



# Smarter Power, Stronger Partners, Volume I

Exploiting U.S. Advantages  
to Prevent Aggression

Terrence K. Kelly, David C. Gompert, Duncan Long

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## Preface

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Current U.S. global strategy depends on the capability to project offensive force to distant theaters. However, the proliferation of anti-access and area denial (A2AD) capabilities threatens to undermine this strategy of offensive force projection. The project reported on here—“Changes in Power, Strategy and Capabilities”—set out to examine the effects of trends in military capabilities among potential U.S. competitors and propose an alternative way for the United States (and particularly for the U.S. Army) to use force, if needed, around the world.

This report is the first in a two-volume series. It examines the motivations, technology, and economics behind the adoption of A2AD capabilities; considers why A2AD is so difficult and costly to counter and whether the erosion of U.S. force-projection capabilities is inexorable; and assesses how long the United States has to respond or adjust to these changes. A companion report, *Smarter Power, Stronger Partners*, Vol. II: *Trends in Force Projection Against Potential Adversaries*,<sup>1</sup> features a set of warfighting scenarios that support the general analysis presented here.

Although the sponsor for this study was the U.S. Army, the authors also sought to inform a broader audience of policymakers who will need to understand and wrestle with the implications of the changing global security context that will drive U.S. strategy.

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<sup>1</sup> Duncan Long, Terrence K. Kelly, and David C. Gompert, *Smarter Power, Stronger Partners*, Vol. II: *Trends in Force Projection Against Potential Adversaries*, Santa Monica, Calif.: RAND Corporation, RR-1359/1-A, in production.

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# Summary

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## Introduction

Since becoming the world's sole superpower toward the end of the Cold War, the United States has used force offensively more or less wherever and whenever it chose to do so. It has removed undesirable regimes, occupied hostile nations, intervened in civil wars, ended mass killings, destroyed enemy war-making capacity, and otherwise imposed its will.

In the future, however, projecting force will entail heightened costs and risks, especially in critical and contested regions—against China in the western Pacific, Russia in eastern Europe, and Iran around the Persian Gulf—owing to improved anti-access and area denial (A2AD) capabilities enabled by the spread of technologies that permit targeting of traditional military platforms. This effect is most pronounced in the case of China and the western Pacific, where U.S. surface naval forces and air bases are increasingly vulnerable. Of the three potential adversaries, China has by far the greatest economic and technological capacity to raise the costs and risks of U.S. force projection. However, if Russia somehow managed to revive its slumping economy and menace ex-Soviet states in its European near abroad, it could also enhance its A2AD capabilities to check the North Atlantic Treaty Organization's (NATO's) response. Iran is and will remain a distant third in the ability to oppose projected forces, but its ability to strike soft but important targets in and around the Persian Gulf in reaction to U.S. threats will improve.

If these trends continue, so will the danger that U.S. adversaries will use A2AD as a shield behind which they can commit aggression.

In the China and Russia cases especially, such A2AD capabilities as advanced long-range air defenses; accurate, precision-guided ballistic and cruise missiles; submarines; extended-range sensors; and digitized command and control (C2) could delay and degrade intervening U.S. ground, naval, and air forces, allowing overwater or overland invasion of neighboring states. However unlikely war with China, Russia, or Iran might be, the declining ability of the United States to bring forces to bear in these regions and against these countries could have deleterious geostrategic consequences. U.S. deterrence would be eroded. Regional states, including U.S. partners and allies, could become more exposed to intimidation, which could, in turn, affect their freedom of action and even their alignment. Ultimately, adversaries could gain a degree of hegemony in regions of critical interest to the United States if they can project force behind their A2AD shields, while keeping U.S. forces out of the region by increasing risk to an unacceptable level.

## Objectives and Approach

The study on which this document reports—“Changes in Power, Strategy and Capabilities”—set out to examine the effects of these trends in military capabilities among potential U.S. competitors and propose an alternative way for the United States (and particularly for the U.S. Army) to use force, if needed, around the world. Specifically, it examines the motivations, technology, and economics behind the adoption of A2AD capabilities; considers why A2AD is so difficult and costly to counter and whether the erosion of U.S. force-projection capabilities is inexorable; and examines the trends that will determine how long United States has to respond or adjust to these changes. Specifically, it uses case studies to look at the challenges of force projection versus A2AD in 2015 and in 2025 to examine how the problem might change over a decade. Using these analyses, it then presents options for new military strategies and assesses how they might perform against expected advances in enemy A2AD capabilities and makes recommendations for change. A companion report, *Smarter Power, Stronger Part-*

ners, Vol. II: *Trends in Force Projection Against Potential Adversaries*,<sup>1</sup> presents in detail the set of warfighting scenarios that support the general analysis presented here.

## Challenges That Anti-Access and Area Denial Pose for U.S. Force Projection

When it comes to the challenges A2AD poses relative to force projections, we found that A2AD has certain basic advantages over force projection that work against the United States:

- Operationally, projected forces must gain *control* to be able to operate freely and prevail in a conflict. In contrast, A2AD needs only to *deny* such control, which can be less demanding.
- The technologies needed to locate, track, and target high-value weapon platforms, such as ships and aircraft, are increasingly available and inexpensive. While targeting technologies are also used in force projection, their advantages are more pronounced in A2AD, which is concerned mainly with finding, tracking, and striking weapon platforms operating in open seas and skies (rather than defensive platforms hidden in cluttered terrain). Moreover, many improvements in A2AD technologies have been continuous and rapid because they rely heavily on technologies that are developed largely for civilian markets, such as information technology and global positioning; in contrast, improvements in force projection are more likely to require entirely new platforms or technologies because they require capabilities, such as stealth, to evade improving A2AD weapons. There is, of course, significant overlap between these categories of systems.
- A2AD capabilities are located mainly on a defender's homeland and in its littoral waters, whereas force projection requires moving platforms—often over great distances—and forcibly entering the

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<sup>1</sup> Duncan Long, Terrence K. Kelly, and David C. Gompert, *Smarter Power, Stronger Partners*, Vol. II: *Trends in Force Projection Against Potential Adversaries*, Santa Monica, Calif.: RAND Corporation, RR-1359/1-A, in production.

defender's land, air, or littoral space. Hence, A2AD forces are more able to absorb losses, exploit internal lines of communication, and keep or readily move forces into position. U.S. forces, logistics, and communication platforms must usually operate thousands of miles from home.

- A2AD is significantly cheaper overall than platform-based force projection. A2AD weapons cost, on average, a small fraction of the cost of the platforms they are designed to strike, particularly missiles that target U.S. ships, aircraft, and bases. For U.S. force projection, the disadvantage is growing as the costs of U.S. ships and aircraft continue to climb faster than the costs of A2AD systems. These trends help explain why enemy A2AD is steadily improving relative to U.S. force-projection capabilities.

With respect to challenges that potential A2AD threats pose to the United States, we found that east Asia poses the greatest technical concern: Although China is not an outright U.S. adversary, its A2AD capabilities are already significant and steadily improving, thanks to the country's astounding economic and technological development. China's antisurface and anti-air missiles and attack submarines (SSNs) are shifting the odds in its favor in the event of hostilities with U.S. forces near China. Russia, though in economic decline and technologically inferior to China, could also exploit geographic advantages and niche A2AD capabilities, such as integrated air defense (IAD) and land-based antiship missiles. Although Iran is far less capable of A2AD than China or Russia and is no match for U.S. forces, focused investment could make it a more challenging adversary, and it also has the option of responding to U.S. strikes by attacking soft targets, e.g., shipping, oil production, and Arab populations in and around the Persian Gulf. In sum, while the greatest A2AD challenge to U.S. forces and interests is in the western Pacific, the problem stems from deep technical and economic trends and could increase in all three critical and contested regions.

## Potential Options to Respond to Anti-Access and Area Denial Challenges to Force Projection

The United States could adopt any number of responses to the A2AD problem. One proposed approach is to rely on destroying an adversary's A2AD capability by "killing the kill chain" through early, deep kinetic and cyberstrikes on key elements of an adversary's command, control, communication, computers, intelligence, surveillance, and reconnaissance (C4ISR) and weapon systems, which are mainly homeland-based. However attractive this option might be on purely military-operational grounds, it could increase risks of crisis instability, preemption, and escalation.

Alternatively, the United States could try to preserve its force-projection capability by improving force *protection*. However, familiar technologies—such as hit-to-kill (HTK) ballistic-missile defense (BMD), acoustic submarine detection, and stealthy aircraft—offer marginal improvements, at best, against large missile salvos, advanced conventional submarines, and combinations of low-frequency air-defense radars, improved infrared search arrays, and fifth-generation interceptor aircraft. The United States could intensify research and development, focusing on unproven but high-potential force-protection technologies, such as drone-supported laser missile defense and non-acoustic submarine detection. However, even if these new technologies prove fruitful, they are unlikely to have practical value in time to counter the increasing A2AD problem and its effects.

The United States could also shift toward very long-range conventional strike weapons, based beyond the reach of regional A2AD. However, these capabilities are very costly and would contribute little to allied confidence, U.S. influence, or regional stability. Adversaries could also perceive them as strategic, which could then elevate the risks of miscalculation and escalation.

Yet another approach is for the United States to rely less on kinetic warfare and more on cyberwarfare. However, U.S. forces and intelligence agencies—not to mention U.S. critical infrastructure, public services, industry, and commerce—are highly dependent on computers. This interconnectedness would mean serious risks of enemy retaliation

and escalation of cyberwar into nonmilitary spheres. The United States should be unsurpassed in its ability to wage cyberwarfare but should not rely on it to offset the decline of its ability to defeat A2AD and to project force.

A more attractive option would involve shifting to less vulnerable platforms: drones, large numbers of distributed low-cost platforms (including drone launchers), submarines, and dispersed bases and force-flows. Although feasible with proven technologies and well worth pursuing, this option would require large and sustained investments, industrial adaptation, and force-structure changes; thus, this option would take many years to complete, while the A2AD problem would continue to grow and endanger U.S. interests.

## **An Integrated Option to Address the Anti-Access and Area Denial Challenges**

Because the ability to project offensive force has been the linchpin of U.S. global security strategy since the end of the Cold War, the decline of that ability warrants reconsideration of why and how the United States uses its sustainable advantages to support its interests, responsibilities, and values. In this regard, we find that the United States can and must recast and enhance its strategy as one of *power projection*, not just force projection, while concentrating militarily on preventing enemies from projecting force under the shield of their A2AD—in brief, a concept that entails exploiting U.S. advantages for the main purpose of preventing international aggression. Such an approach would be based on enduring U.S. advantages in developing and applying new technologies, in synchronizing operations across multiple domains, in maintaining and cooperating with capable partners, and in using non-military capabilities to isolate and coerce aggressors—advantages that become more important as the costs and risks of U.S. force projection grow.

Specifically, we propose a multipronged strategy to exploit U.S. advantages to prevent aggression:

- Use Blue (i.e., U.S., allied, or coalition) A2AD to significantly increase the costs and risks for would-be regional aggressors as the central pillar of the strategy.
- Do so in cooperation with willing partners, some of which will need assistance to develop and use Blue A2AD capabilities.
- Use “power to coerce” (P2C) to deter regional intimidation and low-grade aggression by imposing costs on those that threaten U.S. and allied interests.

For U.S. military strategy, *Blue A2AD* is less a revolution than a reorientation—a different way of thinking about the main principles, purposes, and requirements of using force. As it is, no state, not even China, can match the U.S. ability to sense, target, and strike opposing forces, which is the technical heart of A2AD (though other capabilities might also be critical). The United States excels in most of the technologies, systems, operational processes, and personnel with the requisite skills that underpin effective A2AD: space-based and other extended-range sensors; target identification and tracking; precision guidance; IAD; data networking, fusion, and processing; and integrated C2. The United States also has growing drone, antisatellite weapon, and cyberwarfare capabilities, all of which can be important in Blue A2AD.

The potential contribution of *U.S. partners* to Blue A2AD should not be underestimated. To illustrate, many east Asian nations possess antiship cruise missiles and could supplement them with short-range ballistic missiles, yet they have limited capabilities to find and track targets at those distances. If integrated with U.S. long-range intelligence, surveillance, and reconnaissance (ISR) and advanced C2 assets, they could pose a significant threat to enemy overwater offensive force projection. Not only would such capabilities provide the United States and its partners with operational advantages; they would also enhance deterrence and, assuming that the capabilities are survivable, crisis stability, because they are inherently defensive.

*P2C* can include economic sanctions; support for prodemocracy opposition movements; and other efforts to isolate, pressure, and penalize belligerent states. With its central position in global markets, systems, and services, the United States is well placed to use coercive measures to a greater extent than it has, especially with offensive force becoming harder to employ. Being dependent on access to these same markets, systems, and services, Russia, Iran, and other potential opponents are susceptible to coercion.

Some implications of this strategy include that the United States should sustain and exploit its superiority in the technologies that enable superior A2AD, especially targeting; work with its partners to upgrade and focus their defense capabilities on Blue A2AD as a common bulwark against regional aggression; and use *P2C* to deny adversaries access to financial markets and impose costs by other means of economic isolation and support to democratic opposition groups. Hand in hand with this strategy, the United States should place higher priority on more-survivable military systems, such as submarines and drones (including diverse drone carrier-launchers), and on achieving breakthroughs in technologies that could diminish the effectiveness of regional aggression under the cover of A2AD, such as non-HTK BMD, nonacoustic antisubmarine warfare (ASW), and non-HTK antisatellite weapons.

A U.S. strategy that focuses militarily on preventing aggression and relies more on partners and nonmilitary power would be a major shift from the heavy reliance on offensive force of the period from 1989 to 2015. It is, to be clear, a more defensive global military posture that recognizes the geopolitical status quo as fundamentally beneficial to the United States and relies primarily on nonmilitary means to effect changes in the world order that might be advantageous. Specifically, with more-capable partners and more-effective nonmilitary coercive power, the United States can afford to concentrate its military power on preventing adversaries in critical regions from altering the status quo by projecting force under the shield of A2AD. Importantly, a more defensive and survivable military posture would not mean a diminution of U.S. engagement and influence in these regions. Rather, it would mean a shift in how the United States engages and influences, exploiting

the full range of its advantages as offensive force projection becomes less “usable.” Finally, this strategy would exploit the trends that favor A2AD rather than resisting them as current strategy does. In sum, it is politically, technologically, and economically superior and sustainable.

## **Assessing the Integrated Strategy**

If the strategy outlined here is indeed better than current U.S. approaches, this should be apparent in considering how well the United States could fare in future crises and conflicts. For this purpose, we assessed expected outcomes based on today’s U.S. force-projection strategy (“base case”) against outcomes achievable if the United States were to adopt the proposed integrated strategy to exploit its advantages to prevent aggression (“new case”). Measured against key criteria—feasibility, effectiveness, sustainability, risk, and cost—and potential adversaries—China, Russia, and Iran—the three-pronged strategy suggested here compares favorably to maintaining the current U.S. strategy.

Specifically, we find that the United States could expect major improvements in effectiveness with some improvement in risk and cost under the proposed strategy. By embracing rather than resisting technological and economic trends that favor A2AD over force projection, the United States can prevent adversaries from using their A2AD as a shield under which to commit aggression. Put another way, if the United States were to exploit its advantages more comprehensively, including through partnerships and P2C, it is bound to perform better than it would if it relied inordinately on offensive force projection, the efficacy of which is in decline. However, the proposed strategy is no panacea. The transition costs could be significant, especially those to fill Blue A2AD gaps, improve survivability, and develop new technologies. At the same time, the eventual steady-state cost of this strategy could be lower than the cost of maintaining, upgrading, and protecting legacy platforms. Moreover, U.S. costs can be offset to the extent that partners invest in A2AD.

The strategy proposed here does not provide the United States with the same degree of confidence in the use of offensive force that it has enjoyed since the end of the Cold War. This is likely a necessary trade-off: Focusing on preventing enemy force projection could leave the United States less able to compel regimes to comply with its demands, to intervene in internal conflicts, to facilitate regime change, or to destroy potentially threatening military capabilities. However, three factors mitigate this shortcoming. First, the main U.S. interest in each contested region is to prevent changes in the status quo by aggression. Second, A2AD is already eroding the ability of the United States to use force for reasons other than to prevent aggression. Third, the United States could use P2C to weaken the will or ability of hostile states to intimidate neighbors and to increase the costs of attempting to do so.

The proposed integrated strategy would likely work better against Russia and Iran than against China. China already has or will soon have world-class A2AD; force projection; and military-technological capacity, defense resources, and cyberpower. It will also be the hardest to coerce by nonmilitary means, given its importance to the world economy. However, here, too, several factors offset the strategy's shortcomings. First, U.S. allies in east Asia are more predisposed than other U.S. allies to increase their defense contributions. Japan, especially, has the capacity and inclination to play a larger role in regional security. Second, Chinese force projection would require crossing water (with certain exceptions, such as an attack on Vietnam or the Korean peninsula), exposing it to the Blue A2AD of the United States and its regional partners. Third, there are more important avenues for cooperation with China than with Russia or Iran. Chinese and U.S. interests might be at odds in the western Pacific, but economic interdependence has reached the point at which most Chinese and U.S. leaders believe that cooperation is worth pursuing at the global level. Therefore, while it is technologically, economically, and militarily stronger than Russia or Iran, China has a greater stake in avoiding conflict, especially with the United States.

We also looked at how the proposed strategy compared with the status quo for specific scenarios in the three countries. We drew the

scenarios from the companion volume mentioned above,<sup>2</sup> in which we assumed no changes to U.S. strategy or projected capabilities in 2025. Specifically, this involved four conflict scenarios: the United States versus China in Taiwan and South China Sea (SCS) scenarios; NATO versus Russia in an Estonia scenario; and the United States versus Iran in a Strait of Hormuz scenario. For the analysis presented in this volume, we assume that the new integrated strategy is adopted now and implemented expeditiously. It includes enhanced capabilities absent or not emphasized in the base case: survivable U.S. A2AD, partners' contributions to Blue A2AD, and P2C. While we obviously cannot be confident that the strategy's prescribed capabilities will all be in place by 2025—for example, those requiring new platforms or technological breakthroughs—we assume that substantial progress will be made on all aspects of the strategy. This includes a positive response of partners to U.S. inducements to more actively contribute to their own defense using Blue A2AD concepts, as well as help to acquire complementary defense capabilities. But we do not assume breakthroughs in game-changing technologies, such as non-HTK BMD or ASW.

Table S.1 presents our expected outcomes based on today's U.S. force-projection strategy (base case) with outcomes achievable if the United States were to adopt the proposed integrated strategy to exploit its advantages in order to prevent aggression (new case).

All scenarios compare favorably under the recommended strategy, owing to a combination of enhanced Blue A2AD, more-capable partners, and strategic use of P2C. The most problematic scenario, as could be expected, is a Chinese threat to Taiwan. This conflict might require at least limited strikes on Chinese territory, land warfare on Taiwan, and offensive cyberoperations. Yet the Blue force's ability to deny China use of the air or sea improves even that case. The scenarios also show the disadvantages of one-sided A2AD; mutual A2AD is the better environment for the United States to project power (as opposed to just force) and prevent aggression.

The Russia case for 2025 assumes that Moscow will maintain recent increases in military spending and modernization. This has

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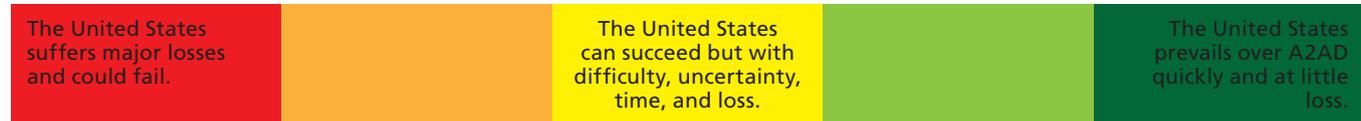
<sup>2</sup> Long, Kelly, and Gompert, in production.

**Table S.1  
Proposed Integrated Strategy Versus Current U.S. Strategy in Four Conflict Scenarios**

Scenario	Base Case	New Case		
United States versus China in Taiwan, 2025	<ul style="list-style-type: none"> <li>• U.S. air bases and major surface combatants are at serious risk from Chinese long-range strike.</li> <li>• Chinese IADSs pose significant challenges to U.S. aircraft attempting to interrupt the kill chain by hitting ISR and C2 nodes.</li> <li>• The United States receives basing access from Japan but little additional materiel support from regional allies in penetrating or degrading China's A2AD.</li> <li>• Chinese surface assets prosecuting the blockade are held at significant risk, especially by U.S. submarines.</li> <li>• U.S. cyberoperations will degrade Chinese C4ISR and support systems.</li> <li>• The conflict culminates when U.S. attacks on the Chinese mainland prompt a response against early-warning radar in Alaska and space targets, raising an immediate danger of nuclear escalation.</li> <li>• The blockade is lifted but at high cost.</li> </ul>	<ul style="list-style-type: none"> <li>• Mutual A2AD prevails, working to the disadvantage of Chinese naval and air control.</li> <li>• Despite the vulnerability of U.S. carriers, surface combatants, and regional air bases to Chinese submarines and missiles, the Chinese surface fleet will be very vulnerable to expanded Blue submarine forces, missiles, and drones.</li> <li>• Chinese IAD will be unable to defeat Blue drone-augmented airpower.</li> <li>• Japan will make major contributions to Blue ISR and conventional submarines.</li> <li>• U.S. cyberoperations will hold at risk and, if needed, degrade Chinese C4ISR and support systems.</li> <li>• A blockade cannot succeed without a survivable Chinese fleet.</li> <li>• Blue kinetic attacks on the Chinese mainland are minimized, limiting the risk of escalation.</li> <li>• Blue prevails despite costs.</li> </ul>		
The United States suffers major losses and could fail.		The United States can succeed but with difficulty, uncertainty, time, and loss.		The United States prevails over A2AD quickly and at little loss.

**Table S.1—Continued**

Scenario	Base Case	New Case
United States versus China in the SCS, 2025	<ul style="list-style-type: none"> <li>• U.S. air bases and major surface combatants are at risk from Chinese long-range strike. The distance of the area of operations from the Chinese mainland mitigates U.S. risk.</li> <li>• Chinese long-range strike is sufficiently effective to require strikes on the mainland, raising the danger of escalation.</li> <li>• U.S. Air Force flying from bases in Philippines and Guam, carrier-based aircraft, and submarines deplete the Chinese surface combatants needed to seize and hold contested islands. Chinese ships operate outside the mainland-based IADS or counterair shield.</li> <li>• Escalatory fears lead to a cease-fire. China’s conflict objectives are decisively denied, but China retains the capability to contest the SCS.</li> <li>• Blue prevails at modest cost.</li> </ul>	<ul style="list-style-type: none"> <li>• Chinese action is interpreted as the start of a campaign to take control of the SCS. Vietnam, Singapore, and Malaysia side militarily with the United States and the Philippines.</li> <li>• Mutual sea denial prevails. Despite the vulnerability of U.S. carriers and surface combatants to Chinese submarines and missiles, the Chinese fleet is vulnerable to nuclear and partners’ conventional submarines and missiles.</li> <li>• U.S. cyberoperations degrade Chinese operations.</li> <li>• Even with its enhanced AZAD, China is left with no way to seize islands.</li> <li>• Blue prevails at little cost.</li> <li>• Blue kinetic attacks on China are minimized, limiting the risk of escalation.</li> </ul>



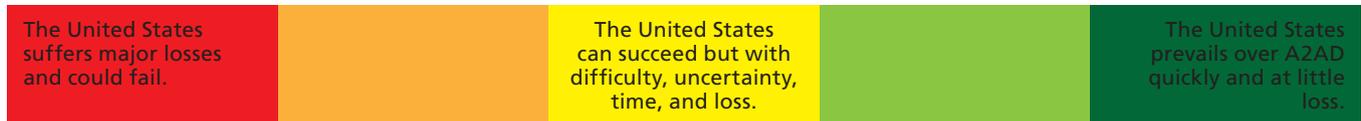
**Table S.1—Continued**

Scenario	Base Case	New Case		
<p>NATO versus Russia in Estonia, 2025</p>	<ul style="list-style-type: none"> <li>• NATO forces cannot respond in time to prevent Russia from overrunning objectives in Estonia.</li> <li>• The Russian IADS provides a protective shield over forces in Estonia. NATO air forces strike numerous targets in Kaliningrad and Russia proper to lift the shield.</li> <li>• Ballistic missiles directed at air bases and transit hubs impose costs on and delay the NATO response.</li> <li>• Major NATO ground forces, centered on U.S. Army units arriving from the continental United States, are eventually introduced to Poland. They march on the Baltics and lead to a Russian retreat before a decisive engagement.</li> </ul>	<ul style="list-style-type: none"> <li>• U.S.–NATO P2C sanctions and isolation worsen Russia’s weak economy (even as aggression proceeds).</li> <li>• Diverse LNG supplies weaken Russian leverage over the European Union (though this cannot happen quickly).</li> <li>• Germany, Poland, and others partner up with ground, air, and missile forces.</li> <li>• Russian IAD extended over Estonia is defeated by U.S.–NATO drone-manned airpower, leaving Russian invasion forces exposed.</li> <li>• U.S.–NATO short-range ballistic missiles and countermeasures, if deployed in time, increase the vulnerability of the Russian IADS and invasion forces.</li> <li>• U.S. cyberoperations will degrade Russian operations.</li> <li>• Blue avoids or minimizes kinetic attacks on Russia proper.</li> <li>• NATO’s posture to deter Russian aggression improves.</li> <li>• Conditions exist for successful U.S. and NATO ground-force operations against Russian invasion forces.</li> </ul>		
<p>The United States suffers major losses and could fail.</p>		<p>The United States can succeed but with difficulty, uncertainty, time, and loss.</p>		<p>The United States prevails over AZAD quickly and at little loss.</p>

**Table S.1—Continued**

Scenario	Base Case	New Case
United States versus Iran in the Strait of Hormuz, 2025	<ul style="list-style-type: none"> <li>• Iran threatens the Persian Gulf states and U.S. air bases with ballistic missiles and shipping with cruise missiles.</li> <li>• U.S. air forces can largely suppress Iranian IADS but, despite significant airborne effort, cannot defeat the missile threat.</li> <li>• An extensive bombing campaign, economic isolation, threat of ground invasion, and demonstration of the U.S. Navy’s ability to transit the Strait of Hormuz eventually compel Iran to abandon the effort to close the strait.</li> </ul>	<ul style="list-style-type: none"> <li>• The availability of diverse non–Persian Gulf oil and LNG sources cushions the effect of the Iranian threat to Persian Gulf oil production and shipping.</li> <li>• Isolation of the Iranian economy, including energy, creates extreme hardship and unrest.</li> <li>• U.S. HTK and non-HTK missile defense degrades the Iranian missile threat.</li> <li>• The drone–manned mix overwhelms Iranian IAD.</li> <li>• Cyberattacks paralyze Iranian military C4ISR and political control.</li> <li>• P2C support for regime opponents creates growing internal distraction.</li> <li>• Blue minimizes kinetic attacks on Iran, reducing the chance of escalation.</li> <li>• Iran launches but cannot sustain proxy threats in the region.</li> </ul>

NOTE: IADS = IAD system. LNG = liquefied natural gas.



become highly improbable if not implausible: Because the world-market price of oil is now at or below Russia's oil-production cost, state revenues and reserves are in free fall. Barring oil and gas prices staging an unexpected large recovery in the coming years, the Russia scenario can be viewed as worst case.

## **Implications of the Strategy for the U.S. Army**

The Army would have a major role in implementing a U.S. strategy to prevent aggression, provided that it has the right concepts, capabilities, and capacity to do so. For Blue A2AD, the Army could provide extended-range IAD; a suite of surface-to-surface missiles (SSMs) and (perhaps) antiship missiles; an arsenal of drones to help with C4ISR; and, possibly, strike options to defeat projected forces. For IAD to be adequate against modern missile threats in particular, research and development into non-HTK technologies that could provide significant advances over current systems are critically important.

The Army could also prioritize the improvement of partners' A2AD capabilities and the interoperability of these systems. The Army's emphasis on Blue A2AD and cooperating with partners would also need to be reflected in its institutional and battlefield operating systems. In particular, its major operational headquarters would need to be able to plan for and perform operations unlike those it has performed in recent years—major combat and A2AD operations.

