475 million through 2024 according to previous estimates.¹⁸² Added to the network resilience investments above, total additional spending for C4ISR would come to \$4.225–4.725 billion through 2024.

Integrate all bomber aircraft with payloads for offensive maritime missions.

Inside-Out calls for integrating anti-ship missiles onto the bomber fleet—particularly stealth bombers like the B-2 and the future B-21—so these survivable aircraft can strike enemy vessels in highly contested environments. LRASM represents a logical option since bombers could use it to attack the highest-priority targets. While no plan exists for integrating LRASM onto the

180 DSB, *Task Force Report: Resilient Military Systems and the Advanced Cyber Threat* (Washington, DC: DoD, January 2013), p. 12.

181 MUX stands for Marine Air-Ground Task Force (MAGTF) Unmanned Aerial System (UAS) Expeditionary. Megan Eckstein, “Marines Won’t Need a Carrier for High-End Fight with MUX Unmanned System,” *USNI News*, June 6, 2018.

182 Mackenzie Eaglen, *Repair and Rebuild: Balancing New Military Spending for a Three-Theater Strategy* (Washington, DC: American Enterprise Institute, 2017), p. 116.

B-2, industry officials have agreed that the project appears feasible.¹⁸³ The project's cost can be estimated based on the previous cost of integrating LRASM onto the B-1B bomber. Calculating the previous B-1B integration cost is tricky. The pertinent documents, which are not publicly available, present integration costs as a lump sum rather than separating them by platform. Nevertheless, based on reasonable assumptions about cost sharing and engineering difficulty, the B-1B cost data suggest that DoD could integrate LRASM onto the B-2 for roughly \$200–300 million in additional spending through 2024.¹⁸⁴ The estimate represents a fair projection both for integrating munitions besides LRASM onto the B-2 and for integrating LRASM onto bombers besides the B-2.

Coordination

Deepen cooperation with Indo-Pacific allies and partners. Compared to concepts and capabilities, deepening coordination costs little in budgetary terms. Working with Indo-Pacific allies and partners requires time, sustained leadership attention, and political courage. Those factors represent opportunity costs, to be sure. But they do not appear as line items in DoD's budget.

One option for deepening cooperation that would carry budgetary implications involves increasing multinational military exercises. Based on the Inside-Out concept, U.S. and allied militaries could conduct new exercises that, for example, demonstrated land-based strike capabilities within China's A2/AD envelope. DoD understands only vaguely the costs of its military-to-military engagement activities. As an official in the Cost Assessment and Program Evaluation office commented, "Nobody understands our exercise portfolio let alone an 'engagement' portfolio. . . . It is a terribly fact free debate, including within the building [Pentagon]."¹⁸⁵ However, recent controversy over canceling a U.S.-South Korea exercise led Pentagon officials to state that the exercise cost around \$14 million.¹⁸⁶ Using that figure as a rule of thumb, if DoD added one additional exercise with Indo-Pacific allies and partners every six months, totaling two new exercises per year—a significant increase given operational and planning constraints—additional spending through 2024 would reach \$140 million.

Reexamine Service roles and missions. Like deepening coordination with allies, reexamining Service roles and missions would primarily require effort and serious self-evaluation, not money. Still, budgetary costs would enter the picture at some point. History illustrates the range of possibilities. If the undertaking proceeded like the 1948 Key West conference that helped enshrine the division of labor among the Services, additional spending would include little more than expenses for preparatory analysis and travel costs for a handful of general and flag officers, plus staff, to go on temporary duty for a week someplace warm. That scenario is

183 Email communication with industry officials, May 9, 2019.

184 Ibid.

185 Email communication with DoD official in CAPE, August 31, 2016.

186 Idrees Ali, "Cost of One of Those 'Expensive' U.S.-South Korea Military Exercises? \$14 Million," *Reuters*, July 6, 2018.

probably over-optimistic given the high stakes involved with reexamining roles and missions. On the other hand, if the undertaking proceeded like the 1986 Goldwater-Nichols DoD Reorganization Act that attempted to suffuse jointness throughout the Pentagon, additional spending would include years of studies, surveys, and process improvements.¹⁸⁷

Given the uncertainty about how a roles and missions reassessment would proceed, along with the fractious politics involved, DoD and Congress could follow the standard move of establishing a blue-ribbon commission. That option entails a calculable cost. To cite a recent example, the FY 2017 NDAA provided \$5 million to fund the National Defense Strategy Commission.¹⁸⁸ Using that figure as a benchmark, reexamining Service roles and missions through a commission would require \$5 million in additional funds through 2024. Any required DoD analysis activities could be funded from the \$20 million reserved for turning Inside-Out into a joint operational concept (see above).

Conclusion

Longer-term costs for a strategy of Maritime Pressure could greatly exceed the \$8–13 billion outlined here, potentially reaching \$30 billion or more based on the precedent offered by the Army’s modularity initiative discussed above.¹⁸⁹ In the most far-reaching case, DoD could reorganize, reequip, and recombine portions of all four Services to optimize their preparedness for dispersed, distributed operations. Yet that change represents only the tip of the iceberg in terms of transforming how the U.S. military operates in the Western Pacific. This report does not attempt to estimate the long-term costs of reorganizing the U.S. military given the uncertainty involved. However, the authors hope that this study, by outlining illustrative near-term costs, has conveyed a better sense of what it will take to answer the China challenge in the Western Pacific.