Because the Army cannot be forward positioned in every region of the world that might be threatened and because moving large Army formations takes time and has real risks if the foe has significant A2AD capabilities (e.g., the sinking of troop and supply ships en route), prepositioning of key equipment sets and munitions would be critically important.

Because Blue A2AD could diminish but not remove the need to defeat an enemy invasion force on a partner's territory, because being able to defeat such invasions would create a salutary deterrent effect, and because the United States could have a critical and sizable role in

doing so, the Army will continue to need a diverse set of maneuver forces (from heavy to special operations).

## Recommendations

As the United States plans for future contingencies and operational needs under constrained budgets, it will need to look toward cost-effective solutions that will maintain or improve the capabilities of U.S. forces while utilizing them efficiently.

To facilitate a transition to the proposed integrated strategy focused on preventing aggression and based on enduring U.S. advantages, we propose the following changes to U.S. strategic thinking:

1. Acknowledge that deep trends beyond U.S. control favor A2AD over force projection.
2. Anticipate risks to U.S. interests in east Asia, eastern Europe, and the Middle East.
3. Admit that these trends and risks imply reduced utility of offensive force projection.
4. Reassess sources and forms of U.S. power and how they can be used.
5. Regard the prevention of international aggression as the principal reason to use force, and recognize that meeting these challenges requires asking and answering questions that differ in important ways from those of the past 25 years.<sup>3</sup>
6. Count more on partners, and help develop their capabilities where needed.
7. Enhance and strategically use nonmilitary powers of coercion.

Building on these shifts in political–military approach, the U.S. Department of Defense would benefit from pursuing the following initiatives:

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<sup>3</sup> We note in particular that preventing aggression has been a principal pillar of U.S. policy in east Asia for decades, particularly in regard to threats to the Republic of Korea and Taiwan.

1. Identify the approaches and forces needed to counter aggression in each area in which U.S. interests are threatened.
2. Invest in key U.S. Blue A2AD capabilities, with special attention to land- and sea-based short- and medium-range missiles, mobile missile launchers, extended-range rocket systems and air defense, diverse drone carrier-launchers, submarines, and cyber-resilience.
3. Encourage regional partners to concentrate on complementary A2AD capabilities, including short-range missiles, long-range rocket launchers, drones, IAD, air-independent propulsion submarines, and special operations forces.
4. Elevate the priority of U.S.–partner bilateral and multilateral military interoperability in all three regions addressed here.
5. Examine how changes to posture help facilitate Blue A2AD.
6. Intensify research and development for technologies that could be advantageous in enhanced A2AD environments, especially non-HTK BMD and nonacoustic ASW.
7. Prioritize planning, preparations, and allied cooperation for P2C options, with a particular emphasis on financial and other economic sanctions.
8. Develop a full set of options for offensive cyberoperations while recognizing that the risks of retaliation and escalation must be weighed in decisions to use them.

The Army would have a key role in the strategy of exploiting U.S. advantages to prevent aggression, and we make the following recommendations:

1. Contribute directly to Blue A2AD with mobile land-based SSMs, longer-range rockets, and extended-range IAD to defeat enemy land, sea, and air force projection.
2. Maintain capable maneuver forces to exploit Blue A2AD and defend partners against overland, overwater, and irregular attacks.
3. Develop and acquire large numbers of drones to augment ISR and A2AD capabilities.

4. Preposition sufficient materiel to enable fast, short-warning deployment to crisis areas.
5. Assist, enable, and interoperate with partners' defense forces.
6. Maintain C4ISR capabilities that are interoperable with or that can, at a minimum, work with joint and partner capabilities.

The Defense Department will also want to closely examine its force structure and system for capabilities that are no longer needed or not needed in the quantities that currently exist in the force. Systems or forces that are particularly vulnerable to advanced A2AD capabilities should be high on the list for consideration for elimination. They might still be able to play important roles in military operations against nations or nonnation threats that do not possess sophisticated A2AD capabilities, but their importance to the national defense should be weighed in light of these findings.

## Further Research Required

This report offers an initial profile of the costs and risks the United States is likely to face in the future as the A2AD threat increases. It also points to several places in which further research and analysis are needed. Before pursuing a new strategy to address future A2AD threats, it will be important to answer the following questions:

1. What types and ranges of theater missiles does the United States need to implement Blue A2AD, and which require Army investment?
2. What tasks must the Army undertake to enhance partners' A2AD capabilities?
3. How does highly capable adversary A2AD affect Army strategic mobility capabilities and intent, including prepositioning?
4. What measures are needed to mitigate the risks of escalation associated with offensive cyberwarfare?
5. What contributions could the Army make to non-HTK BMD and extended-range air defense?

6. What changes to Army leader development are required to ensure that commanders and planners are knowledgeable about the strategic and operational challenges associated with addressing types of threats that U.S. forces and regional allies are likely to confront?

## Acknowledgments

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First, we thank the Army Quadrennial Defense Review Office and, in particular, Timothy Muchmore for sponsoring this work. It builds off a stream of research sponsored by this office that seeks to help the Army—and the nation—look beyond the horizons of the future-years defense program and wrestle with big problems that will materialize in the medium term. Without this office’s sponsorship and guidance, this research would not have been possible.

We also thank current and former RAND colleagues Matthew Carroll, Jerry M. Sollinger, Robert Nurick, and Peter Wilson, who provided invaluable assistance in scenario development. Abby Doll, Caroline Baxter, and James Hoobler all contributed research assistance.

In particular, we also thank those who reviewed this work and provided helpful suggestions and insights: Stuart E. Johnson, Michael Johnson, and a reviewer who asked not to be named.



## Abbreviations

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A2AD	anti-access and area denial
AIP	air-independent propulsion
AO	area of operations
ASAT	antisatellite weapon
ASBM	antiship ballistic missile
ASCM	antiship cruise missile
ASM	antiship missile
ASW	antisubmarine warfare
ATACMS	Army Tactical Missile System
BCT	brigade combat team
BMD	ballistic-missile defense
C2	command and control
C4ISR	command, control, communication, computers, intelligence, surveillance, and reconnaissance
COIN	counterinsurgency
CONUS	continental United States
CVN	nuclear aircraft carrier

DDG	guided-missile destroyer
DoD	U.S. Department of Defense
GCC	Gulf Cooperation Council, common name for the Cooperation Council for the Arab States of the Gulf
GDP	gross domestic product
GPS	Global Positioning System
HTK	hit to kill
IAD	integrated air defense
IADS	integrated air-defense system
ICBM	intercontinental ballistic missile
IISS	International Institute for Strategic Studies
INF	Intermediate-Range Nuclear Forces
IRBM	intermediate-range ballistic missile
ISR	intelligence, surveillance, and reconnaissance
IT	information technology
JTF	joint task force
LNG	liquefied natural gas
MLRS	multiple-launch rocket system
MRBM	medium-range ballistic missile
NATO	North Atlantic Treaty Organization
OTH	over the horizon
P2C	power to coerce
PLA	People's Liberation Army
R&D	research and development

ROK	Republic of Korea
SAM	surface-to-air missile
SCS	South China Sea
SEAD	suppression of enemy air defenses
SIPRI	Stockholm International Peace Research Institute
SRBM	short-range ballistic missile
SSM	surface-to-surface missile
SSN	attack submarine
STP	sensing, targeting, and precision strike
UAV	unmanned aerial vehicle
WMD	weapons of mass destruction



## Introduction

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The study on which this report is based—“Changes in Power, Strategy and Capabilities”—set out to examine trends in military capabilities among potential U.S. competitors and alternative ways for the United States (particularly the U.S. Army) to use force, if needed, around the world. Specifically, the report examines the motivations, technology, and economics behind the adoption of anti-access and area denial (A2AD) capabilities; considers why A2AD is so difficult and costly to counter and whether the erosion of U.S. force-projection capabilities is inexorable; and examines the trends that will determine how long the United States has to respond or adjust to these changes. We use case studies to look at the challenges of force projection versus A2AD in 2015 and in 2025 to examine how the problem could change over a decade. Using these analyses, we then present options for new military strategies and assess how they might perform against expected advances in enemy A2AD capabilities and make recommendations for change. A companion report, *Smarter Power, Stronger Partners*, Vol. II: *Trends in Force Projection Against Potential Adversaries*,<sup>1</sup> presents in detail the set of warfighting scenarios that support the general analysis presented here.

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<sup>1</sup> Duncan Long, Terrence K. Kelly, and David C. Gompert, *Smarter Power, Stronger Partners*, Vol. II: *Trends in Force Projection Against Potential Adversaries*, Santa Monica, Calif.: RAND Corporation, RR-1359/1-A, in production.

## Background

### **The Anti-Access and Area Denial Problem and Its Impact on U.S. Global Force Projection**

Although U.S. forces are still far superior to the forces of any potential adversary, both U.S. forward-based and expeditionary forces are increasingly at risk. Potential adversaries are improving their ability to target forces operating near or against them by exploiting the advance and spread of key technologies, including sensors, global positioning, precision guidance, and data networking and processing. These technologies, in turn, enable potential adversaries to enhance the effectiveness of traditional weapon types and field new capabilities that collectively make up the high-tech elements of A2AD: integrated air defense (IAD), antiship missiles (ASMs), long-range precision ballistic and cruise missiles, antisatellite weapon (ASAT) systems, cyberweapons, long-range sensors, and the ability to use them effectively together. These are just some of the most-important capabilities, and low-tech elements are also important. Many of these technologies can be used in both offensive and defensive modes.

Although the United States retains an edge in them, such technologies are well suited to defending against the conspicuous strike platforms, such as surface ships and manned aircraft, on which U.S. offensive force projection depends. Thus, the mere fact that the United States retains this technological lead does not translate into the ability to defeat A2AD. Some of these capabilities can hit U.S. and allied targets at extended ranges. Motivated by fear of U.S. attack or by desire to be able to use force aggressively while reducing the fear of U.S. intervention, potential adversaries are acquiring A2AD capabilities, including ballistic and cruise missiles, advanced air-defense systems, and submarines, all enabled by extended-range command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR). Thus, states that are otherwise militarily inferior to the United States will be better able to oppose U.S. force projection and significantly increase the risk to U.S. forces operating against them. *Vulnerability* has crept back into the U.S. military vocabulary. There

is growing consensus that something must be done to prevent A2AD from limiting U.S. military options and harming U.S. interests.

### **The Strategic Origins and Implications of the Anti-Access and Area Denial Problem**

The A2AD problem is not new. Soon after Operation Desert Storm in 1991, U.S. military planners became concerned that regional aggressors, having watched the lopsided victory over Iraq, would invest in capabilities to increase U.S. costs and casualties, such as IAD; surface-to-surface missiles (SSMs) and rockets; mines and swarming gunboats; submarines; and chemical, biological, and even nuclear weapons. This prompted a move to “transform” U.S. forces to take advantage of breakthroughs in technology, especially information technology (IT). Computing power, data networking, sensing, and worldwide communications collectively permitted fast and decisive integrated operations regardless of distance.

Some states with reason to worry about U.S. force projection began developing A2AD capabilities in earnest. Still, by enhancing its strike power and precision, air mobility, and networking of joint forces in the ensuing two decades, the U.S. military was able not only to maintain its force-projection capability but also to improve it, despite the growth of A2AD.<sup>2</sup> The pace of U.S. gains against A2AD slowed during the post-9/11 period, despite huge increases in the U.S. defense budget, because the Iraq and Afghanistan conflicts consumed the additional funds and senior-leader attention.

In the background, the pace of A2AD enhancements, especially by China, accelerated during the post-9/11 period. China has the resources and technical capacity to create systems and operational concepts to master the sensing–targeting–precision strike (STP) cycle at distance. In contrast, Iran and North Korea, in the international spot-

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<sup>2</sup> Some of the more important U.S. enhancements and innovations to improve power projection are the expansion of aircraft-carrier strike capacity; the declining costs and expanding stocks of precision-guided munitions, owing to the use of off-board guidance; the strengthening of fast-light ground-force units; “just-in-time” logistics; long-range bombers; cruise missiles; advanced intelligence, surveillance, and reconnaissance (ISR); and network-based joint command and control (C2).

light and seeing themselves as targets (with good reason), have focused more on deterrence options, such as missiles and nuclear weapons, as well as asymmetric threats—a different, but potentially effective, type of A2AD. This particular combination of nuclear weapons and A2AD increasingly presents the United States with the dilemma of how to deter and, should deterrence fail, whether and how to escalate in a conflict. Although U.S. defense spending on force projection dwarfs that of real and potential U.S. adversaries, those potential adversaries have invested in A2AD capabilities of all types as their highest priority. Moreover, as this report explains, improvements in A2AD capabilities have a competitive advantage over improvements in force projection based on traditional platforms, structures, and operating concepts.

These trends raise the question of whether the United States can leapfrog adversary A2AD capabilities technologically, outdo them economically, or outflank them operationally, thus defeating them geostrategically. But, with the diffusion and declining costs of technologies needed to target forces, each incremental improvement in A2AD will get harder and costlier to negate with force projection based on traditional platforms and operating concepts. For reasons discussed later in this report, the *operational return on investment* in A2AD relative to that in force projection seems to be significant and expanding. The United States might be at or past an inflection point at which the edge, or “dominance,” shifts in favor of A2AD, at least for large and sophisticated states that can master the technologies and afford the capabilities.

There is a rising danger that regional adversaries, behind the shield of their A2AD capabilities, will be more able and more tempted to commit local aggression (including restricting access to global commons) while holding U.S. forces at bay. In effect, they would be using an operational defense with A2AD to facilitate strategic offense—i.e., international aggression. As it becomes riskier and more difficult for the United States to project force into a critical region, how can the United States prevent hostile states from projecting offensive force within that same region? The answer to that question is one of the central points of this research.

Our expectation that this problem will grow stems from increased global access to technologies with military utility, especially informa-

tion and global positioning technology, facilitated by commercial trade, investment, and research and development (R&D).<sup>3</sup> Generally speaking, sensors, data communications, Global Positioning System (GPS) guidance, and other capabilities used in targeting are based on technologies that are both increasingly available and, following the trends in the commercial sector, declining in cost. Likewise, A2AD weapons that can exploit such targeting, such as missiles, are more affordable than power-projection platforms, being acquired in growing numbers, and improving in potency. In contrast, the ships and aircraft essential for force projection are increasing in cost.<sup>4</sup> With their costs rising, the numbers of such platforms are declining. The net effect is that fewer U.S. targets could be exposed to growing numbers of weapons that are increasingly capable of striking them. Barring major changes in U.S. forces, there is ample reason to expect these trends to continue.

Figures 1.1 and 1.2 depict trends in the numbers of selected U.S. force-projection platforms and corresponding Chinese A2AD capabilities. Figure 1.1 shows the steady decline in the number of U.S. combat aircraft and ships from 1990 to 2014, with a projection to 2025. We base the aircraft projection on budget data. The illustrative Navy projection reflects the 2000–2014 trend, which is somewhat lower than the current shipbuilding plan, which projects 317 ships in 2025 (as compared with 288 in 2014).<sup>5</sup> Figure 1.2 shows that numbers of Chinese ballistic missiles and modern submarines are growing and will continue to grow. Although these particular systems are not China's

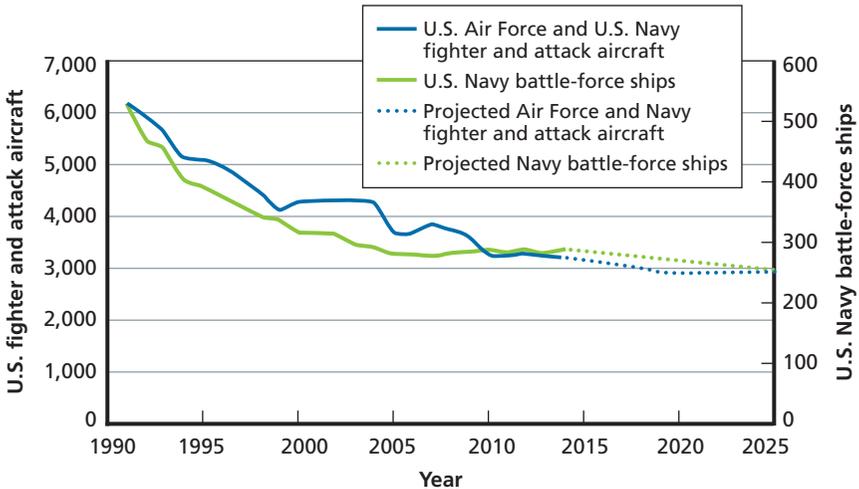
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<sup>3</sup> Some of these technologies are dual purpose, if not fundamentally civilian and commercial, which makes efforts to control their spread much more difficult than, say, weapon systems.

<sup>4</sup> We note that some of these weapon systems, such as missiles and submarines, are used in both A2AD and force projection. However, force projection requires other types of systems, such as aircraft carriers, stealth fighters and long-range bombers, and amphibious shipping, the cost of which is substantial. Furthermore, even for systems common to both A2AD and force projection, the cost of operations far from home is often substantially more than at home. We explore these issues more thoroughly in this report.

<sup>5</sup> Deputy Chief of Naval Operations for Integration of Capabilities and Resources, Office of the Chief of Naval Operations, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for FY2015*, Washington, D.C., June 2014.

**Figure 1.1**  
**U.S. Combat Aircraft and Battle-Force Ships, 1990–2014, with Illustrative**  
**Projection to 2025**



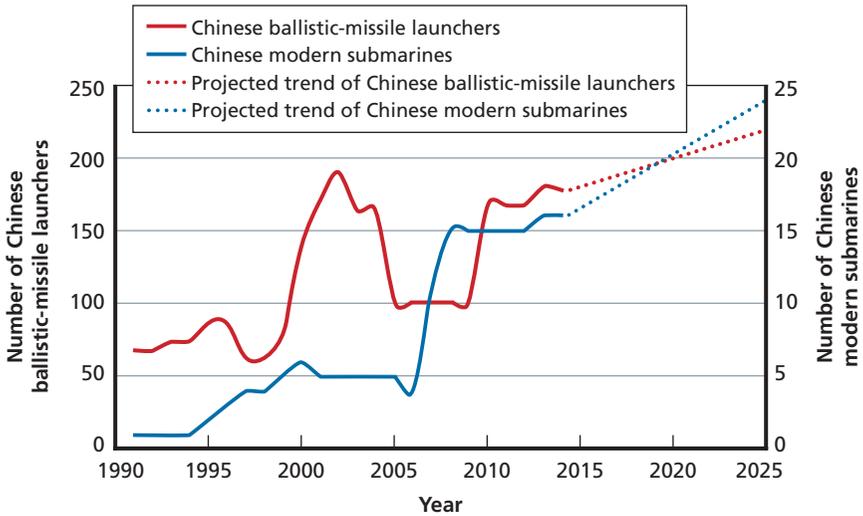
SOURCES: U.S. Air Force historical data from U.S. Air Force, “Logistics, Installations, Mission Support—Enterprise View (LIMS-EV),” modified March 26, 2012. U.S. Navy historical data from International Institute for Strategic Studies (IISS), *The Military Balance 2014*, February 5, 2014. Air Force projection data obtained from U.S. Department of Defense (DoD), *Annual Aviation Inventory and Funding Plan: Fiscal Years (FY) 2015–2044*, April 2014b. Navy projection data from Naval History and Heritage Command, home page, undated, and CNA, home page, undated. The illustrative ship projection is derived from 2000–2014 trends.

RAND RR1359-1.1

only A2AD capabilities (or necessarily direct threats to the U.S. capabilities shown in Figure 1.1), they are indicative of growing Chinese investment in the means to oppose U.S. force projection. More fundamentally, they reflect the rising costs of force-projection platforms and, by comparison, the declining costs of A2AD capabilities.

It is important to keep in mind that qualitative developments accompany these quantitative trends. In short, Chinese missiles, submarines, and other A2AD capabilities are improving, thanks to sensing, targeting, guidance, and other technologies, more than the U.S. ability to track and destroy missiles and submarines with hit-to-kill (HTK) ballistic-missile defense (BMD) and acoustic antisubmarine warfare (ASW), respectively, in large part because their room to

**Figure 1.2**  
**Chinese Missile Launchers and Submarines, 1990–2014, with Illustrative**  
**Projection to 2025**



SOURCE: 1990–2014 numbers as reported by IISS, 2014. Projections are illustrative trend lines based on those data.

RAND RR1359-1.2

improve given the state of technology and engineering was significantly larger. In sum, more-affordable, more-numerous, and increasingly effective A2AD systems are available to target increasingly costly, fewer, and hard-to-defend (though improved) platforms.

If these trends persist, especially in terms of the Chinese A2AD challenge, the United States will need to adjust in a major way, starting now, to the growing difficulty of force projection if it intends to maintain a global security strategy based on the ability to maintain and surge forces into the regions of capable potential foes. Again, adjusting at the margin will not alter the technological and economic trends that favor A2AD over platform-centric force projection. If unaddressed, the problem could create a strategic opportunity for regional power projection by adversaries under cover of their A2AD shields.

### **Current U.S. Responses to the Anti-Access and Area Denial Threat**

As improvements in A2AD threaten the forward-stationed and expeditionary forces of the United States, a natural response is to protect them. This would require better and more air and missile defense, improved ASW capabilities, and the development and enhancement of other systems that can defend the strike platforms, bases, and forces critical to U.S. force projection. Barring major technological breakthroughs in missile-defense and antisubmarine technologies—e.g., directed-energy weapons and nonacoustic detection—protecting platforms against the A2AD of large and sophisticated adversaries is a daunting problem.<sup>6</sup> It follows that, although the United States should pursue promising breakthroughs, as explained later in this report, it cannot count on them, at least not for some years to come.

Recognizing the limitations on defending projected forces, another potential U.S. response is to develop operating concepts and capabilities to strike and disable enemy A2AD before it can be used, both to deter aggression and enable U.S. offensive operations. The United States has relied on its short- and long-range air- and ship-based strike capabilities—mainly aircraft and cruise missiles—to soften enemies' defenses to prepare for invasion (e.g., Iraq, twice, and Afghanistan) or to subdue them without a subsequent invasion (e.g., Libya). These capabilities could also be used to persuade an adversary to accept U.S. demands. At present, the United States appears to be edging toward an increased reliance on attacking elements of an adversary's A2AD kill chain—specifically, in its strategy to deter China—and most of those capabilities are located on the Chinese mainland. *Air-sea battle* is a response to the vulnerability of U.S. forward forces (e.g., carriers, air bases). The concept involves targeting Chinese air bases, mis-

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<sup>6</sup> Most significantly, DoD announced an effort to develop the so-called third offset strategy during the course of this research—that is, a quest for a set of technical and operational breakthroughs that would restore U.S. dominance in military operations. The first offset was the creation of nuclear weapons. The second was the advent of advanced sensing, targeting, and precision strike capabilities. Deputy Secretary of Defense Robert O. Work discusses the third offset strategy and its implementation program, the Defense Innovation Initiative, in a speech that can be found at DoD, “The Third U.S. Offset Strategy and Its Implications for Partners and Allies as Delivered by Deputy Secretary of Defense Bob Work, Willard Hotel, Washington, D.C., January 28, 2015,” Washington, D.C., January 28, 2015.

sile launchers, submarine bases, C2 nodes, sensors, and networks with both physical and cyberweapons.<sup>7</sup>

A fundamental problem with an approach that relies heavily on attacks on enemy territory—especially assets that an enemy views as vital to its defense—is that, should the enemy choose to escalate rather than concede, the United States would be forced to escalate in turn or lose credibility. Furthermore, it is impossible to precisely predict an enemy’s reaction to attacks on its territory and losses to its military, infrastructure, and population—almost by definition, the stakes will be vital. Rather than softening an enemy, such approaches could merely harden its resolve and lead to further escalation.<sup>8</sup> On this last point, it must be assumed that China, Russia, Iran, and other potential adversaries will have their own escalatory options, both horizontal and vertical.

Therefore, it is important to recognize that U.S. capabilities and operations designed to cripple enemy A2AD and thus permit power projection, however warranted, could be destabilizing and escalatory. Such U.S. attacks on an enemy’s homeland or elsewhere would be most effective if they came early, if not preemptively. Certainly, China believes that this the U.S. plan for air–sea battle.<sup>9</sup> Awareness of such a strategy would, in turn, heighten an adversary’s incentive to conduct strikes on U.S. anti-A2AD assets before they can be used. Because the destruction of its A2AD capabilities would leave an adversary weak-

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<sup>7</sup> U.S. strategists’ focus on conventional military strikes against targets on the Chinese mainland is also a result of China’s growing ability to deter a U.S. nuclear first strike and thus to neutralize U.S. nuclear deterrence of Chinese conventional aggression. See DoD, Air–Sea Battle Office, *Air–Sea Battle: Service Collaboration to Address Anti-Access and Area Denial Challenges*, Washington, D.C., May 2013.

<sup>8</sup> See, for example, David C. Gompert, Hans Binnendijk, and Bonny Lin, *Blinders, Blunders, and Wars: What America and China Can Learn*, Santa Monica, Calif.: RAND Corporation, RR-768-RC, 2014.

<sup>9</sup> See, for example, Liu Yan, “The U.S. Military Reveals Secret Tactics that Take Aim at China: ‘Air–Sea Sea Battle’ Will Connect the Four-Dimensional Strike Platforms and Greatly Increase the Regional Conflict Risk Coefficient,” China Radio International Online (in Chinese), November 18, 2011.

ened against a homeland attack, its incentive to “use it or lose it” could be considerable.

Options to destroy A2AD are certainly worth having, and using them might be the right way to prevent or stop regional aggression or to protect other U.S. interests in certain contexts. But should the United States *depend* on a strategy that at least appears to require it to attack early, if not first, and perhaps invite preemptive attack? Should it depend on a strategy that calls for early attacks on enemy territory and perhaps triggers escalation? Should its strategy depend to such a great extent on options that could limit time for crisis resolution short of armed conflict? Or does the United States also want other options that do not require crossing this threshold early, options significantly lower on the escalation ladder, options that could strengthen its political leaders’ ability to manage crises and achieve favorable outcomes without war?

It is important to note that the capabilities needed to attack an enemy’s kill chain and those needed to create time and space for political solutions to developing crises are not mutually exclusive, with air control, sea control, and strike capabilities being obvious examples. It is the strategy behind the capabilities (or the enemy’s perception of the strategy behind the capabilities) that dictates stability in a potentially escalatory conflict. For example, a U.S. nuclear strategy combines capabilities with strategy and intent to create a stabilizing set of conditions for almost any conceivable contingency involving strong national interests. What is needed is a similarly stable concept for using conventional forces that warrants needed capabilities while communicating their intended use in a way that is stabilizing.

In sum, the United States must come to terms with the challenge to the way it projects force without an undue reliance on tactics and capabilities that could destabilize crises, require the United States to strike first, and lead to escalation and retaliation. The precise approach it chooses should recognize the advancement, spread, and costs of key technologies that currently favor A2AD and the changing geostrategic landscape. It should also explicitly examine candidate approaches to ensure that they are sufficient to defend core U.S. interests and allies. In particular, the United States should rethink why it needs to project

*power*, not just *force*, and whether its interests and responsibilities can be ensured through an approach that depends less on sending forces into the teeth of A2AD—a question that this report pursues.

This is not to say that today's U.S. forces cannot overcome existing A2AD. The trends suggested here (and analyzed in detail later) might not represent a severe immediate problem for U.S. force projection, a fact that can create the impression that incremental improvements in U.S. counter-A2AD capabilities will suffice—and, for the next few years, they might. But viewing the A2AD problem as a long-running motion picture instead of a still photograph reveals a more alarming view. As we look out to 2025 and beyond, the need for fundamental changes in U.S. concepts and capabilities becomes apparent. And it will take at least that long to implement those changes.

### **Geopolitics, Strategy, and Usable Power**

The significance of the A2AD problem depends on why the United States might need to use force in the future. Conquest—invasion, destruction of enemy defenses, seizure of critical locations, destruction of enemy offensive capabilities, regime change, and occupation—is likely to be more difficult and militarily costly, and hence risky, than preventing an enemy's conquest of a neighboring country. While U.S. security and interests might dictate such invasive and demanding undertakings, the combination of enemy resolve and A2AD improvements could raise the costs and limit choices for the United States, at least in a conflict with large, sophisticated nations that can afford significant military capabilities. The assumption here is that preventing capable regional states from projecting force will be the main, but not the only, reason for the United States to project power. Moreover, this particular purpose lends itself to promising new approaches by leveraging the technological and economic advantages of A2AD. Broadly, although trends in technology will make it harder and riskier to intervene or project force against capable states, the United States and its allies and partners can exploit the same trends to deter and, if need be, defeat external aggression by would-be aggressor states.

The idea of *refocusing U.S. military strategy to defeat international aggression* by regional powers presupposes that this is the main global

security concern for the United States. Yet this has not been the main U.S. concern for the past quarter-century. Since the end of the Cold War in 1989, U.S. defense strategy has been less concerned with defeating international aggression than with regime change (Panama, Serbia, Afghanistan, Iraq, Libya), occupation and counterinsurgency (Iraq, Afghanistan), intervention to stop atrocities (Serbia, Libya), counterterrorism (Afghanistan, Pakistan, Yemen, Somalia), homeland security, and now cybersecurity. Moreover, a new class of adversary, the non-state actor—violent extremists, drug cartels, pirates, and transnational crime syndicates—is increasingly competing for U.S. attention. Why, then, should the United States now make defeating such aggression its top priority?

The answer stems from the spread, shift, and gradual leveling of technological, economic, and military power because of globalization and, as a result, the “usability” of power. Although the United States will remain the leading power, taking all factors into account, trends favor other powers being able to hinder, if not thwart, U.S. force projection, with China being the strongest contender. Initially, and for some time to come, the growing strength of these states will be more evident and more consequential regionally than globally. Indeed, the United States will have an effective monopoly on global military reach for years, if not decades. However, the phenomenon of spreading power has entered a phase in which the United States has global requirements to protect its interests and those of allies in regions where new powers are emerging. Consequently, the technological and economic asymmetries between A2AD and force-projection capabilities will increase the importance of usable power.

The result of these trends might be that a dominant regional power will have the ability to raise the risks of U.S. force projection to such a level that intervention in support of allies, or even to directly protect some U.S. interests, could become prohibitively high. In other words, while the United States will likely retain the most-capable forces for both force projection and preventing enemy force projection (or A2AD), a sophisticated adversary’s second-ranked A2AD capabilities could pose an unacceptable risk to, if not outright defeat, U.S. force projection. This is not the case today, but the trends seem to point in

this direction. If this is the case, one way of using force—to prevent force projection, or A2AD—is becoming more “usable” than force projection as the United States has practiced regularly since the end of the Cold War.

While the concept of usable power revolves principally around the changing capabilities that the spread of advanced technologies and their decreasing cost have made possible, it is broader than just this “net assessment” approach; it centers on the notion that a state cannot bring its full military power to bear to win conflicts, deter adversaries, or protect national and allied interests. In addition to military barriers (such as A2AD), there are political considerations, international norms, and humanitarian reasons for a strategy that clearly defines the limits of a state’s usable power. Thus, while the United States will likely remain preeminent in most, if not all, categories of military power, including force projection and A2AD, its ability (and willingness) to use power in the same way it has over the past two decades will decline as the relative effectiveness of these types of power shifts. In this report, we show that the relative power balance increasingly favors A2AD over force projection.

There is no way to predict with certainty into what regions and against what regional powers the United States might choose to project force in the decade to come. What is reasonably likely, though, is that states with growing access to technology and regional military reach will find it increasingly possible to establish an A2AD shield that will raise the cost of external (i.e., U.S.) intervention, which would then enable them to use force externally to take territory, seize resources, bully neighbors, settle scores, resolve disputes, and neutralize potential threats (assuming the status quo, in which most countries have not developed and honed their own A2AD capabilities). This report posits that east Asia, the Persian Gulf, and eastern Europe are three critical regions where Chinese, Iranian, and Russian A2AD, respectively, could pose especially serious challenges to international peace and U.S. interests.

## Objectives and Approach

Given this background, this report examines the motivations, technology, and economics behind the adoption of A2AD capabilities; considers why A2AD is so difficult and costly to counter and whether the erosion of U.S. force-projection capabilities is inexorable; and assesses how long the United States has to respond or adjust to these changes. A companion report, *Smarter Power, Stronger Partners, Vol. II: Trends in Force Projection Against Potential Adversaries*,<sup>10</sup> features a set of war-fighting scenarios that support the general analysis presented here.

While this report is principally about military strategy, it necessarily addresses other important elements of national power and strategy as well.<sup>11</sup> In examining U.S. military strategy, this report examines why the United States should be concerned enough about the erosion of one of the principal ways it has used force since the end of the Cold War—its ability to project force—to change the way it conceives of using force, some of its military capabilities, its expectations of allies, and how it thinks about projecting power (not just force) more generally. It examines the trends that underlie these phenomena, constructs a framework for examining strategy options, and then applies this construct to develop recommendations for a new military strategy.

Although the sponsor for this study is the U.S. Army, this report seeks to inform a broader audience of policymakers who will need to understand and wrestle with the implications of the changing global security context that will drive U.S. strategy. As a result, we lay out in some detail the background for how the United States finds itself at this important point in its history and motivations for why it needs to make big decisions about how it will use force to secure its interests.

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<sup>10</sup> Long, Kelly, and Gompert, in production.

<sup>11</sup> If ends are what nations seek to achieve and means are what they have to do it with, strategies are the ways or conceptual approaches by which nations use means to secure ends.

To accomplish these goals, develop strategies for addressing these shifts, and see how they affect U.S. interests, we examined

- the principal threats to U.S. interests
- the principal threats to U.S. military predominance in the context of the relevant national interests and geopolitical factors
- the economic and technical trends that drive the shift in the usability of power
- the likely implications of these threats and trends.

## Definitions, Distinctions, and Scope

A few notes are in order so that the remainder of this document will be easier to follow.

*A2AD* consists of two distinct elements: *Anti-access* typically implies the ability of an entity (usually a nation) to keep another entity out of its theater or area of interest. *Area denial* tends to be at more-tactical distances, such as preventing overflight of specific areas rather than the presence of enemy forces in a theater. In the report, we first establish A2AD's potency to increase the risk of U.S. force projection and then examine how the United States and its partners could use A2AD to further its strategic goals (what we will call Blue A2AD). In doing this, we examine three types of A2AD that will assist in analysis, defined in terms of types of potential offensive actions by any actor (including the United States). They are A2AD to defeat forces attacking (1) over water, (2) over major land borders, and (3) using irregular means. These are particularly useful in examining how Blue A2AD can be developed and used, but the terms are more general. The forms A2AD take in these different circumstances will necessarily differ. For example, it is challenging to conceal fleets of ships when projecting force over water and relatively easy for sophisticated A2AD forces to find and interdict using long-range sensors and long- and short-range shooters. However, preventing a capable adversary from projecting land armies across borders requires not only these capabilities but also

more-traditional defenses (e.g., large armored units, air forces, and air-defense systems to stop large, armor-heavy, joint attacks).

Furthermore, in some cases, it is challenging to distinguish between A2AD capabilities and traditional defensive capabilities. As currently used, *A2AD* connotes the use of long-range STP of some sort to hold at harm or destroy force projected toward or into a country's homeland. However, in the strictest definitional sense, these capabilities are more general. For example, North Atlantic Treaty Organization (NATO) forces along the inter-German border during the Cold War represented a formidable A2AD capability. Rather than make a firm definition and distinction, when we turn to consider Blue A2AD, we address specific capabilities in the context of the types of conflict considered. A2AD capabilities take different forms for countering an invading amphibious fleet than an armor-heavy army backed up by tactical air forces. As such, it is the concept of defeating an attack and the context in which this is necessary that define what constitutes A2AD and what is important. We recognize that this will not satisfy all readers, but we leave it to you to create your own definitions and applications should you wish to differ from our approach.

Different types of A2AD imply different challenges. When we apply these concepts to defeating attacks *over water* (the first type of A2AD enumerated above), we end up with A2AD as currently conceived. This is because the defense establishment is worried about A2AD being used against U.S. forces, and they will arrive in theater by crossing oceans first. However, when we apply it to aggression *over land* (the second type above), we see that what is required to counter this looks much more like traditional armies and air forces, though necessarily taking into account progress in the enemy's ability to do long-range STP. In short, we see a broadening of the traditional understanding of the term *A2AD* in some contexts. As a result, assertions about A2AD's effectiveness against forces projected over land borders should be understood in this context and not as the use of long-range technical means only to counter such aggression.

*Offense* and *defense* are two terms we use often, but they often apply differently to the strategic, operational, and tactical levels of warfare (e.g., it is possible to be strategically defensive and operationally or

tactically offensive—indeed, we will see instances of this in what follows). Keeping these distinctions in mind will be important. For example, current U.S. strategy in the Pacific with respect to possible Chinese aggression in the East China Sea, if it entailed using strikes on China’s major power-projection platforms (e.g., airbases, ports, C2 hubs), could be characterized as strategically defensive and operationally and tactically offensive. A strategy that used the same weapon systems to strike only forces that were being projected at an ally but not assets in the enemy’s homeland, even if at a distance, would be strategically and operationally defensive but tactically offensive.

### Scope

We note that there are challenges that, although important, we do not consider here in any depth because of limitations on the scope of this work.<sup>12</sup> These challenges include threats to the United States itself as a base from which to project power, as well as a target in and of itself. Some of these, such as threats posed by an enemy navy or air force, are well known (though evolving) and need only be mentioned. Others, in particular threats to U.S. critical infrastructure that is fundamental to the function of the nation and the U.S. military’s ability to move forces from the United States to areas of conflict overseas, are only starting to get adequate attention. They create a strategic problem that the United States has not had to face since the Cold War—that U.S. forces could be under attack not only in an overseas area of conflict but also en route (in the case of a conflict with a near-peer competitor) and possibly within the United States itself (from cyberattacks of all kinds and attacks on critical infrastructure). Any complete consideration of strategy (and investment priorities) would need to consider these threats as well.

Although basic trends in A2AD and underlying technological and economic dynamics are clear, a great deal of uncertainty sur-

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<sup>12</sup> See, for example, Ben Connable, Jason H. Campbell, and Dan Madden, *Threshold Exploitation and Stretching: How Russia, China, and Iran Are Eroding American Influence Using Time-Tested Measures Short of War*, Santa Monica, Calif.: RAND Corporation, unpublished research, March 2015.

rounds how they will manifest themselves in particular regions against particular adversaries over time. To illustrate, China's leaders might choose or be constrained to reduce investments in military modernization in general and A2AD in particular if China's economy slows and domestic demands grow. Iran might moderate its belligerence in and around the Persian Gulf and might treat economic development as more important than military capabilities. Nonetheless, because both China and Iran can afford to continue enhancing A2AD and force-projection capabilities, the United States should prepare accordingly.

Most uncertain of all is Russia, given deep weaknesses and pervasive corruption in its economy, aggravated by Western sanctions and the world glut in oil and gas supplies. This study assumed that Russia would continue to improve its A2AD and force-projection capabilities between now and 2025. However, with world fossil-fuel prices at roughly Russia's average cost of production, the state's principal sources of revenue have been wiped out. Because it is difficult to see how Russia can avoid deep cuts in military spending, barring an unexpected recovery in this revenue stream, our projections of future capabilities should be considered worst case.

Keeping in mind these uncertainties and wide differences in economic strength among the three potential adversaries, one might say that the problem of A2AD, and corresponding danger of aggression behind an A2AD shield, will be greatest in China's case by a wide margin. This said, the underlying technological and economic trends that favor A2AD over U.S. force projections are not *sui generis* to China; moreover, geographic and regional differences from among the three critical and contested regions are such that the United States must be prepared to defeat international aggressions, despite enemy A2AD, *vis-à-vis* Russia and Iran as well.

Finally, the scenarios in the companion report, *Smarter Power, Stronger Partners*, Vol. II: *Trends in Force Projection Against Potential Adversaries*,<sup>13</sup> are meant to illustrate the trends in the competition between A2AD and force projection, not to analyze how the United States should respond to those trends. In particular, they are not meant

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<sup>13</sup> Long, Kelly, and Gompert, in production.

to illustrate how the United States might use A2AD, in partnership with friendly nations, to defend its interest—we examine this later in this report using these threats (Russia, China, and Iran) but not these specific scenarios.

## Organization of This Report

This remainder of this report is laid out using a format that first establishes the challenges that enemy A2AD poses for U.S. force projection and then proposes options for solutions to address that problem. In particular, the next four chapters (Chapters Two through Five) address the challenges by answering a series of questions:

- What are the motivations and requirements for A2AD? Which states are able and determined to develop and strengthen their capabilities? (Chapter Two)
- Which future A2AD challenges will be of greatest concern to the United States and its regional allies? (Chapter Three)
- How does A2AD “compete” with force projection operationally, geographically, economically, and technologically? (Chapter Four)
- What can be learned about trends in A2AD capabilities versus force-projection capabilities from a detailed examination of war-fighting scenarios involving A2AD opposition to U.S. force projection? (Chapter Five)

The final four chapters (Chapters Six through Eight) address the solutions by answering a series of questions:

- What alternative options does the United States have, and how do they compare in terms of effectiveness, feasibility, cost, and risk? (Chapter Six)
- Of these alternatives, what strategy would best enable the United States to support its global interests and responsibilities at acceptable levels of cost and risk? (Chapter Seven)

- What requirements does such a strategy suggest for the U.S. Army? (Chapter Eight)

The final chapter examines the recommendations that the findings hold for U.S. policy and for the Army's role in exploiting U.S. advantages to prevent aggression.

## Anti-Access and Area Denial Motivations, Requirements, and Capabilities

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First-rate A2AD capabilities are expensive to acquire and difficult to use; they are significantly enabled by access to space. While many states will be motivated and able to field such capabilities, relatively few states will see it as in their best interests to field A2AD that could truly challenge the United States. Also, acquiring advanced A2AD systems requires committing to and implementing a disciplined multi-year strategy of investment in more-sophisticated technologies and more-highly skilled people than most states and societies can master. Doing so also requires a stable government and economy that can keep adequate investments focused on developing this capability. Although the number of A2AD challengers might be small, a general strategy is still needed, but how the United States responds specifically to this challenge will vary according to where and against whom the threat materializes, why the threat exists, when the threat occurs, and the significance of the threat.

This chapter identifies potential adversaries with both the *will* and the *means* to challenge U.S. force projection. To this end, it begins by asking why states seek the means to oppose U.S. force projection. It then examines the characteristics of effective A2AD and the resources and competencies it takes to meet those requirements. Finally, the chapter concludes with an overview of the states that might be both willing and able to make the effort.

## Motivations

While the list of states motivated to acquire A2AD at a level that could threaten U.S. forces could change over time, the number of states hostile to the United States and damaging to its interests is likely to remain small but could be consequential nonetheless. We believe that states want A2AD capabilities because (1) they fear that some nation will use force against them or (2) they might want to project power themselves in their near abroad and want to keep outside forces from intervening. These two motivations are not mutually exclusive.

Some states view the United States as a threatening power. The list is not short: Since the end of the Cold War, targets of U.S. force projection have included Panama, Iraq, Serbia, Afghanistan, Iraq again, and Libya. At present, nations that have historically feared U.S. aggression, such as Iran, North Korea, China, Cuba, Venezuela, Russia, and Syria, are among the states that appear to worry about becoming targets.

Of these, China is the most capable and significant, given its capacity, its potential, and the importance of Sino–U.S. relations. Moreover, if the United States can find ways to meet the challenge that Chinese A2AD poses, it will have a better chance of meeting the challenges that other states pose. For these reasons, China features prominently in this report. However, our presumption is that the A2AD problem will be more widespread.

The shifting balance of usable force enables countries that could not hope to compete with U.S. forces in a symmetric conflict to raise U.S. risk to a level at which the expected costs exceed the expected benefits of intervention. Lacking the ability to use conventional force effectively against the United States itself—owing to geographic distance and U.S. military superiority—states that fear U.S. force projection must concentrate on operations near them. Using conventional military capabilities, they can do this by denying U.S. general-purpose forces easy access to and freedom to operate in their vicinity. At the same time, the United States itself might be vulnerable to capabilities that, although not A2AD per se, are part of the general deterrence capabilities of which A2AD is one particular type. Nonconventional capabilities, such as nuclear-armed intercontinental missiles, conven-

tional missiles launched from submarines, state-sponsored terrorism, irregular warfare, and cyberweapons, might be attractive to hostile states in deterring or responding to U.S. force projection. If striking the United States is too difficult or dangerous, such states might threaten U.S. friends or allies instead (Israel and Saudi Arabia in the case of Iran; Japan, Taiwan and the Philippines in the case of China; the Republic of Korea [ROK] and Japan in the case of North Korea). Any discussion of a new military strategy to overcome these A2AD trends should also at least acknowledge, if not take into account, such factors as these.

Iran, for instance, appears to regard terrorist agents, proxies, cyberwarfare capabilities, and possibly nuclear weapons as necessary to compensate for its inability to defeat U.S. force projection because it cannot attack the United States using conventional means. North Korea is more limited in its capabilities and appears to regard nuclear weapons as the only way to counter the U.S. threat it perceives. Broadly stated, Iran is motivated to achieve both defense and deterrence, while North Korea's limitations force it to concentrate on deterrence. All else being equal, from the U.S. perspective, Iran is more of a problem because the United States might have difficulty projecting force even if it can deter Iranian use of nuclear or other nonconventional responses.

As discussed in Chapter One, the growing availability of weapons of mass destruction (WMD), cyberwarfare capabilities, and other nonconventional capabilities compounds the A2AD problem. As the means to strike back become more available, the United States might hesitate to escalate when its forces cannot overcome formidable conventional A2AD—a prospect surely not lost on states that fear the United States and covet the means to deter it. Thus, even as it builds its A2AD capabilities in east Asia, China is determined to field a credible nuclear retaliatory capability to deter the United States from using nuclear weapons if faced with conventional defeat.<sup>1</sup> Conversely, while Iran might have been seeking to build nuclear weapons, it has also been enhancing its conventional A2AD. Thus, although this report focuses

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<sup>1</sup> Michael S. Chase, "China's Transition to a More Credible Nuclear Deterrent: Implications and Challenges for the United States," *Asia Policy*, No. 16, July 2013.

on conventional A2AD, we recognize that there are alternative and complementary ways of opposing U.S. force projection.

Fear of U.S. military attack is not irrational. In numerous cases over the past 25 years, U.S. military forces have decisively defeated the forces of the opposing state, rendered those states defenseless, and effected regime change. Five times in 25 years, U.S. force projection has culminated in regime change and the death or imprisonment of the regime ruler, regardless of whether the United States has declared such a war aim.<sup>2</sup> From the U.S. point of view, force projection is typically justified by the belief that the state on the receiving end has violated international norms, violated the sovereignty of another state, or endangered civilians. Recent examples include states involved in drug trade (Panama), states attacking a neighbor (Iraq), states committing atrocities (Serbia), states defying a prohibition on WMD (Iraq), states abetting terrorism (Afghanistan), and states slaughtering their own people (Libya). From an adversary's point of view, the ability to foil U.S. force projection might well be a matter of survival.

Even if it is not determined to remove a hostile regime, the United States might project force against a state to destroy some aspect of that state's military capabilities. This distinction could be important in the case of Iran, should the United States elect to strike Iranian nuclear facilities without expecting to bring down the regime. To the extent that the state in question regards certain military capabilities as indispensable to its security, it will be strongly motivated to develop A2AD capabilities to protect them.

Often, it is a combination of a state's conduct and character that causes the United States to consider force projection. The United States might refrain from projecting force to remove a regime or destroy its military capabilities if that regime does not engage in outright aggression, as it has thus far refrained from attacking Iran. But the United States has not always cited international aggression to justify using force, as the 2003 invasion of Iraq, the 2011 intervention in Libya, and

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<sup>2</sup> The five regimes are as follows: Manuel Noriega (Panama), Slobodan Milošević (Serbia), the Taliban (Afghanistan), Saddam Hussein (Iraq), and Muammar Gaddafi (Libya).

the more recent air campaign against the so-called Islamic State of Iraq and the Levant show.

Moreover, states might conduct themselves in ways they consider essential and even just, however objectionable to the United States:

- Serbia regarded the protection of ethnic Serbs in Bosnia and Kosovo as a duty.
- Saddam Hussein's oppression of Kurds and Shia was critical to his Sunni-based rule.
- Looking ahead, Iran might feel compelled to acquire nuclear weapons.
- China considers its claims to Taiwan and islands in the East and South China Seas to be sovereign rights and "core interests."
- Russia considers neighboring ex-Soviet states to be in its legitimate sphere of influence, in which it asserts responsibility to ensure the well-being of ethnic Russians.

Although A2AD is operationally defensive, it can also serve as protection from outside intervention to thwart regional aggression. This is the main concern with regard to China. Although China has not exhibited expansionist behavior, the general growth of its military power and its heavy-handed approach to territorial disputes give the United States cause to worry, plan, and prepare. China is motivated to field strong A2AD both to prevent the United States from striking it in the event of armed conflict and, in effect, as a shield for its military operations off its coasts.

Just as A2AD capabilities alone are not sufficient for aggression, the existence of A2AD capabilities does not necessarily imply aggressive intent. An aggressive state must be able to project conventional force and sustain operations beyond its borders, at least in its region. This might require capabilities not essential for A2AD—for example, air-mobile ground forces, amphibious forces, blue- and green-water surface and subsurface naval forces, and expeditionary logistics.<sup>3</sup> Regional force projection might also require capabilities that contrib-

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<sup>3</sup> *Blue water* refers to operations in oceans; *green water* is for operations in littoral regions.

ute to A2AD, such as air-strike forces, missiles, IAD, and cyber capabilities. A key consideration, then, is whether a state that is developing A2AD is also developing the capabilities needed to project force but not to defend itself (e.g., amphibious forces).<sup>4</sup> The United States watches closely to see whether states committed to A2AD are also investing in force-projection capabilities. China is beginning to do so; Russia has demonstrated willingness to project forces into neighboring states (Georgia and Ukraine) and has made their improvement a priority; and Iran is developing niche, mainly unconventional means to use force beyond its territory.

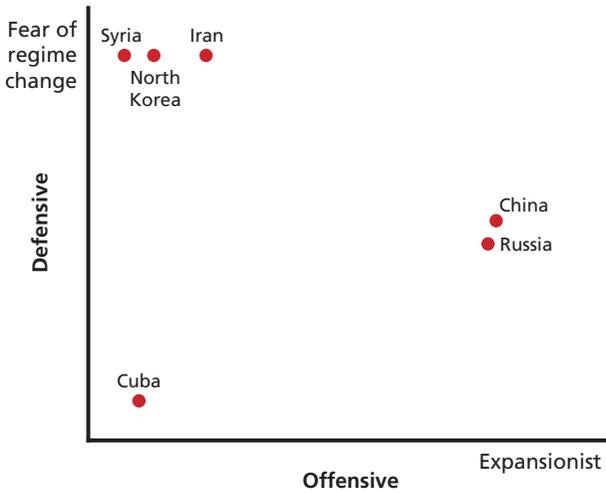
With these observations in mind, we can think of selected states with possible motivations to oppose U.S. force projection with A2AD, as depicted in Figure 2.1. (The graph is intended to be illustrative and does not take into account the capability to meet the requirements of A2AD, which we discuss later in this chapter.) At the risk of oversimplification, motivations can be categorized as homeland defense (defensive) and regional force projection (offensive). Fear that the United States seeks regime change is an especially strong homeland-defense motivation. Expansionist designs suggest a strong motivation to project force and, thus, to acquire A2AD as a shield. A state that is motivated by an interest in projecting force is not necessarily aggressive; in our illustration, we would categorize it as expansionist because it has merely evidenced some interest in operating militarily beyond its borders.

Some of these states, such as Cuba, might not have strong enough motivation to build effective A2AD. Others, such as Russia, might have a moderate but growing motivation. Still others might be strongly motivated but lack the capacity to field effective conventional A2AD and, therefore, concentrate on nonconventional means—North Korea is the prime example. By the same token, states not shown in Figure 2.1 could become motivated if their relations with the United States were to sour and lead to a growing fear of U.S. intervention. What matters

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<sup>4</sup> Terrence K. Kelly, James Dobbins, David A. Shlapak, David C. Gompert, Eric Heginbotham, Peter Chalk, and Lloyd Thrall, *The U.S. Army in Asia, 2030–2040*, Santa Monica, Calif.: RAND Corporation, RR-474-A, 2014, Appendix A, addresses this issue in depth.

**Figure 2.1**  
**Defensive and Offensive Motivations for Anti-Access and Area Denial**



NOTE: We intend for this figure to be illustrative; it does not take into account the capability to meet the requirements of A2AD, which we discuss later in this chapter.

RAND RR1359-2.1

is whether a state with reason to invest in A2AD also has the capacity to develop it, to which we turn next.

Strong motivation implies not only a determination to acquire effective A2AD, at considerable cost, but also the will to use it against U.S. forces. Iran and North Korea, for example, are convinced that the United States would want to bring down their regimes, given the chance, so they might use all the capabilities at their disposal, including nuclear weapons, despite the probability of defeat and possibility of devastating U.S. retaliation. Russia and China, having no such fear of regime change, would likely be more restrained in the types of force used in opposing U.S. force projection. Given that the core motivation behind A2AD investment and use is defensive—self-protection, if not self-preservation—the United States must assume that projecting force against a state with A2AD will mean war, not accommodation.

## Capabilities and Requirements Needed for Anti-Access and Area Denial

Capabilities and requirements differ substantially between conventional A2AD and nonconventional A2AD options:

- *Conventional* capabilities are used directly to delay, degrade, or defeat U.S. expeditionary and strike forces, mainly by attacking platforms (e.g., ships, aircraft, forward bases). While almost all military capabilities could serve some function in an A2AD strategy, we generally focus on those that are most important for anti-access.
- *Nonconventional* capabilities typically lie on the border between A2AD and more-general deterrence capabilities and fall into the following categories:
  - *WMD* (nuclear, biological, and chemical) are less discriminant weapons that could be used against U.S. allies, U.S. forces, or, in the extreme, the U.S. homeland. Although the threat of devastating U.S. retaliation might deter their use, states might regard them as useful to deter U.S. conventional attack and strategic escalation.
  - *Terrorism* can involve directing agents against U.S. allies, forces, interests, or territory. For states that lack the wherewithal to mount conventional A2AD, terrorism is more tempting than WMD as an asymmetric threat. Yet it is also a very risky option because there is a high probability of a strong U.S. response and international condemnation if attribution can be made with reasonable confidence.
  - *Cyberwarfare* might involve attacking networks of importance to U.S. military operations, U.S. security in general, the U.S. economy, or U.S. allies. Cyberwarfare is less easily deterred than WMD threats. Note that cyberwarfare is one way to attack U.S. expeditionary forces' C2 assets.
  - ASAT capabilities can be used to degrade U.S. space-based C4ISR, which is especially crucial for projecting force at great

distance. These capabilities can be “hard kill” or “soft kill” (e.g., jamming).

We note in particular that the mix of capabilities and how they are employed are important to determining what should be considered A2AD and what not. Some systems, such as long-range land-based ASMs, are almost purely A2AD, whereas their near cousins, long-range SSMs, are, at the tactical level, inherently offensive and so can be used both in A2AD campaigns (e.g., to strike air fields that serve as force-projection platforms) and in force-projection campaigns (e.g., to destroy key nodes of an A2AD kill chain and so degrade A2AD capabilities and facilitate force projection).

Satisfying these requirements involves widely varied skills and levels of resources. The easiest is the use of special or irregular forces or terrorist agents.<sup>5</sup> Yet few terrorist organizations have the ability to conduct a large attack on the United States before being detected and struck. The nuclear threshold is among the hardest; acquiring deliverable nuclear weapons is difficult, with the challenges of producing or acquiring weapon-grade material, designing and constructing nuclear explosives, and fitting the explosives into missiles or into bombs on bombers with sufficient range. Meeting these technical–industrial challenges is daunting for most states. Still, as the North Korean case suggests, a regime that is incapable of effective conventional A2AD might nevertheless be able to marshal the scientific and industrial means to create and employ nuclear and other WMD, particularly if aided by a nuclear state. Chemical and biological weapons are somewhat easier to acquire but might be hard to deliver effectively at significant ranges.<sup>6</sup> Although many states and nonstate actors can wage cyberwar, effective cyber A2AD—sufficient to actually degrade U.S. force projection—requires a degree of sophistication in information systems and oper-

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<sup>5</sup> Although terrorist organizations, such as al Qaeda, are not at the beck and call of every state that might wish to employ them, it can be assumed that they will accept support wherever they can get it and would contemplate attacking U.S. interests, allies, and territory in return for such support.