¹⁸⁷ For years after Goldwater-Nichols’s passage, DoD’s annual reports to Congress detailed implementation activities. See DoD, *Fiscal Year 1989 Annual Report to the Congress* (Washington, DC: DoD, February 18, 1988), pp. 154–156. Unfortunately, the reports did not include implementation cost figures. DoD’s historical justification books may contain that data, allowing analysts to calculate how much DoD spent both preparing for and implementing Goldwater-Nichols. One previous study identified the need for such cost research but did not conduct it in any detail. Robert P. Kozloski, “Building the Purple Ford: An Affordable Approach to Jointness,” *Naval War College Review* 65, no. 4, Autumn 2012, pp. 41–63.

¹⁸⁸ National Defense Authorization Act for Fiscal Year 2017, Public Law 114-328, December 23, 2016, p. 2369.

¹⁸⁹ A DoD official independently corroborated longer-term costs exceeding \$30 billion in an interview on November 20, 2018.

CHAPTER 5

Next Steps

As a strategy of deterrence by denial, Maritime Pressure aims to persuade the Chinese leadership that attempting to achieve gains through aggression will cost it dearly and likely fail. The strategy's proposed operational concept, Inside-Out, serves as a point of departure for a vigorous program of experimentation to inform major shifts in investment and force structure toward forces and capabilities that can mitigate the challenges facing the U.S. military and impose challenges upon China and its military.

In summary, DoD should pursue the following actions to begin implementing a strategy of Maritime Pressure in the Western Pacific:

- Develop this report's approach into a joint operational concept;
- Experiment with new organizational structures for ground forces in the Pacific;
- Develop sustainment concepts to support a Maritime Pressure strategy;
- Accelerate fielding of mobile, land-based, long-range missile capabilities;
- Build a resilient multi-domain C4ISR architecture and develop and field counter-C4ISR capabilities;
- Integrate all bomber aircraft with payloads for offensive maritime missions;
- Deepen cooperation with Indo-Pacific allies and partners; and
- Reexamine Service roles and missions.

While this report covered a wide range of topics, several issues and questions fell outside its scope. Future research efforts should explore the following areas in greater detail:

- Identifying areas for reducing U.S. military investment in line with new operational concepts such as Inside-Out (the report makes no specific recommendations on this

score but suggests at several points that it is worth exploring spending less on legacy forces unsuited to contested environments);

- Conducting an in-depth theater posture review of the Western Pacific to assess how the U.S. military might conduct future distributed operations;
- Studying how emerging C2 and battle management architectures and associated technologies could enable new concepts for distributed operations and multi-domain operations;
- Analyzing potential Chinese reactions to U.S. and coalition strategies; and
- Examining the strengths and vulnerabilities of allied and partner militaries vis-à-vis China.

LIST OF ACRONYMS

A2/AD	anti-access/area denial
AESA	active electronically scanned array radar
ASBM	anti-ship ballistic missile
ASCM	anti-ship cruise missile
ASW	anti-submarine warfare
ATACMS	Army Tactical Missile System
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
CCD	camouflage, concealment, and deception
CCP	Chinese Communist Party
CONUS	continental United States
DFSP	Defense Fuel Support Point
DMO	Distributed Maritime Operations
DoD	Department of Defense
DSB	Defense Science Board
ECS	East China Sea
EPF	Expeditionary Fast Transport ship
FFG-X	future frigate
GMLRS-ER	Guided Multiple-Launch Rocket System - Extended Range
HHC	headquarters and headquarters company
HIMARS	High-Mobility Artillery Rocket System
I2CEWS	Intelligence, Information, Cyber, Electronic Warfare, and Space battalion
IAMD	integrated air and missile defense
IBCS	Integrated Air and Missile Defense Battle Command System
IFPC	Indirect Fire Protection Capability
INF	Intermediate-Range Nuclear Forces Treaty
km	kilometers
LEO	low earth orbit
LPI/LPD	low probability of intercept/detection
LRASM	Long-Range Anti-Ship Missile
MDC2	Multi-Domain Command and Control
MDO	Multi-Domain Operations
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit
MOC	Marine Corps Operating Concept
MSHORAD	maneuver short-range air defense
nm	nautical miles
NPDG	National Defense Program Guidelines

NSM	Naval Strike Missile
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
PLAN	People's Liberation Army Navy
PNA	Philippine Navy
PrSM	Precision Strike Missile
RAAF	Royal Australian Air Force
RF	radio frequency
RIMPAC	Rim of the Pacific Exercise
SCS	South China Sea
SHORAD	short-range air defense
SLRC	Strategic Long-Range Cannon
UAS	unmanned areial system
UUV	unmanned underwater vehicle
VLS	Vertical Launch System



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