<sup>6</sup> Theoretically, some biological weapons could be as devastating as nuclear weapons but have the disadvantage of being hazardous to personnel who handle, transport, and use them.

ations that only a few states possess, many of which are U.S. allies (e.g., the United Kingdom, France, Israel). At present, only China has recently demonstrated ASAT capabilities, though Russia could also have such capabilities.<sup>7</sup>

Developing and fielding capabilities for *effective* conventional A2AD, especially *at distance* (as described later in this chapter) is probably the most difficult and demanding requirement—even more so than creating nuclear capabilities. As we explain later, it requires technological sophistication, economic scale, adequate production capacity (unless weapons can be imported), and advanced human capital. Broadly speaking, any state capable of advanced conventional A2AD at distance also is likely to also have cyberwarfare or nuclear (or other WMD) capabilities, with China and Russia being current cases. Yet not all states capable of acquiring WMD will be able to mount effective conventional A2AD; North Korea is an example. Iran has the potential to acquire both WMD and some conventional A2AD, making it a difficult case (especially given its strong motivation). To be most effective, a state would need to conduct A2AD at some distance, but not all states will need to do so at the same distance.

Conventional A2AD centers on the ability to target the forces that a rival projects; examples include platforms and bases on which U.S. forces rely for expeditionary and strike operations, which would entail locating, tracking, and delivering weapons accurately against those forces.<sup>8</sup> The greater the range of such targeting capabilities, the farther away U.S. forces must operate and the longer they will be in the kill zone when approaching a country. But extending the distance of A2AD can be very expensive and difficult. Distance with accuracy requires technological sophistication and integration, which, in turn, require high levels of training and sophisticated C2. It can also require the use of space, which demands the ability to acquire, launch, and operate advanced satellites, in addition to costly infrastructure. The

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<sup>7</sup> See Colin Clark, “Chinese ASAT Test Was ‘Successful,’ Lt. Gen. Raymond,” *Breaking Defense*, April 14, 2015.

<sup>8</sup> A2AD also includes countering forces of all types en route, as well as ground and air forces once they arrive in an area of operations (AO).

resources and technology needed to extend A2AD over the horizon will be available to few states hostile to the United States.

In our judgment, the menu of capabilities from which adversaries must draw for effective A2AD include what is shown in Table 2.1.

All such capabilities require high-quality personnel with the right skills (information scientists, designers, engineers, and users); capable commanders at every level; intensive training and exercises; and experi-

**Table 2.1**  
**Menu of Capabilities for Effective Anti-Access and Area Denial**

Category	Capability
ISR and targeting	<ul style="list-style-type: none"> <li>• Land-, sea-, air-, and space-based surveillance systems (radar, sonar, and optical)</li> <li>• Sensor-fusion, processing, and dissemination networks</li> <li>• Target tracking and handoff</li> <li>• Guidance systems, onboard and off-board</li> </ul>
Flexible and distributed C2	<ul style="list-style-type: none"> <li>• Joint force coordination</li> <li>• Kill-chain management</li> <li>• Agile structures and procedures to respond to change and unanticipated conditions</li> <li>• Countersurface precision strike               <ul style="list-style-type: none"> <li>• Cruise missiles</li> <li>• Ballistic missiles</li> </ul> </li> </ul>
Air defense	<ul style="list-style-type: none"> <li>• Sensors</li> <li>• SAMs</li> <li>• Interceptor aircraft</li> <li>• Networking to permit IAD, which is key to effectiveness</li> <li>• Ability to target aircraft at distance from one's territory (extended IAD)</li> </ul>
Antinaval capabilities	<ul style="list-style-type: none"> <li>• Submarines with torpedoes or missiles</li> <li>• Mines</li> <li>• ASBMs and ASCMs</li> <li>• Surface ships or small craft (for swarming or ambushing) with the ability to sink ships</li> <li>• Attack aircraft with ASMs</li> </ul>
Cyberwarfare capabilities	<ul style="list-style-type: none"> <li>• Defensive, given U.S. offensive cyberwarfare capabilities</li> <li>• Offensive, given U.S. reliance on C4ISR and other military networks</li> </ul>

NOTE: SAM = surface-to-air missile. ASBM = antiship ballistic missile. ASCM = antiship cruise missile.

ence with integrated operations. All else being equal, states with strong human capital will be much more capable of acquiring and using conventional A2AD effectively. China (capable) and North Korea (not capable) represent the two poles.

An important question is whether A2AD works adequately and even effectively only if all of its “moving parts” function effectively and are coordinated. Just as force projection is enhanced to the extent that operations are integrated, so is A2AD. Indeed, without the ability to link up multiple sensors with multiple platforms and their multiple types of weapons, all through complex C2, A2AD will be less effective. Even individual capabilities, such as IAD and ASMs, depend on networked integration. Thus, China’s growing ability to integrate is especially important to its A2AD, and the struggle of Iran and other lesser states to do likewise is a major handicap. In addition, shortcomings in a particular category of A2AD can permit the United States to take advantage. For instance, an enemy with weak anti-air capabilities, though stronger antinaval capabilities (Iran, for example), would invite the United States to concentrate on land-based air-strike forces. An opponent that can threaten surface ships but not submarines (e.g., China) is vulnerable to submarine-launched missiles. That said, specific capabilities, such as submarines, land-based missiles, and air defense, could take a toll even if the A2AD effort is not well coordinated.

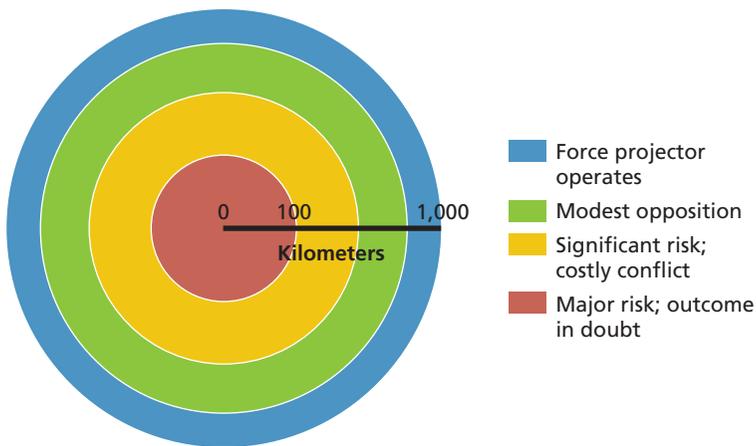
A2AD range extension is both very important, in that it permits attacking U.S. forces early and possibly beyond their strike range, and very difficult. The required technological sophistication and costs increase sharply with range. The advent, declining cost, and spread of drones could have a major effect in that they permit distant ISR and thus reduce the need for space-based systems. Even those able to extend A2AD far from their homeland face a problem of diminishing effectiveness, and thus diminishing return on investment, as a function of distance. The main reasons for this are that

- targeting and weapon accuracy can decline with range (though technology is eroding this problem)
- the density of sensors and weapons that can be brought to bear decrease with range

- U.S. forces have more time and more space in which to react (e.g., maneuver).

Although the side that is projecting force benefits from the declining effectiveness of A2AD over distance, it also faces increasing difficulty and potential losses in projecting force near an adversary with A2AD. Importantly, to strike a nation, force-projection forces have to penetrate from far to near.<sup>9</sup> This suggests the existence of danger zones, depicted in Figure 2.2, a notional diagram in which expectations of successful force projection decrease (or increase) the closer (or farther) forces are to an adversary with effective A2AD capabilities. One critical question is whether U.S. interests and responsibilities might dictate projecting force into such danger zones. Another is whether the leveling of technological, economic, and military power, as discussed earlier, is increasing the radius of these danger zones for a particular adversary over time.

**Figure 2.2**  
**Danger Zones**



NOTE: Distances and associated risk levels are notional.

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<sup>9</sup> Though not all systems do; for example, aircraft based on a carrier or missiles launched from a surface combatant ship would, but the ships themselves would not.

The fundamental geostrategic problem that the United States faces is that such danger zones could increase in intensity, radius, and number and that reducing them by attacking A2AD capabilities on an enemy homeland entails substantial risks.

The scale of A2AD is important as well: The United States can project very large expeditionary and strike forces. Scale demands resources—for investment in the technology, platforms, and infrastructure needed for robust A2AD and a sufficiently large military force to employ the capabilities—which means that larger states and economies might be more capable than smaller ones of effective A2AD. The costs of such A2AD are not prohibitive for states with reasonably large or strong economies. One possible rule of thumb is that defense spending of \$10 billion (for close-in operations) to \$50 billion (for operations at distance) might be essential for effective conventional A2AD. At the same time, most A2AD capabilities are information- and network-intensive; consequently, these investments can yield *increasing returns* (up to a point).<sup>10</sup> While the resource requirements for effective A2AD are significant, they pale in comparison to those for effective force projection.

To give a sense of economic scale as it relates to meeting A2AD requirements, Table 2.2 ranks the 25 states that spend the most on defense. U.S. allies and security partners are shaded blue, and actual and potential A2AD adversaries are shaded red. North Korea's defense spending can only be inferred. (It is believed to be about 15 times what the regime claims.) If, as thought, it is about 25 percent of the country's gross domestic product (GDP), and if that GDP is about \$40 billion, North Korea spends about \$10 billion on defense, an amount comparable to what Iran spends.

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<sup>10</sup> For more on the principle of increasing returns on investment in networking, see W. Brian Arthur, "Increasing Returns and the New World of Business," *Harvard Business Review*, July–August 1996.

**Table 2.2**  
**Defense Spending**

Rank	Country	Budget, in Billions of U.S. Dollars	Percentage of GDP
1	United States	682.5	4.7
2	China	166.1	2.1
3	Russia	90.8	4.4
4	United Kingdom	61.0	2.5
5	Japan	59.3	1.0
6	France	58.9	2.3
7	Saudi Arabia	56.7	8.9
8	India	45.8	2.5
9	Germany	43.5	1.4
10	Italy	34.0	1.7
11	Brazil	33.1	1.5
12	ROK	31.7	2.7
13	Australia	26.1	1.7
14	Canada	22.6	1.3
15	Turkey	18.2	2.3
16	United Arab Emirates	17.6	6.9
17	Israel	14.6	6.2
18	Colombia	12.2	3.3
19	Spain	11.5	0.8
20	Taiwan	10.7	2.3
21	Netherlands	9.8	1.3
22	Singapore	9.7	3.6
23	Poland	9.4	1.9
24	Algeria	9.3	4.5
25	Iran	9.0	1.8

SOURCE: Stockholm International Peace Research Institute (SIPRI), "SIPRI Military Expenditure Database," undated, for 2013 data.

NOTE: Blue = U.S. ally or security partner. Red = actual or potential A2AD adversary. White = neither.

## Capabilities Needed to Field Anti-Access and Area Denial

Economic scale and level of defense spending are the crudest measures of capability to field A2AD. Note from Table 2.2 that only China and Russia are potential military opponents with the resources to build effective conventional A2AD at distance—and Russia’s ability to do so without righting its sinking economy could be questioned. Although Iran can and might increase its defense spending as a percentage of GDP, it will be economically stretched if it attempts to acquire broad-based A2AD to operate at distance. As we will see, this helps explain why Iran is pursuing niche conventional capabilities (e.g., antinaval forces), capabilities to respond to U.S. force projection by attacking soft targets (e.g., shipping routes in the Strait of Hormuz), and nonconventional A2AD (e.g., WMD, terrorists, proxies).

Technological capacity is as important as (and loosely related to) scale. Broadly speaking, the technologies, knowledge, and elements (components, subsystems, and systems) of A2AD are increasingly available. Above all, as we have stressed, *targeting* capabilities for locating, tracking, and hitting targets largely utilize dual-use technologies—sensing, space-based geopositioning, miniaturization, data networking, and data processing—that are spreading through global commercial markets and multinational production and are thus extremely difficult to constrict. With the relentless distribution of scientific excellence, R&D capacity, and proficiency in using information technologies, the U.S.–European–Japanese oligopoly has dissolved. At the same time, the spread of these technologies has been uneven: Russia and Iran are far behind China, and North Korea and Syria are far behind Russia and Iran. All else being equal, the potential adversaries with the highest ability levels in information and related defense technologies, broadly defined, will be the most-formidable A2AD challengers to U.S. force projection.<sup>11</sup> Reinforcing this is the correlation between technological and economic capacity.

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<sup>11</sup> We include microelectronics in general, avionics, sensors, GPS, and other navigation and guidance systems, as well as data communication, fusing and processing, and the ability to produce and use the software that enables these systems.

States that have both the economic and technological potential for *effective* A2AD include the United States, China, Japan, India, Russia, numerous NATO allies, Israel, Brazil, ROK, and Australia. (That Saudi Arabia is not included despite its large economy and defense budget illustrates the significance of technological sophistication, for which the Saudis are not known at this time.) Those with the potential for *effective A2AD at distance* might be even fewer: the United States, China, Japan, India, and, possibly, Russia. Iran's economic and technological potential would seem to place it at the margin of having effective A2AD: capable of close-in A2AD of uneven effectiveness and of niche capabilities to extend A2AD over a distance and to threaten soft targets if attacked. (We assess the A2AD potential of China, Russia, and Iran in detail in Chapter Three.)

Having identified potential adversaries with the motivation for A2AD (i.e., fear of U.S. force projection), we can assess and rank them according to their capability and potential to project force (Table 2.3).

For the actual and potential capability to meet the various requirements of A2AD, China, Russia, and Iran stand out, in that order. China could have a capability to achieve effective A2AD at distance that is second only to that of the United States. Well behind China, Russia's potential depends on its future economic strength, which is, at present, in serious doubt. A2AD is already a high priority for Iran, but the country is struggling to overcome its economic and technological constraints.

## Combining Motivations and Capabilities

Considering both motivation and capability—actual and potential—for A2AD, we conclude that several states have one but not the other, as shown in Figure 2.3. For the sake of reference, we include several “neutral” states.

As a general observation, the states that will have both strong A2AD motivations and capabilities could be rather few—perhaps just three—over the next decade or so. One important reason for this is that most states with the economic and technological potential to

**Table 2.3**  
**Likely Changes in Capability**

Threat Type	China	Russia	Iran	North Korea	Syria	Cuba
A2AD potential						
WMD	Medium-high	High	Low-medium	Medium	Medium	Low
Terrorists	Low	Low	High	Low	Medium	Low
Cyberwarfare	High	High	Medium	Low	Low	Low
Conventional	High	Medium	Low-medium	Low	Low	Low
At distance	High	Medium	Low-medium	Medium <sup>a</sup>	Low	Low
A2AD rank	1	2	3	4	5	6
Force-projection potential						
Force-projection potential	High	Medium	Medium	Low	Low	Low
Combined	High	Medium	Low-medium	Low	Low	Low
Combined rank	1	2	3	4	5	6

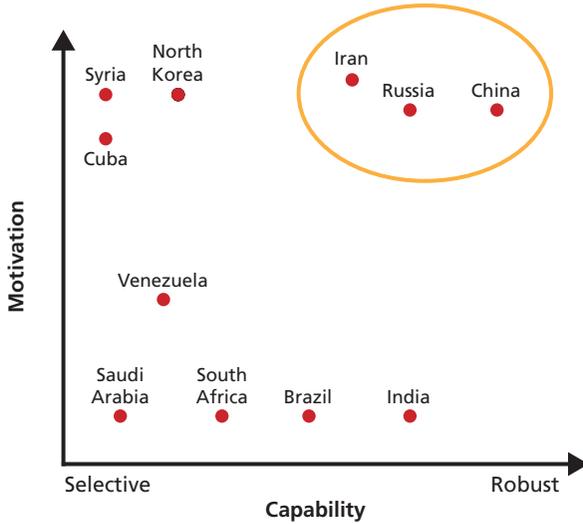
NOTE: Shading connotes a prospective increase in capability from the first value to the second. We base this table on our assessments.

<sup>a</sup> Only because of long-range missile program; capabilities are weak in every other aspect of A2AD at distance.

acquire A2AD are not fearful of U.S. (or other nations') force projection. Effective A2AD at distance requires a high degree of sophistication in applying and using IT *and* sufficient economic scale to meet the resource requirements. Most such states will be integrated in the world economy, democratic (or leaning that way), and friendly toward (or at least averse to conflict with) the United States.<sup>12</sup> Conversely, states

<sup>12</sup> See David C. Gompert, *Right Makes Might: Freedom and Power in the Information Age*, McNair Paper 59, Washington, D.C.: Institute for National Strategic Studies, National Defense University, May 1998.

**Figure 2.3**  
**Combining Motivations and Capabilities**



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openly hostile to U.S. interests and threatening to international security (e.g., North Korea, Syria) will often be small, isolated, and lacking the economic and technological wherewithal for effective A2AD, particularly conventional A2AD.

We focus on China, Russia, and Iran and their potential capability and possible motivations for effective A2AD. Of these three, China is likely to be the most problematic because of its superior technology, significantly larger economy, and determination to supplant the United States as the leading power in the western Pacific. North Korea is a security threat more because of its deliverable WMD than because of effective conventional A2AD, so we do not address it directly in this report.

## Conclusions and Implications

By design, A2AD serves a state's need to keep the forces of other nations from attacking it. When regime change is a stated or suspected U.S. goal, this motivation can be intense for the country that is the declared target or suspects that it is the target. Consequently, the United States cannot count on dissuading a state that feels threatened from acquiring A2AD that is within its economic, technological, and military abilities. Moreover, even when grossly overmatched, a regime that regards the United States as a mortal threat will fight desperately with whatever capabilities it has, possibly including WMD.

*Effective* A2AD is the ability to impose high, even unacceptable costs and risks on opposing forces operating nearby. This is neither easy nor cheap, involving, as it does, a robust kit of defenses against U.S. expeditionary and theater strike forces. Conventional A2AD depends above all on the capability to find, track, and strike the force-projection platforms and facilities. The targeting technologies at the heart of such a capability—sensors, precision guidance, geolocation, data communication—are largely dual use and increasingly available. Yet they are not easy to master, adapt, integrate, and use, especially during a conflict. More challenging still is A2AD *at distance*, which demands extended-range sensing and weapon range and accuracy. Because of the limitations on anti-BMD, ASW, short- and medium-range ballistic missiles (SRBMs and MRBMs), and submarines pose especially difficult A2AD threats to U.S. forces. Integrated SAM-based IAD is critical to contest U.S. air attack yet hard to master. Mines and swarming small craft, more than traditional surface combatants, can choke critical waters and do not require sophistication.

States could complement conventional A2AD defense with capabilities to retaliate if attacked, using cyberwarfare; proxy terrorists; or chemical, biological, or nuclear WMD. Indeed, those that face major economic, technological, and other hurdles to acquiring or using conventional A2AD, such as North Korea, might feel impelled to acquire such nonconventional means. Even states with conventional A2AD (e.g., Iran) might find that it is easier to counterstrike soft targets of

value to the United States, such as oil tankers or poorly defended allied territory, than to defeat U.S. forces head on.

Given its own strategic options—long-range conventional strike, cyberwarfare, and nuclear weapons—the United States might be able to deter counterstrikes against such targets or U.S. territory. By the same token, the acquisition of retaliatory capabilities, as part of a wider A2AD strategy, could give hostile states an increasing ability to deter U.S. escalation if U.S. forces cannot overcome conventional A2AD. Thus, the combination of effective conventional A2AD and escalation options could successfully block or deter U.S. force projection through a mix of costs and risks.

Although it is fundamentally defensive, A2AD can also enable local aggression by shielding against U.S. intervention. A state with effective A2AD that *also* acquires capabilities to project force within its region will be of particular concern to the United States. Even if the United States is not prepared to wage war to change the regime or destroy the capabilities of such a state, it might still have to project force to preserve international security and defend allies and friends.

Finally, it is important for the United States to prioritize the A2AD challenges it increasingly faces. Viewing capacity and motivation together, China looms as the greatest A2AD challenge for the United States—a challenge that could extend across the entire western Pacific. At the same time, Russia and Iran are strongly motivated to be able to raise the costs of U.S. military intervention in their immediate vicinities.



## China, Russia, and Iran

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For the three countries identified in Chapter Two—China, Russia, and Iran—we now examine more closely their motivations and capability for A2AD, including similarities and differences.<sup>1</sup>

### China: Motivations and Capability

In the past 20 years, China has shifted its military orientation from the Eurasian landmass to the Pacific and from ground forces to naval and antinaval forces. This shift reflects its economic dependence on seaborne trade, concern about U.S. power, unresolved territorial claims, and desire for greater influence in east Asia. China's economic interdependence and the political criticality of its economic growth are strong inhibitors to conflict, especially with the United States.

At the same time, China views the United States as the greatest threat to its security and ambitions in east Asia. China could be motivated to use force in areas that it claims, though such a move could be seen as international aggression: Taiwan, the East and South China Seas, and the Korean peninsula, should a conflict with North Korea or a North Korean collapse threaten its borders. It could be motivated to

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<sup>1</sup> We note that the study team also considered an analysis of North Korean capabilities. We decided not to include North Korea as a special case because, although it does pose a real threat to U.S. interests, it would add little to the consideration of emerging trends in potential enemy capabilities and the need for changes in U.S. strategy with respect to the A2AD threat.

threaten or use force against neighbors if provoked and if the risks of U.S. intervention can be reduced.<sup>2</sup>

Following its inability to contest U.S. intervention in the Taiwan Strait crisis of 1995 and 1996, A2AD has been China's highest priority. It has focused intently on meeting and defeating U.S. force-projection capabilities and, as a result, has a potential full kit of A2AD, plus rudimentary but improving capabilities for force projection:

- antinaval forces: submarines, ASBMs, ASCMs, and surface ships
- land-based ballistic and cruise missiles with short, medium, and intermediate ranges
- IAD capabilities
- air-intercept and land-strike aircraft, including a developing fifth-generation stealth aircraft program
- extended-range ISR, including over-the-horizon radars
- extended-range communication networks
- space capabilities second only to those of the United States, including ASAT
- cyberwarfare capabilities
- some level of C4ISR integration.

Because China has established its A2AD capabilities and feels significant inclination to recover lost territory, there is some basis for concern that it is building its own force-projection capabilities to act on these claims. If so, it could do so in many cases under an A2AD shield that could make it difficult and risky for U.S. forces to intervene, particularly near China itself.

China's political situation appears stable, and its economy continues to grow rapidly. This implies continued investments in its defense sector and the technologies needed to improve it. These developments indicate that it will likely continue to gain ground with respect to U.S. military capabilities.

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<sup>2</sup> See Kelly, Dobbins, et al., 2014, for a description of Chinese interests, possible actions, and signs that it has adopted a more aggressive foreign posture.

As such, any of three major trajectories for Chinese development could affect U.S. security:<sup>3</sup>

- *systemic continuity*: China remains more or less on its current path of growth but acts as a responsible, if assertive, political player on the world stage.
- *regional hegemony*: As China's power increases, it decides to use it to settle territorial disputes and to intimidate or defeat its neighbors.<sup>4</sup>
- *systemic breakdown*: Economic chaos similar to that experienced in 2008 or other factors cause fundamental breaks in the political and economic situation in China, with unpredictable effects.

Of these, China today is likely somewhere between the first and the second. Put differently, it is predisposed to accept and cooperate with the United States at the global level while contesting the status quo and competing with the United States regionally in east Asia. While U.S. policy should try to encourage China toward systemic continuity, this does not preclude China from trying to change the regional status quo to its advantage. Should China be so motivated, it could pose significant threats to its neighbors, particularly those with which it has territorial disputes.

As this is written, China is experiencing greater economic instability, deceleration, and doubt than it has in decades. There are growing concerns about excessive and bad debt, asset bubbles, and financial-market turmoil. Even if these developments do not cause major disruption or weakening of China's economy, they could increasingly preoccupy the regime, temper international ambitions, and constrain resources available for the military. At the same time, heightened internal economic and political strains could also lead to more-assertive external behavior, e.g., assertion of Chinese territorial claims, and

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<sup>3</sup> Kelly, Dobbins, et al., 2014.

<sup>4</sup> In the words of China's foreign minister at the time, Yang Jiechi, "China is a big country and other countries are small countries, and that's just a fact" (John Pomfret, "U.S. Takes a Tougher Tone with China," *Washington Post*, July 30, 2010).

sustained growth in military spending. In any case, it seems unlikely that any curtailment of China's military spending would include what has become its highest priority: A2AD to reduce vulnerability to U.S. intervention in the region and to U.S. attack on China. By the same token, the effort by China and the United States to reduce areas of friction in connection with the 2015 Xi–Obama summit is unlikely to cause China to deemphasize A2AD. Therefore, the United States must assume for now that China will keep improving its A2AD and perhaps use it as a shield for international threat or use of force.

### **Russia: Motivations and Capability**

Russia is a regional power with an imbalanced, commodity-based, and sickly economy; an aging and shrinking population; and corruption rampant throughout its political system and society. For much of the time since the end of the Cold War, Russian armed forces suffered from low-quality personnel, a bloated structure, obsolescent equipment, and poor mobility.<sup>5</sup> Facing extremist threats, primarily from the Caucasus and central Asia, Vladimir Putin characterized Russian forces a decade ago as an “army of 1.4 million men, but no one who could go to war.”<sup>6</sup> At present, Russia has a limited conventional military capability to project force over significant distances or counter U.S. force projection in the event of conflict. At the same time, it still fields advanced military capabilities in certain fields important to A2AD, such as air defense. Moreover, high energy prices and swelling state revenues have, until recently, permitted Russian investment in military modernization.

Owing to such investment, Russia's seizure of Crimea and interference in Ukraine reveal some improvements in Russian forces and tactics since the ragged performance in Georgia in 2008. Irregular operations have been prominent and partly effective. Despite recent

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<sup>5</sup> See Jakob Hedenskog and Carolina Vendil Pallin, eds., *Russian Military Capability in a Ten-Year Perspective: 2013*, Stockholm: Swedish Defence Research Agency, FOI-R-3734-SE, December 2013.

<sup>6</sup> Putin delivered this line in his annual address to the Russian parliament in 2006.

emphasis, how much Russian regular forces have also improved is not clear, insofar as their involvement in the Ukraine crisis and in bombing soft targets in Syria has not tested them in any significant way. At the same time, the combination of Western financial sanctions and the decline in global energy prices has severely weakened Russia's economy by cutting off access to capital and causing state revenues to plummet—conditions which could last for years to come. While the effects of this dramatic downturn on military spending and capabilities remain to be seen, it is hard to see how the Russian state, starved from revenues, can sustain heavy investment in military modernization or overhaul its outdated defense industry. Making matters worse is the fact that Russia has lost access to Ukraine's defense industry.<sup>7</sup> Moreover, the import of western European military technology and systems will be severely constricted, as evidenced by France's decision not to deliver the state-of-the-art *Mistral* combat vessel.

Strategic clarity has been missing from Russian national defense policy and planning since the end of the Cold War, resulting in Russia's military being assigned a myriad of disparate missions.<sup>8</sup> This confusion might reflect an inability to jettison old Soviet ways of thinking, the complexity of new challenges, a lack of consensus on foreign policy goals and relations, a failure to set priorities and allocate resources accordingly, or the subordination of defense policy to Russian domestic politics. As a consequence, Russia's stated defense goals appear to exceed its capacity to achieve them. By inference, those goals seem to include the following:<sup>9</sup>

- maintaining rough U.S.–Russian strategic nuclear equivalence, the only remaining feature of Russia's global-power status
- compensating for NATO's conventional military superiority

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<sup>7</sup> For a description of the unique dependence the Russian armed forces have on Ukrainian aerospace and defense production, see Igor Sutyagin and Michael Clarke, *Ukraine Military Dispositions: The Military Ticks Up While the Clock Ticks Down*, London: Royal United Services Institute for Defence and Security Studies, briefing paper, April 2014.

<sup>8</sup> See Hedenskog and Pallin, 2013.

<sup>9</sup> We draw these points from prior RAND research and our analysis of Russia's long-term goals.

- responding to China's growing power and influence in Russia's far east
- confronting irregular threats (e.g., separatism, extremism) within and immediately beyond Russia's southern frontier
- exerting influence over states that once made up the Soviet Union and that it views as within its sphere of influence
- intervening in its near abroad if necessary to protect ethnic Russian minorities
- backing up Russian economic interests and territorial equities in the Arctic and adjacent waters, given promising resource extraction and increased navigability
- playing a military role and thus regaining political influence in the Middle East.

The first three of these goals, coming at a time of diminished confidence in conventional military capabilities, have led Russia to re-prioritize its nuclear forces, and it has a much larger and costlier strategic nuclear force than is needed for deterrence. This reduces the resources available to modernizing its conventional forces. Moreover, trying to support numerous and disparate missions will become much more difficult and unproductive as state and military budgets decline.

Compounding the problem is the fact that the standoff between the vanguard of reform and the rearguard of the status quo has prevented Russia from specifying and sticking with a program of conventional-force modernization. As a consequence, Russia still finds itself with excessive, top-heavy, slow, rigid, mobilization-based forces instead of the ready, mobile, high-performance, networked forces its leaders admit it needs. The problem of having old-fashioned forces is aggravated by the scarcity of high-quality recruits and a bloated, largely uncompetitive defense industry.

Still, state and public support for an assertive foreign policy and a strong military to back it up has not been this high since the end of the Soviet Union, and Russia's intervention into Crimea was popular. As resources get tighter, Russia will need to decide where to concentrate them to best support such international boldness, especially in and toward former Soviet republics and satellite states in eastern Europe. A

prudent assumption is that Russia will focus on certain core capabilities that can serve multiple missions. These include the following:

- integrated air-defense system (IADS)
- space-based (sensors, communications, and GPS) and counter-space systems
- advanced fighters and land-attack aircraft
- theater air transport
- Intermediate-Range Nuclear Forces (INF) Treaty-compatible precision-guided ballistic and cruise missiles or similar systems, and perhaps systems that are not INF Treaty-compatible<sup>10</sup>
- submarines
- Blue-water naval combatants
- flexible, responsive expeditionary forces, in addition to legacy forces
- irregular forces, including special operations forces and support for proxies
- cyber.

Such capabilities could both pose a force-projection threat to states along Russia's borders and increase Russia's A2AD to thwart Western intervention. The depth and duration of its economic slump will largely determine whether Russia has sufficient resources to achieve and sustain such improved capabilities.

The capabilities Russia seeks is one matter; how it acquires them is quite another. Russia's once-colossal defense industry has atrophied. It no longer has the huge export markets it once did, and it has likely lost the output of some portions of the Ukrainian defense industry, which was critical for more-technologically advanced military equip-

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<sup>10</sup> *INF Treaty* is shorthand here for *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (INF Treaty)* (United States of America and Union of Soviet Socialist Republics, *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (INF Treaty)*, Washington, D.C., December 8, 1987). In August 2014, the U.S. Department of State accused Moscow of developing long-range cruise missiles in violation of the INF Treaty. See Michael R. Gordon, "U.S. Says Russia Tested Cruise Missile, Violating Treaty," *New York Times*, July 28, 2014.

ment, including electronics.<sup>11</sup> Furthermore, while Russian leaders recognize need for high-quality military personnel, the primary supply is scarce, given Russia's lagging birthrate and the lure of commercial employment.

With such uncertainties about clarity of mission and sufficiency of resources in mind, different scenarios for Russian military capabilities are possible, such as these:

- The Russian defense establishment remains mired in malaise and infighting. By trying to meet all its defense goals, Russia can meet none effectively. The commitment to strategic forces could continue to consume the resources needed for conventional-force modernization. Although Russia might spend heavily on defense, much of it could continue to be wasted.
- Sustained low gas and oil prices force Russia to deemphasize military spending plans and modernization programs in general. As GDP growth stalls and the military's slice of the GDP shrinks, legacy structures and forces prevail by default and atrophy because of inadequate funding. Reform amounts to little more than cost-cutting.
- A serious deterioration in Russia's relations with the United States and Europe leads the country to divert its strategic attention and resources back to the possibility of large-scale conflict with NATO forces, however unlikely. Its commitment to reform and fielding more-modern, faster, networked forces is subordinated to legacy capabilities.
- Russia musters the resources, reform, and discipline to set and fulfill its highest defense priorities. It seeks to reassert usable power and real influence over the former Soviet Union. A growing defense share of recovering GDP provides ample resources to build a modern, mobile, professional, information-based military. A leaner military, emphasis on quality, and improved com-

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<sup>11</sup> See, for example, F. Stephen Larrabee, Peter A. Wilson, and John Gordon IV, *The Ukrainian Crisis and European Security: Implications for the United States and U.S. Army*, Santa Monica, Calif.: RAND Corporation, RR-903-A, 2015.

pensation enable Russia to afford the personnel it needs, despite demographic constraints. Russia further decides to be more parsimonious about its nuclear forces to concentrate on advanced conventional capabilities to wage war in its immediate vicinity.

The last of these scenarios seems improbable because of steeply declining state revenues and constricted access to capital and technology. Yet, because of its implications, U.S. and NATO defense planners cannot ignore it. In such a scenario, Russia could be expected to acquire and deploy many of the building blocks of effective A2AD: IADS, short- and medium-range missiles, the ability to challenge U.S. air control, attack submarines (SSNs), precision weapons, adequate C4ISR, cyberwarfare capabilities, and perhaps ASAT. Indeed, it already has the technical capabilities to do most of these tasks and, in some cases, such as air and missile defense, fields some of the most-capable and sophisticated systems in the world. Given such capabilities, Russia would have an enhanced ability to project its own forces against its immediate neighbors while increasing the risk to countries that might come to their aid. The combination would represent a growing challenge to U.S. interests and ability to project force to defend those interests.

While it currently appears unlikely that Russia will be unable to sustain defense spending at a level that would permit such broad military modernization, it might still treat A2AD as a top priority to oppose U.S. and NATO intervention along its periphery and threats to Russia itself. At a minimum, it should be able to maintain capable ground forces and the IADS to protect them from air attack. Given geographic advantages and constraints on forward, eastern deployment of U.S. and NATO forces, the threat of Russian aggression against adjacent countries could remain serious.

In sum, despite significantly reduced defense spending, if Russia were to press ahead with military reform, slash spending on legacy forces, and set A2AD as a top priority, it could conceivably present an increased A2AD challenge to the United States and NATO. Though unlikely because of Russia's economic sickness, such a development would have such serious consequences for NATO's easternmost reaches that we assumed it for this study.

## Iran: Motivations and Capability

Hostility between Iran and the United States is so deeply entrenched that genuine, lasting rapprochement is a remote possibility at best and certainly not a course that U.S. planners can count on. Although it is not an emerging power like China, India, or Brazil, Iran is a dangerous, revisionist state in one of the world's most unstable and violent regions. The United States regards Iran in its current political form as a threat to world oil supplies, an aspiring hegemon in the Persian Gulf, a sponsor of violent extremism, and an advocate for the elimination of Israel. Because Iranian acquisition of nuclear weapons would aggravate all of these perils, the United States has organized international economic sanctions, vowed to use force if needed, and committed itself to preventing this development. The United States maintains powerful strike forces within tactical distance of Iran, making it Iran's gravest danger.

Although Iran has every reason to fear the United States, its regime shows little sign of altering the course that has brought the two into confrontation. Indeed, the Iranian leadership's attitudes toward the United States appear even more venomous than U.S. attitudes toward Iran. Furthermore, Supreme Leader Ali Khamenei and his inner circle of religious and military leaders believe that a regime change is a U.S. goal.<sup>12</sup> They interpret U.S. regional military might, commitment to sanctions, support for dissidents, covert operations, threats to destroy Iran's nuclear program, and even offers to negotiate as instruments to achieve the regime's elimination. Primarily for these reasons, Iran has a strong motivation to build the capabilities needed to counter U.S. force projection.

Lacking the ability to defeat the United States in a force-on-force conflict, Iran has sought to deter a U.S. attack or sap U.S. will to fight primarily by threatening world access to oil and related shipping routes, a soft but "high-value" target. In addition to threatening shipping in the Persian Gulf and Strait of Hormuz, Iran might respond

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<sup>12</sup> See Akbar Ganji, "Who Is Ali Khamenei? The Worldview of Iran's Supreme Leader," *Foreign Affairs*, September–October 2013.

to the threat of attack by fomenting terrorism in the area, destabilizing Arab states with sizable Shi'ite populations, or attacking targets in Israel and on the Arabian Peninsula.<sup>13</sup> This defensive posture is coupled with Iran's interest in expanding its power and influence in the region at the expense of the power and influence of the United States and its partners. The country's acquisition of nuclear weapons would further all these goals: self-preservation, regional and religious leadership, and ending U.S. supremacy in the Persian Gulf.

According to DoD, Iran's A2AD strategy is to counter U.S. force projection through "deterrence, asymmetrical retaliation, and attrition warfare."<sup>14</sup> In a conflict, Iran's response to superior U.S. military force would be to avoid formal combat, inflict losses on U.S. forces, and close the Persian Gulf.<sup>15</sup> The United States has the ability to degrade Iran's capacity to carry out such a strategy by attacking targets in Iran, but Iran's escalatory options, particularly the acquisition of nuclear weapons, would increase the risks of doing so. Consequently, even with grossly inferior military forces, Iran has the potential to thwart U.S. force projection against it and in the Persian Gulf generally. If it cannot expel U.S. forces from the Persian Gulf with its particular form of A2AD, Iran can at least confront the United States with a growing, if not prohibitive, cost of war.

The United States views Iranian military preparations—its conventional A2AD, nuclear program, and proxy links—as a threat to the

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<sup>13</sup> Iran's asymmetric military strategy has been the subject of intense interest among military analysts. For additional background, see, for example, Michael Connell, "Iran's Military Doctrine," in Robin Wright, ed., *The Iran Primer: Power, Politics, and U.S. Policy*, Washington, D.C.: U.S. Institute of Peace Press, 2010, pp. 70–76; Anthony H. Cordesman, Alexander Wilner, Michael Gibbs, and Scott Modell, *US–Iranian Competition: The Gulf Military Balance—I: The Conventional and Asymmetric Dimensions*, 10th ed., Washington, D.C.: Center for Strategic and International Studies, January 6, 2013; and Fariborz Haghshenas, *Iran's Asymmetric Naval Warfare*, Washington, D.C.: Washington Institute for Near East Policy, Policy Focus 87, September 2008. For a perspective on the motivation for this development and some example capabilities, see Brett Davis, "Learning Curve: Iranian Asymmetrical Warfare and Millennium Challenge 2002," Center for International Maritime Security, August 14, 2014.

<sup>14</sup> DoD, *Annual Report on Military Power of Iran*, Washington, D.C., April 2012, p. 2.

<sup>15</sup> Cordesman et al., 2013, pp. 35–40.

region as much as self-defense. As DoD states, “Iran’s grand strategy remains challenging US influence while developing its domestic capabilities *to become the dominant power in the Middle East*.”<sup>16</sup> U.S. military planning emphasizes attacks on Iran proper, for both deterrence and operational advantage, because that is where the bulk of Iranian A2AD capabilities can be found. In turn, Iranian A2AD enhancements reinforce the U.S. presumption that Iran itself must be struck to protect U.S. interests. Thus, there is a cycle of threat, fear, and war planning.

Iran is investing in a variety of capabilities to raise the cost of attacking the country: WMD, terrorists and proxies, subversive Iranian agents abroad, and cyberwarfare, as well as largely asymmetric “conventional” A2AD. For this study, we assumed that Iran would make enough progress to develop a small, crude, but deliverable, nuclear-weapon capability by 2020. The final sprint could be ordered at any time. Although the main purpose of its nuclear weapons would be to deter a U.S. or Israeli nuclear attack, Iran might want to sow fear that its nuclear weapons could be used first if the state’s survival were in jeopardy. Regardless of its doctrine for using nuclear weapons, a collateral benefit could be to improve Iran’s stature and coercive leverage in the region.

Other WMD would fit the Iranian strategy of raising the costs of a U.S. attack. Iran is a declared chemical weapon power and might be capable of biological warfare. It could develop advanced biological weapons within the next five years, roughly the same time frame required to deploy deliverable nuclear weapons.<sup>17</sup> Such weapons would not have to be used directly against attacking U.S. forces: Israel or hostile neighboring states would be more inviting and less risky targets. Although the regime professes opposition to the use of such weapons, facing the threat of annihilation, it might be less easily deterred from using chemical or biological weapons than nuclear weapons. Speculatively, Iran might favor nonnuclear WMD if its nuclear-weapon ambition were frustrated.

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<sup>16</sup> DoD, 2012, p. 2; emphasis added.

<sup>17</sup> Cordesman et al., 2013, p. 25.

Iran already has options to use terrorists against U.S. friends, interests, and, potentially, the homeland. It maintains and supplies a network of violent nonstate actors (e.g., Hezbollah) and appears to have no qualms about using them against vulnerable civilian targets. Neither Hezbollah nor any other Shi'ite militant group has exhibited the predilection for large-scale indiscriminant terrorism. Although Iran's agents might not be able to easily visit 9/11-like destruction or deploy WMD on the United States itself today, the low U.S. tolerance for terrorist violence could make even lower levels of Iran-sponsored terrorism a significant factor in a crisis. Unlike Iran's nuclear weapons, its use of terrorists could be very difficult for the United States to deter, especially in the heat of an armed conflict.

Iran's conventional military posture is difficult to parse. Having suffered massive losses during its war with Iraq—perhaps 50 percent of its equipment—and faced U.S. efforts to block international arms transfers, Iran has struggled to build capable, well-rounded, modern armed forces. Instead, it has sought to bridge the yawning gap with its adversaries in its conventional capabilities by building an asymmetric-warfare capacity to deter and defend against attacks and invasion and to expand its influence over its neighbors.<sup>18</sup> It has done so by committing, on average, about 5 percent of its roughly \$500 billion GDP to defense.<sup>19</sup>

Even as the world's second- or third-largest holder of oil and gas reserves, resources for defense are severely constrained and quite minuscule, considering Iran's large collection of enemies. After years of GDP growth at more than 6 percent, the Iranian economy has slowed to a crawl (with high inflation), mainly because of international sanctions. Iran's defense spending (approximately \$10 billion per annum) is dwarfed by that of Saudi Arabia and other Persian Gulf states (approximately \$100 billion, combined).<sup>20</sup> A2AD against U.S. force projection and the ability to threaten neighboring states and shipping take clear precedence over Iran's modernization of its traditional ground, air, and

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<sup>18</sup> Connell, 2010; Cordesman et al., 2013; Haghshenass, 2008; Davis, 2014.

<sup>19</sup> SIPRI, undated, for 2012 data.

<sup>20</sup> SIPRI, undated.

surface naval forces. The air force is old and of little value, either for air defense or striking regional targets, but the army is large and relatively competent. Along with the Islamic Revolutionary Guard Corps, it would likely mount a stout defense against invading ground forces, which might evolve into guerrilla warfare. But the army is not capable of withstanding a major U.S. joint attack, much less conducting significant, opposed offensive operations. The navy's surface combatants would last no longer than the air force in a conflict, and they are not the main instrument of Iran's threat posture.

Instead of counting on regular forces, Iran is concentrating on A2AD capabilities to inflict losses on attacking U.S. forces. As explained above, effective A2AD is difficult and costly. Given U.S. reliance on air strikes, air defense is an obvious priority. Iran has extensive SAM assets, but most are obsolete. Its systems are also not well integrated, have significant shortcomings in sensor coverage, and are vulnerable to electronic warfare.<sup>21</sup> Iran's goal is a long-range, modern, SAM-based IADS. Its efforts to acquire sophisticated elements of IAD from Russia or China and U.S. efforts to prevent such transfers—successful thus far—reflect the importance of air defense in Iranian A2AD and the urgency of the need to stop it. Although Iran will improve, expand, and extend its SAM capabilities immediately beyond its territory, limitations on sensor range will make spotting and targeting distant aircraft a long-term challenge. Overall, Iran's doubtful ability to protect itself from U.S. air attack will likely intensify its interest in an ability to counterstrike U.S. forces and other targets in and around the Persian Gulf.

To this end, other Iranian priorities include land- and ship-based rockets and ballistic missiles, cruise missiles, fast-swarming small craft, mines, and submarines, including midget designs.<sup>22</sup> While such capa-

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<sup>21</sup> Cordesman et al., 2013, p. 68.

<sup>22</sup> According to Cordesman et al., 2013, p. 10,

Iran shifted its focus to developing a strong asymmetric capacity utilizing smart munitions, light attack craft, mines, swarm tactics, and missile barrages to counteract US naval power. While such assets cannot be used to achieve a victory against US and allied air and sea forces in a major conflict in the Gulf, they are difficult to counter and give

bilities could constitute a direct A2AD threat to U.S. forces, they will not be able seriously to degrade, much less defeat, those forces in the foreseeable future, though they could increase U.S. combat losses. Their main value is for *indirect* A2AD (e.g., threatening soft targets that include U.S. partners or interests in the region); this is in contrast with China, which is concentrating on *direct* A2AD to deplete U.S. forces and foil U.S. force projection. Thus, Iran's best hope of avoiding major damage, defeat, or regime demise appears to be in threatening neighboring states and energy infrastructure.

With or without nuclear weapons, missiles figure importantly in Iran's A2AD strategy. Iran is building an arsenal of cruise missiles, SRBMs, and MRBMs. It is also making major advances in its longer-range missiles, including the development of solid-fuel systems. However, it is doubtful that the systems it has today would be sufficiently reliable or accurate to be effective against long-range targets, unless they are armed with nuclear warheads. Iran has not mastered the challenges associated with intercontinental ballistic missiles (ICBMs), though it is working toward this under the guise of a satellite-launch vehicle program. Iran could have a small, crude ICBM capability toward the end of the ten-year period of this study.

Iran has little or no operational capability to use ballistic missiles or long-range rockets against ships and no over-the-horizon targeting capability to locate and track U.S. naval assets. Given the difficulty developing accurate ASMs, the principal Iranian threat to the region will be swarming boats with short-range missiles or rockets; mines; and modern, quiet attack and midget submarines.

A2AD at distance will remain a serious challenge for Iran, owing to the problem of extended-range sensing, C4ISR, and weapon guidance. It has begun to invest heavily in unmanned aerial vehicles (UAVs) and unmanned combat aerial vehicles. Although Iranian officials make lofty claims about these capabilities, little is known about their opera-

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Iran the ability to strike at larger conventional forces and critical civilian shipping with little if any warning. Iran has also sought to expand its military influence and deter any US-led conventional attack with its nuclear and ballistic missile programs.

tional history and performance.<sup>23</sup> That said, these technological developments will likely translate to growing capabilities in this area. Given its A2AD strategy and challenges, Iran can be expected to acquire significant drone capabilities through international markets or domestic production.

Iran remains largely dependent on foreign sources of advanced arms, so it is vulnerable to U.S.-orchestrated arms embargoes. It has imported Russian submarines, North Korean midget submarines and fast-attack craft, and a variety of modern Chinese ASMs. It has also acquired modern Russian or Chinese air-to-air, air-to-ground, anti-armor, and short-range air-defense missiles, as well as modern homing torpedoes. Finally, there are reports that Iran has acquired advanced types of Russian and Chinese mines.<sup>24</sup> At the same time, Iran is working to design and manufacture major conventional weapon systems, with a particular emphasis on cruise and ship-to-ship missiles and SAMs. Given the obstacles to imports and domestic production, progress in building these conventional A2AD capabilities will be slow, making nonconventional means (e.g., terrorism, cyberwarfare, WMD) more appealing.

As part of its indirect approach to A2AD, Iran increasingly relies on its Quds Force, the military branch assigned to special operations and unconventional warfare, along with other covert services, to support extremist elements or exploit Sunni and Shi'ite tensions in Lebanon, Gaza, Yemen, Iraq, Kuwait, Saudi Arabia, Syria, and elsewhere in the region.<sup>25</sup> These organizations could help Iran wage low-level proxy

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<sup>23</sup> Cordesman et al., 2013, p. 127.

<sup>24</sup> Anthony H. Cordesman, "The Conventional Military," in Robin Wright, ed., *The Iran Primer: Power, Politics, and U.S. Policy*, Washington, D.C.: U.S. Institute of Peace Press, 2010, pp. 66–69.

<sup>25</sup> Iranian agents are reportedly also active in Latin America, though it is doubtful that this would create the potential for a serious "second front" in any conflict with the United States. See Joby Warrick, "Iran Seeking to Expand Influence in Latin America," *Washington Post*, January 1, 2012.

or indirect wars and pressure regional states by threatening to support dissidents.<sup>26</sup>

Advanced C4ISR, a prerequisite of advanced A2AD (whether close in or at distance), remains a challenge for Iran. Over time, it should be assumed that Iran will develop the systems, skills, and procedures to exercise good C4ISR over coordinated A2AD operations in its immediate region. However, A2AD at distance is a huge challenge that requires technological access and mastery, investment in infrastructure (e.g., space-based sensors and guidance), and C2 complexity that will remain largely beyond Iran's capacity.

At the same time, Iran's potential should not be underestimated: It has considerable human capital, growing IT skills, and the ability to concentrate resources (mainly oil and gas revenues) on A2AD. At the same time, its economy is weak because of national mismanagement and international sanctions and the depressed price of crude oil and gas. It could struggle even more in the face of the further development of shale oil and gas and other alternative fuel supplies in North America and elsewhere.

On the whole, Iran can be expected to make steady, if unspectacular, progress in close-in A2AD but faces a wall in regard to effective A2AD at distance. It can therefore be expected to rely heavily on capabilities that provide long-range retaliatory options: cyber, MRBMs, eventually ICBMs, terrorism, and, should it develop them, nuclear weapons. Although Iran cannot begin to approach China in terms of the effectiveness or reach of its conventional A2AD, it will have a growing ability to respond if attacked. Meanwhile, even Iran's limited A2AD capabilities will require the United States to attack an expanding list of targets on Iranian territory: IAD, missile launchers, force concentrations, air and naval bases, and nuclear facilities. In sum, the problem for U.S. force projection against Iran is the growing risks it will run in overcoming Iran's limited but increasingly capable A2AD, coupled with the existence of a set of soft targets of interest to the United States and its partners in the region that are vulnerable to Iranian irregular attacks.

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<sup>26</sup> Cordesman et al., 2013, p. 116.

As for cyberwarfare capabilities, while it cannot rival the United States, China, or Russia, Iran has real expertise. Iranian hackers have demonstrated their skill in targeting the private sector and individual citizens, though crashing U.S. C4ISR networks will likely remain beyond Iran's reach for the foreseeable future.<sup>27</sup>

Iran could also attack or impede the flow of petroleum exports from the Persian Gulf, particularly through the Strait of Hormuz—and it has threatened to do so. Despite increased fossil- and alternative-fuel production in North America and elsewhere, the strait is projected to remain the most important shipping route for oil, and there are currently few options for regional exporters to bypass it.<sup>28</sup> However, choking off shipping in the strait would affect Iranian imports and exports just as much as it would affect those of neighboring states.<sup>29</sup>

The improvement of Iranian A2AD capabilities, though asymmetric and niche, will likely force the United States to increase its list of targets on Iranian territory: missile-defense radars and SAM sites; SRBM, MRBM, and cruise-missile batteries; naval and air bases; C4ISR; military and Quds Force concentrations; and, possibly, leadership headquarters. It is only if Iran can acquire nuclear weapons and create the fear necessary for deterrence that it will be able to use its asymmetric or conventional forces against the threat of U.S. or allied force projection.

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<sup>27</sup> See Jim Finkle, "Iran Hackers Targeted Airlines, Energy Firms: Report," Reuters, December 2, 2014; Ellen Nakashima, "Iranian Hackers Are Targeting U.S. Officials Through Social Networks, Report Says," *Washington Post*, May 29, 2014; and Mark Clayton, "Cyber-War: In Deed and Desire, Iran Emerging as a Major Power," *Christian Science Monitor*, March 16, 2014.

<sup>28</sup> Tom Gjelten, "U.S. Rethinks Security as Mideast Oil Imports Drop," National Public Radio, November 14, 2012; U.S. Energy Information Administration, "World Oil Transit Chokepoints," Washington, D.C., last updated November 10, 2014.

<sup>29</sup> Peter S. Green and Mark Shenk, "Iran Might Hurt Self Most by Closing Strait of Hormuz Oil Route," Bloomberg, December 29, 2011.

## Assessments and Comparison

Table 3.1 presents a summary comparative assessment of the current A2AD strategies and capabilities of the three states of interest in this report: China, Russia, and Iran.

Taking both motivations and capabilities into account, our assessments point to several conclusions. Most obvious, China presents a more serious A2AD problem for the U.S. military to defeat than either Russia or Iran does, now and in 2025. Even with its strong motivation, Iran does not have the capability to mount effective A2AD. Russia could, but whether it does so will depend on its economic where-

**Table 3.1**  
**Anti-Access and Area Denial Comparison, Level of Threat**

Threat	Russia (Assuming Economic Recovery)	China	Iran
Motivation	High	High	High
Strategy	Direct and indirect (as evidenced in Crimea and Ukraine)	Direct; deter or defeat by striking U.S. forces in the region	Indirect; deter or avoid defeat by counterattacking to raise costs of U.S. attack
Cyberwarfare	High	High	Medium
Conventional A2AD (close)	Medium	High	Low
Conventional A2AD (at distance)	Medium	High–Medium	Low
Risk of nuclear first use	Medium	Low	Not applicable (but low if it were to develop the capability)
Force projection	Medium across land borders into adjacent territory	Medium	Low
Economic and technological capacity to compete militarily with United States	Medium	High	Low

withal and military priorities. At least for China and perhaps overall, the problem for the United States will get worse, owing to the spread of technology for A2AD and assuming that the fear of U.S. military intervention and attack persists.

## Conclusions and Implications

China is strongly motivated to reduce the threat of U.S. intervention should it exercise what it sees as its sovereign rights in adjacent territory and seas. China has the requisite resources and technological aptitude to enhance and extend A2AD beyond the strike range of U.S. theater forces in the coming decade (because of U.S. adherence to the INF Treaty limitations, to which China is not a party). It is also enhancing its strategic—nuclear, cyber, and ASAT—capabilities, giving it the ability to deter strategic U.S. escalation and options to respond if the United States were to attack A2AD elements in China itself. China's second-highest defense priority is to develop capabilities to project force in the region, mainly to back up Chinese territorial claims. Effective A2AD at distance is a prerequisite if China intends to pursue regional force projection.

Russia's motivation for A2AD has been less strong than China's but might be growing. In general, despite relatively high defense expenditures, Russia's military capabilities have lagged since the end of the Soviet Union, though recent conflicts have no doubt helped Russian leaders improve its capabilities. In recent years, however, large revenues due to high energy prices have enabled Russia to improve some of its forces. Looking ahead, Russia's sick economy will either stall military modernization or require the regime to commit a substantially greater share of the state's shrinking resources for that purpose. In any case, if Russia is determined to be able to project force in its immediate region, it could become more committed to developing A2AD to deter or defeat NATO intervention. Most Russian A2AD would remain located in Russia. Defeating it by attacking Russia would risk Russian strategic escalation, including the possible first use of nuclear

weapons. Key developments, assuming that Russia has the economic wherewithal to pursue them, might include the following:

- real efforts to reform the Russian military to enhance effective joint operations
- improvements in Russian defense planning and budget allocation
- efforts to overhaul Russia's defense industry, access to which was lost because of the Ukraine conflict
- focused investments in A2AD despite the economic challenges Russia faces.

Iran is as strongly motivated to deter U.S. intervention as any state, owing to its belief that the United States wants to eliminate its government. However, Iran is, at most, marginally capable of acquiring, fielding, and using effective A2AD close in, much less at distance. On the whole, its strategy appears to be fourfold:

- some A2AD to increase U.S. force losses, especially among surface naval-strike assets and other force-projection platforms (e.g., airfields)
- capabilities to attack vulnerable targets that are highly valued by the United States and its allies (e.g., shipping routes, military headquarters, population centers)
- the use of proxies to aggravate instability and perpetrate terrorism
- deterring U.S. attack on Iran or escalation by acquiring WMD and cyberwarfare capabilities.

Broadly speaking, China is the model for effective A2AD in that its capabilities feature improved and extended conventional means to oppose U.S. forces, supplemented by cyberwarfare, nuclear deterrence of U.S. escalation, and the ability to raise risks of attacking the A2AD kill chain based in the Chinese homeland. With the current exception of air defense, Russia is less capable than China and will lack the economic and technological wherewithal to match China's A2AD. However, it has geographic advantages: less maritime exposure and close land-border proximity to possible targets.

Iran is different in important respects. It is convinced that the U.S. aim is regime change. While it also wants dominion in and around the Persian Gulf, its security posture puts a high premium on self-protection, if not survival. Its capacity for conventional A2AD, targeting mainly U.S. forces, is weaker than China's or Russia's. Iran depends more on the use of terrorists, subversive agents, and other instruments of destabilization to counter or deter U.S. force projection. However, whether Iranian escalation would include use of nuclear weapons is unclear, given the risks of retaliation and the possibility that Iran will not develop such weapons. But, if we presume a limited and comparatively unsecure nuclear capability and a dominating fear of regime change, Iran might be more likely than China or Russia to exercise such an option.

The three cases cover the range of challenges facing U.S. force projection. Whether and how the United States can overcome these challenges depends on the interaction of force projection and A2AD, topics addressed in Chapter Four.

## Force Projection Versus Anti-Access and Area Denial

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The analysis in Chapter Three of the A2AD capabilities of China, Russia, and Iran was largely one-sided and static; however, one nation's A2AD capabilities can be assessed and forecasted only in relation to another's force-projection capabilities (and vice versa) in the specific context of that nation's location, potential conflicts, and political leanings. A state motivated to project force and another motivated to stop it both invest in enhancing their respective capabilities with the other foremost in mind. Depending on the strength of those motivations, an arms race can ensue. Because the dynamic can be highly asymmetrical, the contest is more complex, more unpredictable, and less conducive to negotiation and regulation than a symmetrical arms race, as in the Cold War.

Such a contest has two distinct but related manifestations: (1) hostile operational engagement (war) and (2) competitive efforts to strengthen capabilities (investment). The first might be actual or hypothetical contingencies in which the United States employs forces against a distant adversary with A2AD capabilities. The second is the ongoing development of the capabilities of each country relative to the other over time. As in many classical arms races, such reactions are often circular, aggravate fears, reinforce motivations, and become politicized and institutionalized. They also can spawn worst-case, conservative planning—the logic engine of escalating arms competitions.

Competition between A2AD and force projection is influenced and can be determined by operational, geographic, technological, and economic factors:

- The *operational* tasks that projecting and opposing forces have to perform are interdependent but differ in important ways and pose different problems.
- *Geography*, on global and regional scales, shapes the requirements for effective force projection and A2AD.
- While there is considerable overlap between *technologies* that further force projection and those needed for A2AD, there are also differences. A2AD and force projection benefit differentially from technological developments.
- *Economics* are important not only because scale is critical to both force projection and A2AD but also because returns on investment can differ substantially.

Some of these factors are more subject to change than others. As noted in Chapter One, the advance and spread of technology and the shift in relative economic strength are fundamental in the “leveling of power” that could make force projection against A2AD more difficult. Many key technologies and important economic drivers are largely independent of military competition and requirements. At the other extreme, geography is constant over time, though it also varies from case to case.

Although each factor is affected by the others, the analysis that follows isolates them and presents a net assessment of advantage in the A2AD-versus-force projection contest. We also assess whether, how much, and how quickly the A2AD problem is growing and what that means for U.S. force projection, as well as the implications for U.S. global interests, role, and strategy.

## Operational Factors

An age-old rule is that offensive forces must significantly outnumber or outgun defensive ones to succeed, fundamentally because it is easier, all else being equal, to hold than to take ground. The offender does have some advantages, such as the initiative (the choice of time and place of the attack, at least at the tactical level); however, this has not generally changed the prevailing assumption.

Around this “standard” of offense versus defense, enhancements in tactics and technology over the centuries have sometimes favored one or the other. Although the tactical debate predates him, Napoleon understood that the maneuvering of agile troops moving swiftly in disaggregated formations (which he called corps) could concentrate enough force at a specific time and location to break a defense. World War I represented the height of the power of the defense against the offense. Casualties were incredibly high, a result of increasingly accurate and rapid-fire weapons. Yet, by World War II, mechanized armor supported by artillery and air forces and enabled by wireless radios was able to penetrate the World War I–style defenses and penetrate deep behind the line to achieve operational and even strategic decisions before slower-moving defenses could react. The Soviets subsequently adopted a similar approach to defeat the German army with mass armored formations and, later, to menace NATO during the Cold War.

By the First Gulf War, precision munitions, overhead sensors, air superiority, and land–air–ship communication and coordination (among other factors—the “Second Offset”) gave the U.S.-led coalition forces a significant advantage over Iraq’s heavy ground forces. The ability to sense, identify, target, and precisely strike individual targets on the battlefield, made possible by technical advances and high-quality human capital and training, changed the offensive–defensive balance. As a result, a generation of strategists and military leaders has experienced little but the success of force projection, made possible by a U.S. monopoly on this STP complex. No enemy had similar skills or could eliminate some element of capability needed to make this cycle work. Since then, largely because of the increasing accessibility and

decreasing cost of key technologies, other nations are increasingly able to develop and field, if not master, the STP complex.

In addition to its monopoly on the STP complex, the United States also spent vastly greater sums on all aspects of military capability, from R&D, to training, to professional education and development, to acquisition programs—all made possible by a preponderance of economic resources, technological acumen, human resources, and the ability to synchronize it all on the battlefield. Unfortunately, both the STP monopoly and the U.S. ability to radically outspend all adversaries are over, particularly when one recognizes that U.S. investments are for a global force and potential adversaries' investments are for local or regional forces.

Prior to the U.S. establishing a monopoly on the STP complex, it had been an accepted fact that it takes superior force for the offense to defeat a well-prepared defense. Around the end of the Cold War, the STP monopoly gave U.S. forces a huge force advantage even when they were outnumbered. However, the technical and operational advantages from mastering the STP complex have all been on the side of the force projector (the United States), with none on the side using A2AD (e.g., Iraq, Afghanistan, Serbia). While Serbia, in particular, held out for some time against STP-enabled strikes, it did so mostly by absorbing them rather than by seriously threatening NATO forces.

An important question, then, given the trends in technological dispersion and the potential to develop the operational capabilities needed for STP, is how things would work out if both sides were able to master at least some elements of the STP complex. Given these trends, which way is the offense–defense pendulum swinging now? And, importantly, is A2AD (the defense) still fundamentally easier than force projection (the offense) given these new realities, as traditional military wisdom would dictate?

Answering these questions requires considering operational factors and the nature, direction, and pace of technology (addressed later in this chapter). Our hypothesis is that, although it is difficult, A2AD can be easier than force projection in that it depends on accomplishing one main task: defeating offensive forces as they enter or operate in the

vicinity of one's homeland.<sup>1</sup> Table 4.1 summarizes some of the main considerations for this judgment.

As Table 4.1 indicates, a few major issues distinguish the challenges of force projection and A2AD. Under pressure of time, in the heat of battle, and in the teeth of uncertainty, conducting modern large-scale force projection can test the limits of human capacity to plan, organize, and operate—one reason that only the U.S. armed forces can do it. Moreover (in the case of the United States), because the same forces might have to be projected into virtually any of the world's regions with little warning to perform disparate missions, they must be very versatile. They bear the burden of bringing with them everything needed for large-scale operations far from home and do not have the advantages of home infrastructure, resources, and population for support. Although this study considered only three regions, they present widely varied operational circumstances. Moreover, events of the past few years alone indicate the unpredictability of where the United States might need to project force.

On the other hand, the force projector does have the initiative. Global force projection occurs only when and where political authorities direct it, perhaps at a time of the global power's choosing. In theory, the force projector also has the benefit of the element of surprise. In contrast, A2AD defenses must already be in place or able to be put in place quickly.

More basically, force projection normally requires the ability to *gain control* (of a given area for a given time), whereas the latter requires the ability to *deny control*. The two functions might seem like mirror images, but they are not: To deny control, it is not necessary to wrest and maintain it, only to disrupt it.<sup>2</sup> Offensive force projection, from beginning to end, affords the defender many operational opportunities for disruption. The expeditionary power must set and sustain the conditions that allow difficult and complex military operations to proceed

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<sup>1</sup> A2AD can also involve escalatory threats (e.g., counterstrikes against soft targets, the use of WMD).

<sup>2</sup> David C. Gompert, *Sea Power and American Interests in the Western Pacific*, Santa Monica, Calif.: RAND Corporation, RR-151-OSD, 2013, p. 2.

**Table 4.1**  
**Challenges of Anti-Access and Area Denial and Force Projection**

Capability	A2AD	Force Projection
Movement to the conflict	Local; facilitated by homeland infrastructure	Must move forces to the conflict; infrastructure support varies
Operations	Over known terrain but reactive to the force projector's actions	Projected into foreign territory, but offense has advantage of the initiative
Sensing	Space and home based; must find approaching targets; force-projection bases probably known	Space and with deploying forces; know fixed targets of interest but must find mobile ones
Targeting	Moving or stationary (regional bases); must identify and track most-important targets	Moving or stationary; many important targets fixed
Freedom of action	Easiest within homeland and surrounding air and sea; harder as distance from homeland increases (e.g., across water)	Easiest in international sea or airspace when far from enemy homeland; increasingly difficult as distance decreases (must establish some level of air, sea, and land control)
Survivability and reconstitution	Homeland advantages in both	Projected forces more heavily reliant on platforms (e.g., importance of stealth); often less robust and harder to reconstitute
Command, control, and communication	Facilitated by homeland infrastructure	Must bring with projected forces or do from distance
Logistics	Advantages of homeland	Must bring with projected forces unless strong basing and alliance structure
Infrastructure	Homeland advantages for movement, communications, logistics, medical, engineering, and other infrastructure, but all, including general support capability, is threatened	Must bring with projected forces, but general support capability might not be threatened if far from field of battle
Escalation calculations	Red lines more predictable	Red lines less predictable
Other	Support of population	Projecting into a hostile population

and be brought to a successful conclusion, including the significant degradation of the adversary's war-making capabilities. The adversary, in contrast, might succeed by degrading, impeding, and completing, even temporarily, the offensive power's attempt to control: For example, Iran need not control the Persian Gulf and Strait of Hormuz to deny U.S. warships or international oil tankers safe use of these waters.

Many, if not most, of the advantages that accrue to the A2AD side over the force-projection side are because the former does not have to bring forces to the fight—they are already there and enjoy the advantages of the defender. This, in turn, shapes the forces that the A2AD side fields, as well as its technology investments. It is also important to provide a generic outline for force projection. Our conception of how the United States has in the past and might in the future practice it follows, at a generic level of detail and consists of these key steps:

1. Conduct detailed ISR operations to help establish a concept of operations.
2. Establish a foothold near the region from which to operate and flow forces into the region. This includes identifying air bases, moving naval assets into place, and establishing logistic support facilities. If a land invasion is anticipated, this might also include staging areas for this campaign.
3. Use long-range strike assets—missiles and air forces, primarily—to degrade or destroy the enemy's ability to operate its own ISR and C2. Key force elements, such as large armored formations and air forces, might also be destroyed.
4. Invade and conduct decisive operations (although this could be impractical against major land powers, e.g., China and Russia).

Examples help illustrate important facets of this contest. Insofar as its strike power relies on regional air bases, the United States requires more or less continuous use of them; yet its opponent might be able to deliver disabling attacks on such bases with missile salvos, which do not require constant and sustained bombardment. An aircraft carrier must constantly maneuver to enable the launch and recovery of its offensive and defensive aircraft against assorted targets; yet a sub-

marine sent against the carrier or a ballistic missile launched against it might need no more than a single attack. Surface ships of all sorts might have to navigate repeatedly through narrow waters and operate in coastal waters, yet deploying mines and ASMs or dispatching fast boats to interfere with them would be more-discrete acts.

Such operational asymmetries are especially evident in the western Pacific, where the People's Liberation Army's (PLA's) warfighting objective is the swift yet temporary disruption of U.S. intervention. PLA writings, which are effusive about A2AD, do not suggest a requirement to *control* the theater of hostilities; rather, they imply that U.S. forces will be able to do so eventually if the battle drags on too long—reflecting the importance of promptness in A2AD. Moreover, the susceptibility to disruption of complex force projection, especially if it relies critically on the integration of networked joint forces, weapons and C4ISR, and long-haul logistics, could reward Chinese (and Russian and Iranian) investment in cyberwarfare, as well as ASAT. Later in this chapter, when we consider economics, asymmetries in operational complexity and difficulty help explain why Chinese investments in A2AD, at least, have more than offset the effects of larger U.S. investments in force projection in the past decade or so.

Force projection is also fraught with politics, perhaps even more so than other major military operations because the projector's national survival and vital interests might not be at stake. Operational success and thus the achievement of war aims are in part a function of losses and political tolerance for losses in forces, especially military personnel casualties. If force projection becomes operationally harder, it will likely become costlier in American lives and dollars. This could affect U.S. public support, unless political leaders can make a unified and convincing case that action is imperative. U.S. political willpower could be a strategic casualty of effective A2AD.

In the case in which a state fears attack on its homeland (rather than seeks to commit aggression under its A2AD shield), this asymmetry of stakes might translate to an asymmetric willingness to accept

losses.<sup>3</sup> Indeed, the A2AD state might have no choice but to defend itself, even at the sacrifice of its forces, whereas the side projecting force has choices, including not intervening or breaking off conflict if it becomes too costly. This means that countries that feel threatened, even if poorer and technologically backward, are unlikely to be dissuaded from acquiring A2AD to compete with a threat of attack or from actually using A2AD to oppose force projection. When the potential A2AD side is not all that much poorer or more technologically inferior to the force projector, determined A2AD could have an advantage over discretionary force projection. If A2AD becomes more effective operationally, a nation's challenge to obtain sufficient popular support for force projection, in the absence of a demonstrable threat to vital interests, would surely grow. Put differently, as operations shift in favor of A2AD, domestic politics might shift away from force projection.

In sum, both A2AD and force projection involve difficult tasks; the former is less complex and, because it takes place in or around the homeland of an ally or partner, more robust than the latter, whereas the latter enjoys the advantage of having the initiative. Increases in sensing, targeting, and long-range precision strike erode some of the advantages of the initiative—most notably, surprise. Political asymmetries of interests (choice versus necessity), tolerance for losses, and will to fight could amplify operational asymmetries that disadvantage offense more than defense—the need to control (for force projection) versus the lesser need to deny (for A2AD).

Consequently, the United States could continue to have better soldiers, sailors, airmen, and marines; more firepower; technological superiority; a larger defense budget; a virtual monopoly on the ability to use force globally; and the likelihood of fewer casualties than the enemy, yet could *still* be unable to project force and achieve war aims with favorable operational odds and at politically acceptable costs. Weaker adversaries, seeing little choice, might be more prepared to accept losses and to use whatever capabilities they have at their disposal. As we argue

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<sup>3</sup> We note that, in the Taiwan case, China sees Taiwan as part of China (as does the United States), whereas, in a Russian invasion of one of its neighbors, this is not the case.

later, the decreased cost and increased availability of key technologies that improve A2AD will amplify this asymmetry.

## Geographic Factors

Broadly speaking, and all else being equal, armed conflict close to a state's homeland and far from the nation projecting power favors the former. This is true no matter what operational concept is in question. Although the former's homeland is vulnerable to attack and the latter's might not be (barring some form of unconventional force), the projecting power has to go to the defender and defeat its A2AD. In the ensuing conflict, if the defending power has retaliatory options (e.g., nuclear weapons, terrorists, large-scale cyberwar, severing critical oil-shipping routes), it might be able to deter attack on itself and thus alleviate its one-sided vulnerability. If not, geography—if nothing else, the distance the force projector must travel to attack—provides the A2AD side with advantages over force projection.

With existing conventional military technologies, the United States must position its forces within theater or tactical range of a regional adversary, either by basing them or sending them there across transregional, transoceanic distances. (It is nearly 10,000 miles from the U.S. West Coast to China and from the U.S. East Coast to Iran.) With present technology and economics, U.S. conventional “global strike” systems with intercontinental range (e.g., long-range bombers and missiles) lack both the volume and the flexibility to substitute for projected general-purpose forces, as discussed later. This is not pertinent for cyber- and ASAT warfare, for which distance does not matter; but, for now, the United States must project conventional forces to and operate them in an enemy's area, despite A2AD, and this is the focus here.

The enemy's requirement is to keep U.S. theater forces beyond their effective strike range and be able to destroy them before they can operate within that range. Furthermore, the defender has advantages of “interior lines of operation,” which might be of particular value in maintaining reliable communications, in moving forces where needed

more rapidly than the distant adversary can, and in providing logistical support. Also, the defender might use its own territory for “strategic depth,” thus exploiting expanse, concealment, and mobility to frustrate strike operations, utilizing national infrastructure and a supportive population, simplifying and securing C2, and otherwise supporting A2AD. Also, the country potentially subject to U.S. force projection can mitigate the risk of attack by threatening retaliation against the United States, its allies, and its interests. Juxtaposed with this is the fact that, for the United States to project force at these distances against almost any foe, U.S. forces must be sent, employed, and sustained at the end of a planet-spanning tether. Those forces must be operationally self-sufficient and, in some cases, work on continent-sized exterior lines. All of this creates huge operational, logistical, and communication challenges. Finally, against many foes, U.S. territory might not be vulnerable in a remote conflict, nor would it have as much operational value to the adversary as its own territory.

The force projector might also be disadvantaged by having to operate in tight waters or other awkward geographic features near a regional adversary: Consider the Taiwan Strait, Yellow Sea, Persian Gulf, Strait of Hormuz, and the land and sea approaches to the Baltic states. Although restricted and irregular geography might obstruct a regional aggressor’s force projection (discussed later), it can also complicate access to the theater and to enemy territory and forces—in effect, serving as natural A2AD. Among other problems, naval forces can be more vulnerable and sea control more difficult if the adversary can make use of geographic features (e.g., islands) and threaten choke-points. Conversely, only by holding and using such features can the power projecting force into a region wrest an advantage.

Land geography can be more or less of a challenge than sea geography, depending on the circumstances. If the force projector enjoys strong alliances in the vicinity of the A2AD power, it would enjoy many of the same homeland advantages. For example, because other NATO countries border or are in close proximity to the Baltic states, U.S. operations in support of NATO countering a Russian incursion into the Baltic states could be well positioned if the United States had the right forces postured in Europe. In the absence of such alliances or

basing, the challenge of establishing land bases where none exist in the face of determined opposition is one that U.S. forces have not faced on any sizable scale since the end of World War II.

One way of overcoming the disadvantages of geographic distance and constraints is by acquiring, maintaining, and strengthening regional allies and partners. Of course, with allies and partners come obligations and risks, depending on how capable and how exposed to attack they are. Moreover, although steadfast and muscular U.S. support can buttress ally and partner reliability, allies' and partners' own politics and the shadow that a regional power casts might work in the other direction or at least introduce uncertainty about ally and partner behavior in a crisis. Whether and under what conditions local partners have both the capability and the reliability to offset geographic disadvantages and add more assets than liabilities depends on the partner, the region, and the regional adversary, not to mention the strength and believability of U.S. commitments and strategy. Placing greater reliance on and enabling local allies and partners could be a part of a broad U.S. response to the (worsening) A2AD problem. But this is a complicated and uncertain strategy, which we address in depth in discussions of Blue A2AD later in this report.

Distance is a crucial variable in the effectiveness of both A2AD and force projection. Although the United States can operate literally halfway around the planet—owing to its scale, technology, skill, and experience in force projection—regional adversaries are hard pressed to extend effective A2AD far beyond their coasts and borders. However, incentives to extend A2AD can be powerful: The farther the reach of sensors, weapons, and communications, the farther U.S. bases, aircraft carriers, and cruise-missile vessels must be to operate safely, which can limit their strike options and effectiveness; moreover, by extending A2AD, a state might expand the area in which it can use or threaten force with a diminished fear of U.S. intervention. Although it is difficult, A2AD at distance is a further and potentially acute problem for U.S. force projection, which explains especially China's commitment to it.

The prospect of A2AD at distance implies expanding geographic danger zones into which force projection will become increasingly

problematic, although, outside such zones, the force-projecting power still has the upper hand. The geostrategic map of critical regions and the world is being redrawn because of technological trends that favor A2AD and permit A2AD at distance.

## Technological Factors

The contest between A2AD and force projection will be strongly influenced by how the contestants apply technology, especially IT. IT has produced not just one but two distinguishable “revolutions in military affairs”: networking and targeting.<sup>4</sup> The former enables forces to operate in unison even though distributed—in essence, integration without stifling vertical control. The latter revolution makes forces easier to locate, track, and destroy. That the United States has a substantial lead in both does not guarantee that these technologies cannot work to its disadvantage as they spread. After all, it got a significant lead and has applied far more resources to both networking and sensing and targeting than its potential adversaries have. Looking ahead, the duel of these dual revolutions will affect the prospects for U.S. global force projection, interests, and strategy.

Although the technologies of these two revolutions are largely common, their effects can be different—in some respects, even in tension. Networking allows diverse and scattered forces to cooperate, making them at once more effective than disjointed forces and less vulnerable than concentrated ones. Besides the advantages of being able to operate over large distances, networking allows forces of all services and in all domains—land, naval, air, space, and cyber—to share information, expand awareness, collaborate, and synchronize their operations. Moreover, because networking permits joint firepower, expeditionary forces can be more effective and, in some cases, smaller, lighter, and therefore more rapidly deployed than ones before the digital revolution. The unrivaled effectiveness of U.S. power projection is attributable largely to the ability to deploy and operate integrated, joint expe-

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<sup>4</sup> For a deeper look at the two revolutions, see Gompert, 2013.

ditionary forces at great distance, with precise and decisive strike power and, until recently, relative impunity.

Meanwhile, IT, including the decrease in size, weight, and power demands for electronic devices, has also led to dramatic improvements in STP: finding and tracking targets, fusing and processing rivers of data from diverse sources and making targeting decisions, feeding the results to any weapon, allowing precise off-board navigation, and determining whether weapons have destroyed their targets. Although *sensing* and *targeting* in the broad sense used here also require weapons themselves (e.g., missiles), technological developments have reduced their cost, increased their accuracy, and therefore reduced their size and weight.<sup>5</sup> No longer does increased range necessarily come at the expense of accuracy; nor does accuracy come with a huge price tag. When linked through C2 networks to growing numbers of diverse weapons, STP systems are capable of destroying observable targets at increasing distances; thus, the networking revolution enables the sensing and targeting revolution. China is a case in point.

At the same time, because the purpose of advanced STP is to destroy opposing forces, it competes with the dispersal that the networking of those forces makes possible, which is meant to make them more survivable by virtue of being less concentrated and conspicuous. To illustrate, enemy A2AD capabilities, enabled by networking and STP, could pose greater dangers for U.S. forces, impede the establishment of air and sea control, and degrade battlefield intelligence collection. This, in turn, would significantly degrade the effectiveness of U.S. forces and threaten both the mission and the force.

A force that dominates in both networking and STP will, all else being equal, have a decisive operational advantage, assuming that cyberattacks do not crash its C4ISR networks. The U.S. military presently holds this dual advantage; however, because A2AD is so different in its operational tasks from force projection, it is possible for U.S. forces to remain superior in both branches of the military information

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<sup>5</sup> The advent of off-board guidance has dramatically decreased the cost of precision-guided munitions, though the investment in infrastructure (e.g., satellites) needed for such guidance can be considerable.

revolution and still suffer a decline in their ability to project force. This is a counterintuitive but critical point: As long as the United States is preoccupied with force projection, improvements in A2AD because of advances in STP technologies can work to its disadvantage *even if it is also superior in those technologies*—one important aspect of what we call *usable power* in Chapter One.

The targeting and networking revolutions can have contradictory effects. Although they permit projecting forces to operate in a dispersed manner, thus complicating the A2AD side's STP problem, in time, even networked, dispersed forces can become easier to target and destroy as the range and resolution of sensors, the range and accuracy of weapons, the sophistication of C2 systems, and the connectivity between all these improve. As STP and C2 improve, force projection becomes more problematic. Because of Chinese A2AD, the U.S. military already faces doubts about the survivability of U.S. forces stationed in or dispatched to east Asia.<sup>6</sup> Similar, though less severe, challenges could arise to U.S. forces in or sent to the Persian Gulf because of Iranian A2AD, even if these were not nuclear challenges. Conceivably, improved Russian A2AD could raise doubts about a NATO strategy of projecting forces to defend outlying allies abutting Russia, especially the Baltic countries.

A critical question, then, is whether the operational advantages that these technologies provide to A2AD will outpace those that accrue to the force projector. While there are common technologies—micro-electronics, transmission and switching systems, data processing, satellites, sensors, GPS (for navigation and guidance)—there are reasons to believe that the A2AD advantages will progress more swiftly than the force-projection ones. The reasons for this are as much structural and institutional as they are technical. Once the basic technologies for mastering the STP complex are introduced and mastered, further enhancements can be made without fundamentally changing operating concepts or acquiring new major platforms. Improvements in resolution, range, and guidance can be more or less linear and incremental,

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<sup>6</sup> See Gompert, 2013. The U.S. Secretary of Defense and the U.S. Pacific Command commander have reiterated this point on several occasions as well.

as Chinese improvements in A2AD capabilities show.<sup>7</sup> However, locating and striking enemy targets requires sensing and firing systems that are in range, which creates practical problems when trying to anticipate where attacks are likely to come from. The more sensors and firing units have to service targets and the larger the area over which they are dispersed, the more challenging it becomes for the side doing the targeting and striking.

In contrast, the ambitious exploitation of networking to enable dispersed operations over great distances is not without limits; it can be difficult and disruptive. For example, logistical considerations and the range of weapons in these dispersed units or between platforms are still constrained by physical, rather than informational, realities. Furthermore, systems that are designed to operate in partnership with other systems, such as logistical units supporting an Army brigade combat team (BCT) or ships that are parts of a carrier strike group, cannot perform their assigned functions (e.g., supplying the BCT or protecting an aircraft carrier from attack by aircraft or submarines) if too widely dispersed.

Indeed, embracing networking is *meant to be* disruptive, in that new concepts of operation, new ways of organizing, and new types of platforms are required to take full advantage of the ability to integrate distributed forces. Institutional and industrial inertia works against such discontinuities more than it does against continuous improvement in targeting.

While developing or examining all possible scenarios is impossible, consider, for example, one case that is important for the question of U.S. military strategy: the vulnerability of U.S. aircraft carriers to Chinese ASBMs. Having developed ASBMs, it is much easier for the Chinese to improve their effectiveness against their targets than it is for the United States to replace inherently vulnerable carriers with less-conspicuous and more-dispersed sea-based strike capabilities.<sup>8</sup> Eventually, a U.S. shift toward more-diverse, more-distributed, smaller, elusive, nonsurface forces in the western Pacific could complicate and

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<sup>7</sup> Gompert, 2013.

<sup>8</sup> Gompert, 2013.

confound Chinese targeting. Until then, Chinese targeting could outpace U.S. responses to it.<sup>9</sup>

There is a related technical explanation for why targeting capabilities will progress more easily than power-projection capabilities, at least with known technology. Given access to space, high-resolution sensors, broadband data transmission and high-speed processing, and ample resources to achieve scale, it will become possible to spot, recognize, and target most sizable, unhidden objects virtually anywhere on the earth's surface, especially in domains that do not contain a lot of "clutter," including land, sea, and even slow-moving (air-breathing) aviation platforms. At present, only the United States can aspire to such a capability, limited only by the costs of real-time global coverage assisted by land-, sea-, and air-based sensors. However, the critical technologies for this are spreading; China, for one, has the wherewithal to apply them. At present, the targets *themselves*—traditional ships; vehicles; and aircraft; not to mention fixed targets, such as airfields, ports, C2 facilities, and depots—cannot be readily replaced by nonobservable, cheaper, more-numerous, or expendable ones. Thus, although targeting advances quantitatively, targets must be changed in kind. The advent of drones might be such a discontinuity in platforms (though institutional and industrial interests could retard the process of substituting them for manned platforms). That targets can be distributed, thanks to networking, offers something of a reprieve. But there is a finite limit to the ability to disperse targets (e.g., individual human beings), whereas sensing and targeting capabilities have no such limit, in theory. Practically, however, there are only a finite number of systems to do the sensing, targeting, and firing of precision weapons, so they cannot sense, target, and engage everywhere. But as the ranges and capabilities of these systems increase, they might have the advantage. And if targets

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<sup>9</sup> We note that this is an extreme example meant to illustrate a point. We also note that there is a never-ending sequence of technical and operational moves and countermoves that lead to swings in the dominance of one form of warfare over another. We make no claim here that the current trends will be permanent.

are visible, the probability of their being seen will increase; if seen, targeted; and if targeted, destroyed.<sup>10</sup>

Existing technology has produced great advances in sensing and targeting, but it leaves three challenges for regional adversaries: (1) access to that technology, (2) extending sensing and targeting over distance, and (3) weapon range. Access to existing technology—largely dual use—is expanding, and the technology (though not necessarily its military applications) is decreasing in price. China already has such access, as well as its own development capabilities and the ability to apply it. Russia could develop it. Iran could buy or lease it. Other countries will also pursue it.

Once the technologies are mastered, the STP complex over distance is more of an infrastructure problem than a technical one. Extending range is largely about access to and use of space and advanced terrestrial systems (e.g., over-the-horizon [OTH] radars), which can be expensive and, at least for the near future, hard. Once the infrastructure exists—satellite development, launch, operation, and connectivity; development and fielding of OTH radars—progress is straightforward. China already has become a space power and has OTH capabilities.<sup>11</sup> Russia retains some space capabilities. However, Iran's use of space is nascent at best. At the same time, satellites and high-tech OTH radars are not the only way to extend the STP complex over distance. Drones have enormous potential to this end, and these will be readily available and comparatively cheap. Even cell phones can be used for some sensing efforts.

Having discussed sensing and targeting and assuming precision strike, the remaining problem for the regional aggressor or defender

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<sup>10</sup> Ballistic missiles remain, for the moment, an exception to these trends in that they are much harder to target and destroy than slow targets and much less expensive than missile defense systems, including C4ISR, needed to intercept them. While ballistic missiles can contribute to A2AD and deterrence, they are generally not adequate for international conquest, which is the main concern here.

<sup>11</sup> David C. Gompert and Phillip C. Saunders, *The Paradox of Power: Sino-American Strategic Restraint in an Age of Vulnerability*, Washington, D.C.: National Defense University, Institute for National Strategic Studies, Center for the Study of Chinese Military Affairs, 2011.

is weapon range. Extending range while maintaining precision is an engineering and industrial problem, not a scientific one (except if ballistic atmospheric reentry must be solved, which is a problem at long ranges). Accuracy at distance is less and less a problem, assuming that GPS or other navigational systems are accessible. Earth-hugging cruise missiles can be quite accurate with increasingly available technology. With space-based sensors, GPS-like guidance, and terminal guidance, ballistic missiles are becoming more accurate despite distance (as ICBMs have long been); indeed, the most-advanced guidance means that accuracy is not sacrificed as a function of range. Although targeting at distance is still challenging, the hard part is developing the extended-range C4ISR, not delivering the weapon.

Force projection exploits many of the same technologies as A2AD, especially STP and networking. However, force projection, as the United States practices it, is fundamentally platform-centric, relying as it does on combat and transport aircraft; aircraft carriers; and other surface combatants, troop ships, and satellites. As long as such targets are concentrated, stationary, or slow moving, they will be increasingly vulnerable to targeting at distance.

Force projection is also vulnerable to cyberwarfare and ASAT assets. As A2AD is extended to longer distances, it, too, will be more vulnerable to these capabilities. Moreover, as potential adversaries develop their own force-projection capabilities, they will confront these same vulnerabilities. Denying access to position and navigation systems, either through cyber or kinetic means, would be particularly debilitating to most STP functions.

Finally, technology has to be operated by personnel with the requisite skills. As such, a nation that wishes to field a capable A2AD capability needs both the human resources to produce the technology (or the ability to buy it on the world market) and military professionals who can operate it. This could be a challenge for quite a few countries.

Considering geography and technology together, we see that a country whose strategy is A2AD-based can exploit new technologies at shorter (easier, cheaper) distances, and the challenges of extending these ranges do not require investments in fundamentally new technologies or platform types. Rather, once sensing and targeting at distance are

mastered, weapon ranges can be increased with existing technologies and good design and engineering capabilities. In contrast, the requirements for stationing, moving, and operating large platforms and forces at great distance impede force projection.

## Economic Factors

Because of the relentlessly rapid rate of improvement in price performance of IT, IT could change the economics of defense as it has the economics of other sectors.<sup>12</sup> The pervasiveness and favorable economics of IT will improve the cost performance of both networking and targeting capabilities for the United States and for its potential adversaries. But at this juncture, at least, the economics of IT would seem to favor A2AD over force projection, for the simple reason that the former has more to gain from it than the latter does (as we will explain). Once the A2AD infrastructure exists (e.g., air-defense systems, missile facilities, submarine bases, C4ISR complexes), investment in more and better sensors and precision weapons is more economical than power-projection capabilities: Anti-aircraft missiles are cheaper and easier to make than aircraft; ASMs are cheaper than ships; ASATs are cheaper than satellites; and mines are cheaper than ships and tanks. And, importantly, U.S. force-projection capabilities already take advantage of networking and STP capabilities, whereas many, if not most, A2AD systems in potential adversaries' inventories do not. Because of this, legacy systems, though largely networked and advantaged by STP capabilities, are designed to effectively deliver maximum strike capabilities rather than survive against STP and networked A2AD (e.g., aircraft carriers).

While A2AD improvements do not necessarily require changes to the force or all operating concepts in kind, they do imply significant changes over time. The force-projecting power either is stuck with legacy platforms, which will be increasingly vulnerable to rapidly

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<sup>12</sup> Why this has been slower to occur in the military field than in others is explained in David C. Gompert and Paul Bracken, *Bringing Defense into the Information Economy*, Washington, D.C.: Center for Technology and National Security Policy, National Defense University, March 2006.

improving A2AD systems designed to counter them, or must embark on large-scale, disruptive, costly, and presumably slow change toward new, more-survivable, less targetable means by which to project force. Because A2AD has advantages over force projection in exploiting technology and is improving steadily, we believe that its operational return on investment is not only superior to that of force projection but growing.<sup>13</sup>

To see this, one needs only to compare defense spending and trajectories in capabilities. The United States has been in its own league when it comes to defense spending since the end of the Cold War, having spent roughly \$5 trillion during the post-9/11 decade.<sup>14</sup> (All figures are in constant fiscal year 2013 dollars.) Excluding the costs of operations in Iraq and Afghanistan, the U.S. annual defense budget has grown \$250 billion from the beginning to the end of that period. The United States spends almost 40 percent of the world total (37.6 percent in 2013); add U.S. allies, and this figure jumps to 70 percent. Twelve of the top 15 defense spenders are U.S. allies or partners, with another (India) not aligned but friendly. China, now second in defense spending, has increased its annual budget since 2000 by more than \$160 billion per year, or 8.5 times, a whopping figure unless compared with the U.S. increase.<sup>15</sup> Total Iranian military spending has been about \$120 billion between 2000 and today. At present, China, Russia, Iran, Cuba, and North Korea together spend less than half of the U.S. defense budget and only about 25 percent of total of the United States and its

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<sup>13</sup> Returns on investment in force projection and in A2AD are most meaningful when expressed in terms that are operational and relative to one another. We call this the *relative operational return on investment*. We can estimate the increments of certain A2AD capabilities needed to neutralize (e.g., destroy) increments of certain force-projection capabilities and then, by indicating the marginal cost of the respective increments, get a sense of the relative returns. Thus, if it takes three units of A2AD (for example, a given number of weapons) to neutralize one unit of force projection (for example, a particular platform), and if the cost of one A2AD unit is one-third the cost of a force-projection unit, the same level of investment would produce a tie between these capabilities.

<sup>14</sup> SIPRI, undated. We derive all figures in this paragraph from this source.

<sup>15</sup> According to SIPRI, undated, the People's Republic of China's defense spending was \$22.2 billion in 2000 and \$188.5 billion in 2013, in constant 2013 dollars.

allies combined. U.S. spending is more than three times China's, more than seven times Russia's, and as much as 70 times more than Iran.

For its investment, to tie its A2AD together, China has fielded a large number of new submarines; an expanded SRBM, MRBM, and intermediate-range ballistic-missile (IRBM) force; ASMs; IAD; and improved C4ISR. It is also developing force-projection capabilities. Iran has acquired and deployed mines, swarm boats, missiles, and rockets, not to mention terrorists and proxies. For its investment, the United States has mainly produced better versions of the aircraft and ships that, although, in some cases, harder to sense and target (e.g., fifth-generation fighter aircraft compared with fourth-generation aircraft), can still be located and destroyed. As A2AD improves, these aircraft and ships are likely, over time, to become easier targets at greater ranges from U.S. adversaries. If U.S. leader statements are to be believed, all these potential adversaries have made gains on the United States.

The reasons for the higher return on investment for A2AD than for force projection become more obvious when one considers the economic content of each. We can identify four basic "elements" that make up all military capabilities: technology, platforms, infrastructure, and people. The economics—costs and cost trends—differ significantly among these elements. Broadly speaking, we can say that the cost of technology as a function of performance is declining, the costs of platforms and technically skilled people are increasing steeply, and the cost of infrastructure is increasing gradually. We note that, while platforms incorporate technology, the cost of which is often decreasing, the complex combinations create significant engineering and construction challenges that tend to negate the positive trend in tech costs. Furthermore, high-tech platforms are often much more capable than lower-tech ones and so might be more effective in fewer numbers. But this is true only to a degree. For example, new, higher-tech systems that replace systems that already exist in low numbers (e.g., aircraft carriers, long-range stealth bombers) cannot yield significant reductions in the number of systems in the inventory if they are to be effective.

Because various types of force-projection and A2AD capabilities are composed of different mixes of these elements, it follows that the economics of those capabilities also differ. Table 4.2 offers our qualita-

tive assessments of the economic composition of key force-projection and A2AD capabilities. These assessments are not meant to obviate rigorous cost analysis, which should be done if decisionmakers require more quantitative analysis of the cost differentials between cost trends in force projection and A2AD; rather, they are meant to provide a first-order assessment of these trends.

With costs of platforms increasing relative to the costs of technology and given the greater reliance on platforms in force projection than in A2AD, it appears that the trends in force projection more closely mirror those of *platforms* and A2AD those of *technology*. The observation that proximity drives this phenomenon further bolsters this argument. The side using A2AD to defend itself from force projection has the advantage of its homeland (from which to launch A2AD defenses), while the force projector must move its ability to strike to the other side's location (hence the need for more-sophisticated platforms). Moreover, looking to the future, we see that the cost of A2AD is *declining* relative to that of force projection, while its operational effectiveness is increasing. For the same level of resources, investment in A2AD yields greater operational value than investment in offsetting force projection by an increasing amount.

In short, force projection—as the United States currently conceives, funds, and practices it—tends to be *platform-centric* (and thus capital-intensive), while A2AD tends to be *technology-centric* (and thus less capital-intensive). Although both sides use some of the same platforms and technologies, the requirements for protecting the homeland differ. For example, the A2AD side does not need aircraft carriers and supporting vessels, long-range bombers, or large amphibious ships.

Although IT is only one element of the equation, an examination of cost trends in IT as a surrogate for “technology” and a comparison with the cost trends for major platforms provides a first-order look at relative cost growth in A2AD and force projection. Admittedly, technology needs to be translated into C2, weapon systems, and skilled personnel before it can be used in any role, but, to the extent that it is the major component of many A2AD capabilities, this first-order look should provide insights.

**Table 4.2**  
**Force-Projection and Anti-Access and Area Denial Capabilities**

Capability	Requirements <sup>a</sup>
Force projection	
Long-range air mobility	<i>Platforms</i> , infrastructure, people, technology
Expeditionary ground forces	People, <i>platforms</i> , infrastructure, technology
Long-range air strike	<i>Platforms</i> , technology, people, infrastructure
Forward air bases	Infrastructure, people, <i>platforms</i> , technology
Naval strike and sea control	<i>Platforms</i> , technology, people, infrastructure
SSM system, cruise missiles, hypersonic weapons	Technology, <i>platforms</i> , infrastructure, people
Deployable logistics	Infrastructure, people, <i>platforms</i> , technology
Global C4ISR	Technology, infrastructure, <i>platforms</i> , people
A2AD	
Theater ballistic missiles <sup>b</sup>	<i>Technology</i> , infrastructure, platforms, people
WMD	<i>Technology</i> , infrastructure, platforms, people
Regional extended-range ISR	<i>Technology</i> , infrastructure, platforms, people
Regional communication	<i>Technology</i> , infrastructure, platforms, people
Land-based ASM	<i>Technology</i> , platforms, infrastructure, people
Both	
ASAT	Technology, infrastructure, platforms, people
BMD	Technology, platforms, infrastructure, people
Cyberwarfare	Technology, people, infrastructure, platforms
Tactical air strike and superiority	Platforms, technology, people, infrastructure
Air and missile defense	Technology, infrastructure, platforms, people
Submarine	Platforms, technology, infrastructure, people

NOTE: Italicized words in the table emphasize the importance of certain factors for force projection or A2AD.

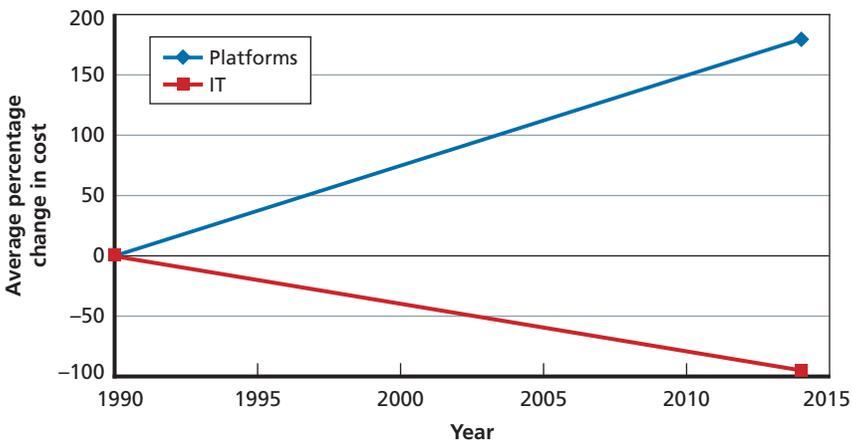
<sup>a</sup> In this assessment, we list requirements in what we believe to be the order of necessity for the mission.

<sup>b</sup> Theater ballistic and cruise missiles would be under the “both” category if the INF Treaty did not preclude the United States from fielding them.

Figure 4.1 shows the divergence in economic trends associated with force projection from those associated with A2AD in the past 25 years. Aircraft carriers, other naval surface combatants, SSNs, and multirole aircraft explain the cost growth of the large, complex platforms the United States uses to project force. IT, and computers in particular, are used as a surrogate for A2AD targeting technology; although this ignores other requisite technologies (e.g., sensors, guidance systems), the costs of these have also benefited from the sharp and steady improvement in IT price performance in recent decades and dual-use technologies. While these are very rough approximations of the economic trends in force projection and A2AD, they capture the unrelenting growth in platform costs and the decline in IT costs that account for the unfavorable economics of trying to project forces.

These trends imply that investments in technology, especially ones with larger percentages of IT content, might tend to yield better

**Figure 4.1**  
Changes in Average Costs of U.S. Weapon Systems and Information-Technology Capabilities



SOURCE: Our analysis based on cost data for platforms drawn from Selected Acquisition Reports and Congressional Research Service reports on F-16, F-18 E/F, and F-35 aircraft; *Nimitz*- and *Ford*-class aircraft carriers; *Arleigh-Burke*- and *Zumwalt*-class destroyers; and *Los Angeles*- and *Virginia*-class submarines. We drew cost data for IT from "The Rise of the Machines," *Popular Science*, November 1, 2011; they include costs for servers and personal computers.

returns than investments in major, complex platforms. This can be examined more closely in operational terms by comparing the cost of specific A2AD capabilities and the cost of the force-projection capabilities that can defeat (or neutralize) them, taking into account that it might take a comparatively large number of A2AD systems to defeat one force-projection system.<sup>16</sup> This also assumes military forces with the personnel able to use the technology.

Excluding cruise missiles versus surface ships (because it skews the results even more in favor of A2AD), the average cost of an A2AD capability is about one-fiftieth of the cost of the force-projection capability that it could neutralize in a combat operation. We are not suggesting great precision in these cost relationships: Defining each “unit” is based on judgment, as is estimating how many units of A2AD capabilities it might take to neutralize one unit of force-projection capability.<sup>17</sup> However, we have tried to be reasonable and, if anything, conservative (i.e., giving force projection the benefit of the doubt). Even if our cost estimates are off by an order of magnitude, the marginal cost of A2AD is much less than that of force projection, with neutral operational effect given today’s costs and capabilities. Table 4.3 captures our estimates of these costs.

Although the marginal economics and investment returns of A2AD and force-projection capabilities favor force projection, there is still the matter of total resources available, noted earlier. Aggregate economic size, resources for state purposes, state resources for defense, and defense resources for either force projection or A2AD could offset marginal cost and investment factors. In this respect, its economic size and strength have enabled the United States to maintain strong force-projection capabilities despite unfavorable microeconomics—so far, at least. The U.S. economy remains roughly equal to the Chinese economy, almost ten times the size of the Russian economy, and almost

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<sup>16</sup> Gompert and Bracken, 2006, examines the disparity in cost trends in IT and defense investments in depth.

<sup>17</sup> R&D, physical infrastructure, C4ISR, and support are required for both A2AD and force-projection capabilities to perform. While the complexity and costs of these larger systems can be substantial for A2AD, they are, if anything, greater for force projection because of the disadvantages of not operating from the homeland.

**Table 4.3**  
**Anti-Access and Area Denial and Force-Projection Cost Comparisons, Selected Capabilities**

A2AD		Force Projection		Comparison	
A2AD Capability or Unit	Approximate Cost per Unit, in Millions of Dollars	Force-Projection Capability or Unit	Approximate Cost per Unit, in Millions of Dollars	Illustrative Engagement Ratio, A2AD:FP	Cost Ratio, Given Number of Engaged Units, A2AD:FP
Anti-air (SA-20)	1	F-35	140	10:1	1:14
ASBM (DF-21D)	11	CVN	13,000	5:1	1:230
		CVN + wing	20,000		1:360
		DDG	1,700		1:30
Cruise missile (C803)	1	CVN	13,000	5:1	1:2,500
		CVN + wing	20,000		1:4,000
		DDG	1,700		1:350
Sub ( <i>Yuan</i> )	500	CVN	13,000	2:1	1:10
		CVN + wing	20,000		1:20
		DDG	1,700		1:2
Swarm (fast boat)	15	CVN	13,000	10:1	1:80
		CVN + wing	20,000		1:130
		DDG	1,700		1:10

Table 4.3—Continued

A2AD		Force Projection		Comparison	
A2AD Capability or Unit	Approximate Cost per Unit, in Millions of Dollars	Force-Projection Capability or Unit	Approximate Cost per Unit, in Millions of Dollars	Illustrative Engagement Ratio, A2AD:FP	Cost Ratio, Given Number of Engaged Units, A2AD:FP
ASAT HTK interceptor	20	ISR satellite	3,000	2:1	1:75
Advanced MRBM	11	Terminal High-Altitude Area Defense round	11	1:3	1:3
Basic SRBM	1	Patriot round	3	1:3	1:9

SOURCES: We drew A2AD unit costs from reporting and our estimates based on U.S. system analogues. We drew force-projection unit costs from Congressional Research Service reports, National Academy of Sciences reports, and Selected Acquisition Reports. Engagement ratios are notional.

NOTE: A blank cell indicates that the addition of the wing affects the cost but not the engagement ratio, so they are the same as the nuclear aircraft carrier (CVN) in that set. We have rounded the cost totals and cost ratios; they should be treated as approximate. DDG = guided-missile destroyer.

20 times the size of the Iranian economy.<sup>18</sup> However, in the past decade, the U.S. economy has grown by about 1.7 percent per year, compared with 6 percent for emerging regional powers (China 10 percent; others 5 percent on average). The Russian economic growth rate, dependent as it is on oil and gas prices, was approximately double that of the United States until 2013, at which point it shrank to well below that of the U.S. economy; Iran's economy has actually contracted in the past few years largely because of sanctions and collapsing energy prices—although this will change now that sanctions have been lifted.<sup>19</sup> The U.S. economy could grow by an average of just more than 2 percent in the coming years, whereas emerging regional powers' economies, including China, are expected to grow by more than 7 percent per annum.<sup>20</sup> Figure 4.2 shows the effects of these differential growth rates over time.

With its current debts and deficits, mounting opposition to federal spending, and eye-watering obligations to the generation now retiring in the United States, it seems unlikely that U.S. defense spending will swell in absolute terms or as a percentage of GDP like it did in the decade following 9/11—barring some shock to U.S. national security. Chinese defense spending is now growing faster than GDP—as much as twice as fast (18 percent versus 9 percent)—and can be expected to continue to expand at least at the rate of GDP growth (6 percent). The effects of this can be seen in Figure 4.3.

One-to-one comparisons of U.S. and Chinese defense spending do not sufficiently take into account the significance of geographic differences. The United States has global interests, responsibilities, and defense needs, while China is focused on reducing U.S. power and

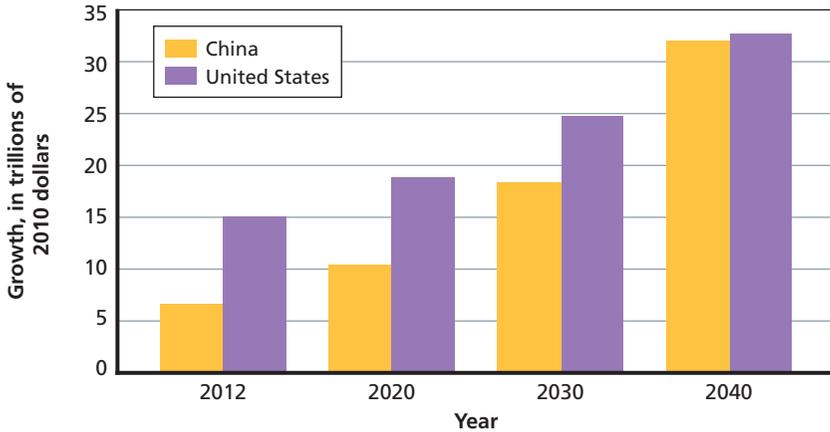
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<sup>18</sup> Comparative statistics from Central Intelligence Agency, "Russia," *The World Factbook*, June 20, 2014, as of August 2014.

<sup>19</sup> Recent emerging-economy growth rates (2004–2013): Argentina (6 percent), India (8 percent), Indonesia (6 percent), Mexico (3 percent), Pakistan (5 percent), Saudi Arabia (6 percent), South Africa (3 percent), Turkey (5 percent), Vietnam (6 percent), Brazil (4 percent), and Nigeria (8 percent) (International Monetary Fund, "World Economic Outlook Database," October 2014 edition).

<sup>20</sup> World Bank Group, *Global Economic Prospects, January 2016: Spillovers Amid Weak Growth*, Washington, D.C., January 2016.

**Figure 4.2**  
**Projected Gross Domestic Product Growth in China and the United States**



SOURCE: Kelly, Dobbins, et al., 2014.

NOTE: Comparisons employ market exchange rates. The purchasing power parity method shows a considerably higher Chinese total for the present and near future, but it makes less difference in the out-years as Chinese manpower and other costs rise to more closely approximate those of other developed countries. Assumed rates of growth were 5.7 percent per year, on average, for China and 2.8 percent for the United States.

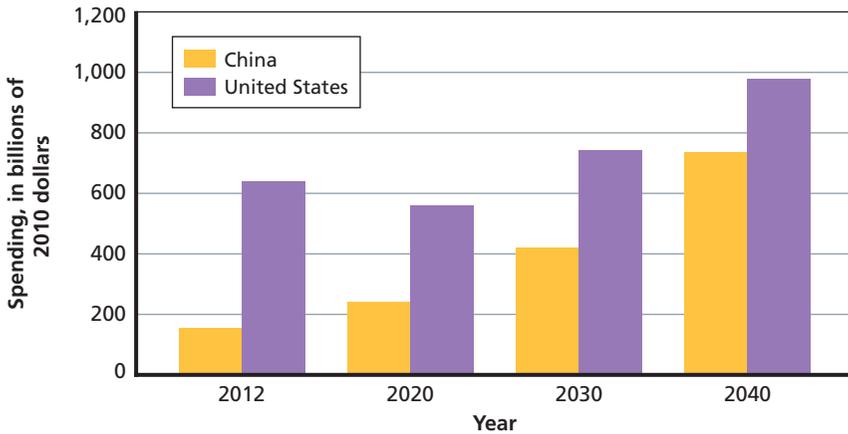
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the threat it poses to China's ambitions in its immediate region. Given the aggregate defense spending figures above and the size of the U.S. investment in the U.S. Pacific Command AO, China already spends roughly as much as the United States does on military capabilities in the region.

Again, it is difficult to say what the United States will spend going forward on force projection and what China will spend on A2AD. However, we believe that China has no higher defense priority and is strongly committed to enhanced A2AD specifically against U.S. force projection. It does not seem unreasonable to say that China will apply the same percentage of its spending to A2AD that the United States applies of U.S. defense spending to force projection.

In any case, the United States spends far more on force projection than China or any other potential adversary does on A2AD, yet the United States has lost ground. This is clear from defense budgets

**Figure 4.3**  
**Projected Defense Spending by China and the United States**



SOURCE: Kelly, Dobbins, et al., 2014.

NOTE: Projections assume that U.S. per capita spending on defense returns to its early post-Cold War level of 3 percent of GDP, while China continues at its current and recent historical level of 2.3 percent.

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and U.S. leader statements on the threat that other countries' A2AD capabilities pose, as previously cited. Therefore, it seems likely that the United States will lose ground more rapidly as its huge lead in defense spending shrinks. Meanwhile, the favorable cost-performance and return-on-investment economics of A2AD will increase the cost of force-projection capabilities for the United States.

Finally, cyberwarfare appears to be a very economical way of affecting military operations. Sophisticated offensive cyberwarfare is both difficult and expensive to counter via cyberdefense. Because cyberwarfare will be increasingly important in armed conflict and tends to benefit A2AD more than force projection (at least in the U.S. case) because of its less complex C2 requirements with respect to A2AD (until A2AD becomes highly dependent on global C4ISR), this development could further increase the economic burdens of U.S. force projection.

Technological and cost trends, taken together, are altering the math of targets and weapons that can strike them, much to the advan-

tage of A2AD. This is evident by examining only platforms and missiles that can be targeted on them. Considering the planned procurement of U.S. combat aircraft and naval surface ships, rising unit costs are forcing the United States to acquire and field fewer of them. For example, the reported cost per flying-hour of the multipurpose F-35 is roughly 10 percent higher than that of the F-16, its forerunner,<sup>21</sup> and a U.S. CVN is roughly twice the cost it was 20 years ago. Although it is true that these platforms are more capable than the earlier versions and that the stealthy F-35 is more survivable than the F-16, the basic fact remains that the number of targets U.S. forces present in projecting force has declined. In contrast, the number of missiles that China, Russia, and Iran hold is increasing, along with their range and accuracy. (Recall Figures 1.1 and 1.2 in Chapter One, showing the trends, past and projected, in weapon-system numbers.)

## **Conclusions: Integrating Operations, Geography, Technology, and Economics**

The operational asymmetries can be compounded by geographical asymmetries that tend also to favor A2AD. The main geographic advantage in projecting force is that only the regional state's homeland is exposed to conventional attack; indeed, the United States is coming to increasingly rely on attacking enemy territory to counter improved A2AD. However, with the spread of various retaliatory capabilities, adversaries can increase the risk for the United States of attacking their homelands.

Some key technologies, although applicable in both force-projection and A2AD missions, offer more advantage in A2AD, in which significant advances in targeting might come more readily, affordably, and continuously than advances in the platforms on which force projection depends. At the same time, A2AD becomes more difficult the farther it is extended. The goal of extending the reach of sensors, com-

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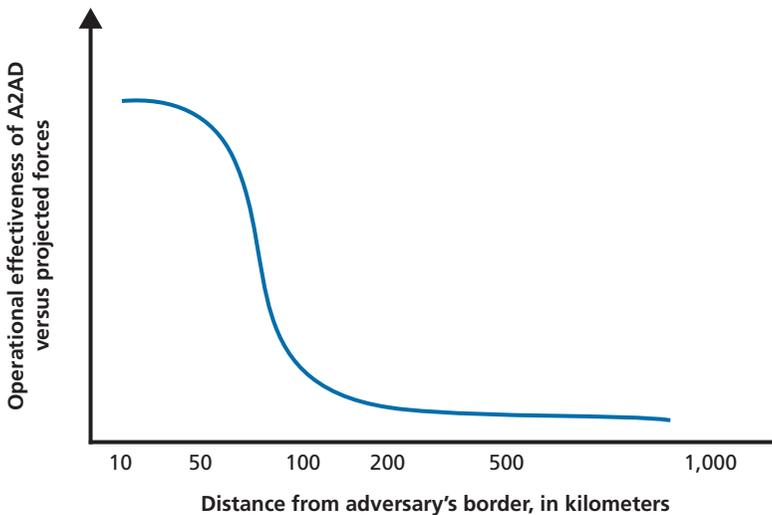
<sup>21</sup> Amy Butler, "F-35A Cost per Flying Hour Exceeds F-16 by 10%," *Aviation Week Network*, April 18, 2013.

munications, and precision weapons much beyond the horizon has been a challenge even for China and is beyond the technical means, sophistication, and resources of most countries. Beyond a certain distance, which, of course, can vary greatly by potential adversary and geographic location, projected forces will likely hold the upper hand. Not clear is whether U.S. forces can effectively carry out their missions when staying beyond such A2AD danger zones.

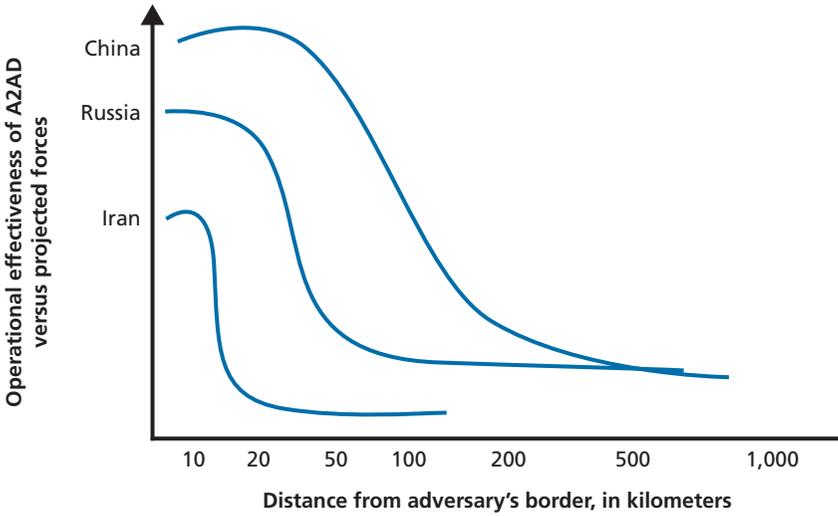
We capture the conclusions of this chapter in notional depictions of the relationship between A2AD and force projection over growing distance and over time (Figures 4.4, 4.5, and 4.6). These figures are meant to characterize how A2AD capabilities decrease with distances from the homeland and therefore affect the ability of a nation that wants to project force to operate. In Chapter Five, we make these ideas more solid by examining specific cases.

The vertical axes in Figures 4.4 through 4.6 represent the degree of A2AD operational effectiveness over projected forces; the horizontal axes represent distance from an adversary's borders or coasts. Figure 4.4 simply illustrates that the relative advantage of A2AD near the home-

**Figure 4.4**  
**Anti-Access and Area Denial Effectiveness over Distance**

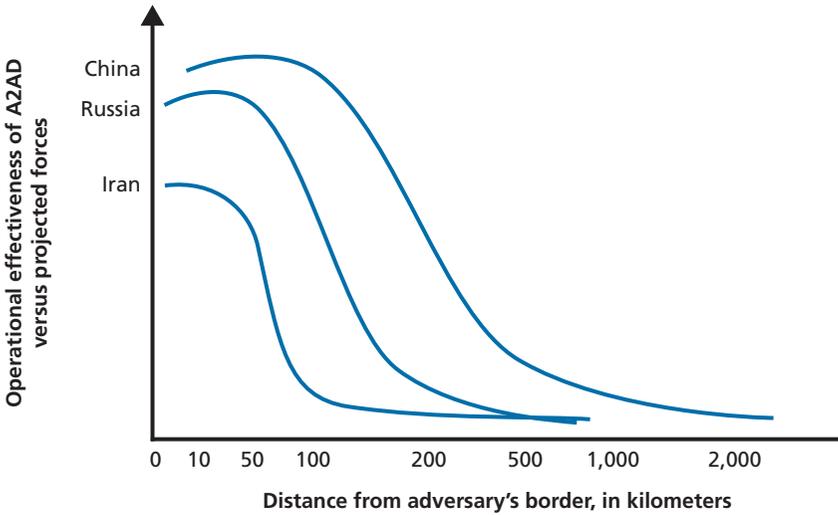


**Figure 4.5**  
**Anti-Access and Area Denial Effectiveness in 2015, by Country**



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**Figure 4.6**  
**Anti-Access and Area Denial Effectiveness in 2025, by Country**



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land, because of a combination of operational, geographic, and technological factors, decreases with distance. For example, A2AD effectiveness will decrease at distances outside the range of anti-aircraft systems and will further decrease as other systems can no longer be brought to bear. Just how steep the decline is depends on military-operational competence, commitment of resources, and the technological sophistication of the adversary, especially in mastering extended-range targeting (sensing and precision guidance), as well as other factors, such as geography. The area under the curve can be seen as the U.S. inability to project force with confidence of success at acceptable costs.

Obviously, the significance of geography varies from theater to theater, and some potential adversaries are more advanced than others. This does not mean to imply that the A2AD problem varies only in degree across adversaries. Under the rubric of A2AD, the emphasis on capabilities and strategy differs greatly. China can be regarded overall as the most comprehensive and difficult case, Russia as less difficult than China, and Iran as less difficult than either. Figure 4.5 shows notional A2AD curves for China, Russia, and Iran in 2015.

What of the future? A2AD's superior relative operational return on investment and the trends we discussed above mean that these curves will shift to the right and up for U.S. adversaries that are motivated to defend themselves against U.S. intervention and attack. Such adversaries—China, above all—will have the economic means to increase defense spending in general and to concentrate the increase on investment in A2AD. The United States will be able to offset improved A2AD only by increasing its investment in force projection, which might not be feasible in a constrained fiscal environment.

Figure 4.6 shows that China and other potential adversaries will be increasingly able to oppose U.S. intervention and attack, both by increasing the effectiveness of A2AD at a given distance and by extending the distance of effective A2AD. As already explained, the improvements in Russia's A2AD capability posited in this study assume a recovery in Russia's economy in the coming years, which seems improbable but cannot be excluded.

Chapter Five examines these curves through an analysis of hypothetical operations involving U.S. force projection and Chinese, Russian, and Iranian A2AD, close in and at distance, now and in ten years.

## **How Anti-Access and Area Denial Competes with Force Projection: Summary Assessment of Scenarios and Implications**

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Up to this point, we have described why the United States should anticipate an increase in A2AD capabilities in critical and contested regions; why potential adversaries in those regions—not just China but also Russia and Iran and perhaps others—have both the motivation and the wherewithal to increase their A2AD capability; and the operational, technological, economic, and geographic dynamics affecting the competition between force-projection capabilities and A2AD.

To bring all these threads together and increase confidence in these theories, we developed a series of scenarios that describe potential military conflicts between the United States and China, Russia and Iran. These scenarios were designed to test our central argument that A2AD is developing an operational advantage over force projection and that, barring changes in U.S. military strategy and forces, these trends will worsen. Therefore, we assume that U.S. capabilities will be those that now exist or are programmed to exist. The scenarios are not designed to test how the United States could respond differently, such as with A2AD of its own. In particular, they are not designed to consider how the United States and its partners might use A2AD to thwart aggression—we discuss that in subsequent chapters when we consider a proposed solution to the A2AD challenge.

### **Scenario Development**

A scenario-based approach is a reasonable method for examining these theories. Although a series of formal war games played by independent

players would be a better approach, doing so would have required an order of magnitude more resources than available here; however, war games that reflect on these scenarios are taking place at RAND and have affected our thinking.<sup>1</sup> The scenario-based approach we adopted seeks to add rigor to the maximum extent possible. For each confrontation, we wrote two separate vignettes, one set in the current time frame (2015) and one set ten years hence (2025).<sup>2</sup> We also had two sets of scenarios for China—one with a flashpoint in Taiwan and one with a flashpoint in the South China Sea (SCS). We also added a 2025 scenario in Iran that involved a nuclear Iran. Table 5.1 lists all nine scenarios. Each is intended to drive a rigorous thought process—to examine the A2AD–force projection competition in the context of the most important of the potential adversaries and examine the effects of the most critical of the discussed trends and dynamics discussed in Chap-

**Table 5.1**  
**Summary of Scenarios**

Combatants	Flashpoint	Year
United States and China	Taiwan	2015
United States and China	Taiwan	2025
United States and China	South China Sea	2015
United States and China	South China Sea	2025
NATO and Russia	Estonia	2015
NATO and Russia	Estonia	2025
United States and Iran	Strait of Hormuz	2015
United States and Iran (nonnuclear)	Strait of Hormuz	2025
Excursion: United States and Iran (nuclear)	Strait of Hormuz	2025

<sup>1</sup> See David A. Shlapak and Michael Johnson, *Reinforcing Deterrence on NATO's Eastern Flank: Wargaming the Defense of the Baltics*, Santa Monica, Calif.: RAND Corporation, RR-1253-A, 2016.

<sup>2</sup> The latter scenarios are unrelated to the former. For example, the 2025 conflict between the United States and Iran assumes that the events discussed in the 2015 scenario never happened.

ter Four. In particular, they investigate whether and how the A2AD advantage over force projection increases with time.

Full descriptions of these scenarios can be found in a companion volume, *Smarter Power, Stronger Partners*, Vol. II: *Trends in Force Projection Against Potential Adversaries*.<sup>3</sup> In this chapter, we summarize the scenarios and highlight important implications for U.S. military strategy.

These scenarios are narratives that describe the interplay between the combatants' strategic and operational objectives, concepts of operation, and military capabilities. They describe in specific terms the outcomes of the posited conflicts. The specificity of the narratives makes the concepts more tractable, while their plausibility lends weight to them. Our focus on particular adversaries and particular regions fixes the importance of trends in A2AD versus force projection in specific geopolitical and geographic contexts. At the same time, the variety of adversaries and the varied outcomes of the scenarios yield various potential lessons for the United States.

The scenarios postulate *military* conflicts only; A2AD developments will undoubtedly impact geostrategic competition even absent open warfare, but we do not explore those prospective impacts here. We developed the scenarios using publicly available literature and the input of subject-matter experts. The scenarios focus on particular aspects of the proposed campaigns and do not describe all, or even all important, operational details. Finally, the caveat that attends all similar exercises applies here: We do not intend these scenarios to predict these specific conflicts or to contend that these specific narratives are the single most likely way the contests would unfold. Any number of variables could induce different paths and different outcomes.

The current (2015) and future (2025) versions of the scenarios use a common flashpoint and geopolitical context, so that changes in capabilities (rather than, for example, political will) are the dominant cause of difference between the two cases. For adversaries, publicly available literature provided information on current capabilities and capacity, and we used literature and subject-matter expert input, combined with

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<sup>3</sup> Long, Kelly, and Gompert, in production.

our own judgment, to create the future picture. For the United States, we based 2025 capabilities and capacity on an extension of the current defense program, with no postulated major technical breakthroughs or dramatic reductions in force structure.

This work was completed, reviewed, and responses to reviews were in progress when the agreement with Iran on its nuclear program was completed in July 2015. As noted, the scenarios examined for this included a nuclear option for Iran in 2025. Although the agreement is meant to still be in effect then, it cannot be excluded that Iran will violate or abrogate it to resume its nuclear-weapon program.

## Summary of the Scenarios

The summaries that follow are highly condensed: The full versions run to about 50 pages each. These summaries are meant to describe the most-important elements to orient the reader to claims made about their implications in subsequent sections in this chapter.

A net capability assessment is offered for each adversary, in graphical form, at the end of this section.

### China

As shown in Table 5.1, there are four different China scenarios: 2015 and 2025 versions of a Chinese blockade of Taiwan and 2015 and 2025 versions of a Chinese seizure of Philippine territory in the SCS.

#### ***United States Versus China, Taiwan, 2015***

In response to indications that Taiwan will try to solidify its autonomy, Beijing embarks on a blockade to compel Taiwanese leaders to change their position. This campaign is not just a traditional naval blockade; it also includes strikes on any military capabilities that would allow Taiwan to resist. The United States responds forcefully and rapidly. The initial target set for cruise missiles and penetrating stealthy aircraft focuses on the Chinese kill chain—the means by which it can target U.S. forces. These include C2 networks and ISR, as well as air defenses and bases for Chinese aircraft and ships. U.S. submarines also sink

Chinese ships supporting the blockade. The chief Chinese replies are ballistic-missile and air-launched cruise-missile attacks against U.S. air bases in Japan and against U.S. ships.

The United States suffers significant losses, including the loss of surface combatants and a mission-kill of an aircraft carrier, but ultimately the continuing toll that U.S. SSNs exact on Chinese surface ships forces China to lift the blockade and cease hostilities.

### ***United States Versus China, Taiwan, 2025***

The 2025 scenario also addresses a Chinese blockade campaign answered by a U.S. response. China now has more-numerous and more-accurate SRBMs and IRBMs, bolstered by improved long-range ISR. These have a telling effect on U.S. airpower: Guam and bases closer in are now under significantly greater pressure, and carriers can be found and targeted with both ASBMs and ASCMs out to and beyond the range of U.S. attack aircraft. Missiles also prove threatening to other U.S. surface ships. China also has enhanced counterspace capabilities.

The U.S. approach to conflict is much the same: Strike Chinese C4ISR and other mainland targets when hostilities commence to kill the A2AD kill chain. However, the air-defense threat and the range from which tactical aircraft must operate, given the danger that Chinese missiles pose to both fixed bases and carriers, impedes the U.S. ability to comprehensively and promptly attack Chinese assets.

The conflict escalates when China attacks U.S. satellites and teeters at the brink of nuclear exchange. At this point, the United States, in an effort to suppress ongoing conventional ballistic-missile attacks, appears to strike China's nuclear force. China replies by hitting U.S. missile defense sites in Alaska. Sobered, the leaders find a way to negotiate a cease-fire.

### ***United States Versus China, South China Sea, 2015***

Conflict erupts over control of Second Thomas Shoal, territory currently controlled by the Philippines. The United States comes to the Philippines' aid after China blockades Philippine outposts and shoots down a Philippine Air Force plane. The United States is able to overcome Chinese efforts principally by making the SCS uninhabitable for the PLA Navy. Air superiority is comparatively easy to establish

and maintain. Chinese forces are unable to effectively target U.S. bases in the Philippines or Guam and unwilling to expand the conflict by attacking bases in Japan. U.S. forces do not initially strike mainland China, because it is judged that the risk of escalation would be great while the operational benefit would be limited. When China manages to hit a U.S. carrier with an ASBM, however, U.S. forces launch attacks against Chinese OTH radar and facilities linked to ASAT capabilities.

Like in Taiwan in 2015, attrition of PLA Navy surface ships by U.S. SSNs and aircraft convince Beijing to negotiate a cease-fire.

### ***United States Versus China, South China Sea, 2025***

Like in 2015, China attempts to seize control of islands held by the Philippines, with its power backed by improved long-range strike and ISR. Its ability to find and target U.S. ships and to hit U.S. air bases makes the conflict significantly more challenging for the United States. The United States has several surface combatants sunk or put out of action, including two aircraft carriers, by air- and submarine-launched ASCMs and shore-launched ASBMs. Chinese success prompts U.S. escalation to mainland attacks, focused on C4ISR networks and assets.

Ultimately, each side is able to deny the other control of the SCS—the United States with air and cruise-missile strikes and China with its formidable A2AD capabilities. The war concludes when China loses contact with a nuclear missile-carrying submarine and moves to a heightened state of nuclear alert. Alarmed, the two sides find agreeable cease-fire terms.

### **Russia**

The 2015 and 2025 Russia scenarios in Table 5.1 both describe a Russian invasion of Estonia that triggers a war with NATO. As noted, they assume a recovery of Russia's economy and state revenues.

### ***North Atlantic Treaty Organization Versus Russia, Estonia, 2015***

Russia invades Estonia to “protect the rights of ethnic Russians.” Russian conventional forces overrun their objective, a largely ethnic Russian enclave bordering Russia, before NATO can mount a credible defense. NATO political will is sufficient to uphold Article 5, and it

sets about pushing the Russian army out of the Baltics.<sup>4</sup> The chief Russian A2AD barriers to overcome are the modern air-defense network and conventionally armed SRBMs and ground-launch cruise missiles. Russian IADS, based in Kaliningrad and around Saint Petersburg, provide a complete shield over the Baltics. The SRBMs and ground-launched cruise missiles target NATO air bases as far away as England and threaten potential routes of advance.

NATO is superior in both capability and capacity. The crucial question is whether the threat of Russian nuclear retaliation will deter it from bringing its full power to bear. Russia might perceive a strategic threat if a NATO suppression-of-enemy-air-defenses (SEAD) campaign were to strike defenses around Saint Petersburg and elsewhere in eastern Russia. Russian nuclear doctrine also allows for the possibility that a significant conventional defeat on the ground in the Baltics could be met with a nuclear response.

NATO makes the crucial decision to not afford sanctuary to any Russian military assets supporting its forces in the Baltics; also, despite the danger that such a campaign could lead to a Russian nuclear response, it launches a SEAD campaign striking targets extensively in Kaliningrad and in Russia proper. When IADSs are sufficiently suppressed, NATO airpower exacts a tremendous toll on Russian ground forces. Russia withdraws as NATO ground forces, including U.S. brigades deploying from the continental United States (CONUS) into German ports, travel by ground transport and road march across Europe, and threaten Russian forces with defeat in detail.

### ***North Atlantic Treaty Organization Versus Russia, Estonia, 2025***

Like in 2015, Russia invades Estonia to protect the rights of ethnic Russians in enclaves that border Russia. Russian military capabilities have improved by a modest degree since 2015, but the basic military balance is unchanged. Air defenses and ground-launched missiles remain the most-threatening capabilities to the NATO relief of the Baltics.

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<sup>4</sup> Article 5 of NATO's Washington Treaty (NATO, "The North Atlantic Treaty, Washington, D.C., April 4, 1949," last updated March 21, 2016) states that an attack on one alliance member is an attack on all. See NATO, "Collective Defence: Article 5," February 18, 2005.

In addition to the systems in place in 2015, Russia has now fielded IRBMs. The geography is, of course, a constant and thorny problem.

Russia can quickly send large numbers of ground forces into Estonia and protect them from its own territory. Like in 2015, Article 5 treaty obligations are upheld, and Russian territory is targeted. NATO compels a Russian retreat as a combined-arms campaign closes on the Baltics and threatens defeat.

### **Iran**

Threats from Iran are different in magnitude from those from China or Russia. This is true both in their importance (Iran cannot threaten the United States in nearly the same way) and in their nature (Iran will remain significantly less capable of threatening U.S. forces or allies). That said, Iran still represents a class of threats to U.S. interests and partners that is important to consider.

Two Iran scenarios (as shown in Table 5.1)—one set in 2015, the other in 2025—describe a conflict in which the United States attempts to overcome an Iranian effort to close the Strait of Hormuz. A third scenario briefly depicts a similar conflict, also set in 2025, in which Iran has a small number of medium-range missile-deliverable nuclear weapons.

#### ***United States Versus Iran, Strait of Hormuz, 2015***

In the 2015 case, the United States can compel Iran to stand down in a matter of weeks with few losses. Iran is simply overmatched by U.S. force projection and, particularly, by U.S. airpower and the threat of ground invasion. The United States can operate short-range strike aircraft from basing locations close to the Strait of Hormuz, a boon to its ability to target and suppress the ships and missiles that Iran requires to threaten shipping, though missile-hunting success is uneven. Iran cannot mount a convincing threat to these bases, although it has some success with irregular attacks and aims its inaccurate ballistic missiles at soft targets in an effort to intimidate regional U.S. allies. When it becomes apparent that the operational tide inevitably favors the United States and that the United States is willing and able to escalate the conflict, Iran backs down.

The greatest challenge for U.S. forces is enabling and conducting an extended air campaign against fleeting targets in the littoral. U.S. forces also need to suppress Iranian air defenses to reduce the threat to patrolling aircraft. Importantly, in this scenario, demonstrated air dominance and the threat of ground invasion caused by the movement of large ground units from CONUS toward the Middle East that could result in regime change leads to Tehran's capitulation before the area is entirely sanitized of Iranian threats and before U.S. naval assets are forced to do significant work in harm's way. It seems probable that, with political will, Iran could have sustained a threat to Strait of Hormuz shipping for a considerably longer period—at least until U.S. ground forces took control of key areas on the northeastern side of the gulf and strait. Iran also had some irregular escalation options—such as sponsoring terrorist attacks against regional U.S. allies—that it did not exercise.

#### ***United States Versus Iran, Strait of Hormuz, 2025***

The 2025 case shares an outcome with the 2015 case: The United States can compel Iran to stand down. However, this future campaign is significantly more challenging. It is twice as long and involves significantly greater air and naval losses, and the United States never fully defeats Iran's A2AD capabilities. Ultimately, its decision to deploy significant ground forces to the Middle East and threaten invasion and regime change leads Tehran to cede the fight, under the understanding that this will stop the invasion threat. Greater numbers of more-accurate SRBMs and MRBMs enable Iran to pose a potent threat to fixed regional targets, forcing the United States to operate from air bases outside SRBM range and intimidating local U.S. partners. Iran's ISR is still comparatively weak, but its ASCMs are capable, and it can find and target U.S. ships with irregular means, exacting a significant toll on U.S. navy surface combatants in the Persian Gulf. The United States lacks the capacity and operational wherewithal to fully suppress the ballistic- and cruise-missile threats and the air defenses that sheltered them.

***Excursion: United States Versus Iran, Strait of Hormuz, 2025 (Nuclear)***

Unsurprisingly, adding operational nuclear weapons to Iran's 2025 A2AD capabilities leads to a radically harder and riskier challenge for the United States. The United States enjoyed escalation dominance over a nonnuclear Iran in the prior two scenarios, a strategic advantage that was ultimately the key to unlocking the operational A2AD challenge at an acceptable cost. Now, actions that seem to threaten Tehran with regime change invite nuclear retaliation.

This excursion outlines two broad alternative directions for the ensuing conflict. In one case, the United States avoids hitting targets that Iran would perceive as threatening the regime or its nuclear capability. This shelters some Iranian ballistic missiles and air defenses and makes it significantly harder for the United States to roll back Iranian A2AD in the Strait of Hormuz. The two sides battled to a stalemate. In the other case, the United States embarks on a comparatively unconstrained effort very similar to the nonnuclear 2025 campaign. The conflict spirals out of control and leads to a nuclear exchange.

**Net Capability Assessment**

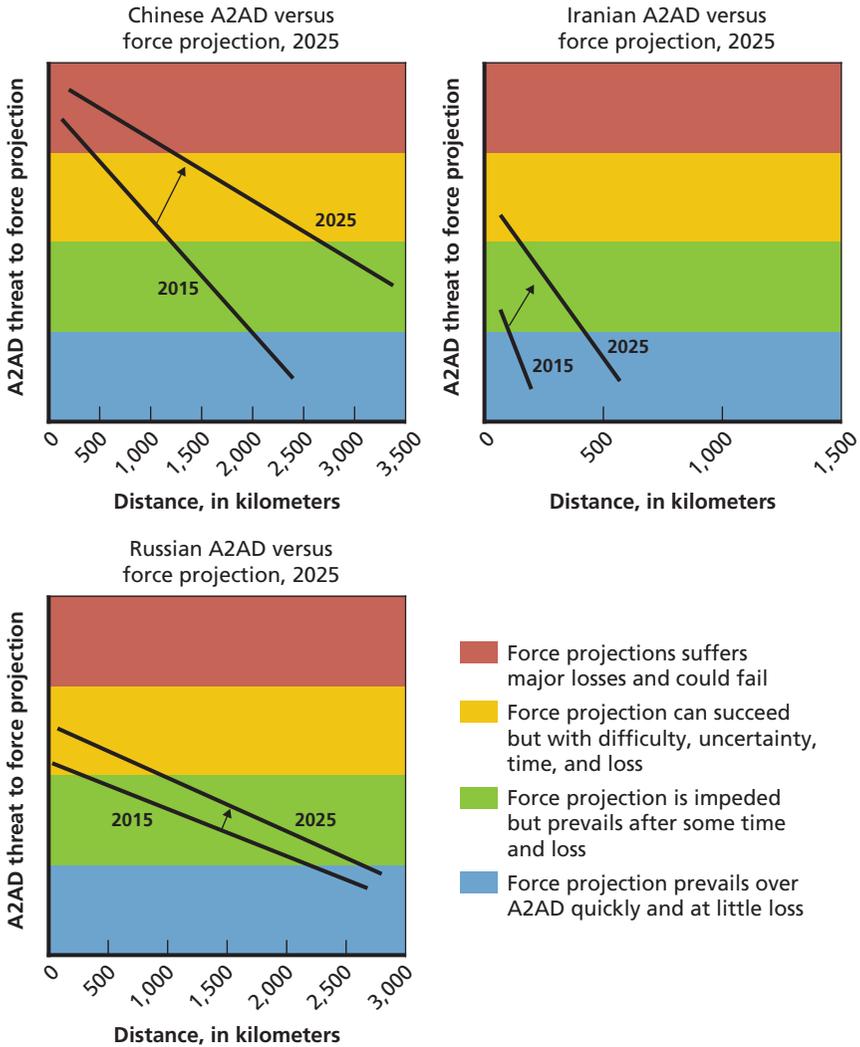
For the three countries and scenarios, Figure 5.1 provides a net capability assessment, in graphic form, of adversary A2AD versus U.S. force projection over distance and over time. (It does not include the nuclear Iran excursion.) The black lines that trace the threat are aggregations of assessments of individual capability contest areas (e.g., A2AD versus fixed assets, A2AD versus strike aircraft). They are necessarily approximate. The implications of these assessments are discussed below.

**Implications of the Scenarios**

**The Adversaries Matter, and They Are Getting Better at Anti-Access and Area Denial**

The adversaries in these scenarios are both strategically significant and plausible as adversaries. The underlying details vary, but there are other common elements. Each scenario, in both 2015 and 2025, shows that

**Figure 5.1**  
**Net Capability Assessment**



NOTE: The black lines that trace the threat are aggregations of assessments of individual capability contest areas (e.g., A2AD versus fixed assets, A2AD versus strike aircraft). They are necessarily approximate.

each adversary's ability to threaten U.S. forces diminishes as distance from its homeland increases. However, the threat at a given distance, as well as the geographical upper bound, grows during the intervening decade. The net assessments shown in Figure 5.1 tell this story graphically, but one point deserves special emphasis. In two cases—China in a Taiwan conflict and Russia—this A2AD shield enables aggression in the near abroad. China is less successful in the SCS, where it lacks such a shield even in 2025. For Iran and the Strait of Hormuz, a close-in keep-out zone is an end unto itself, and its extension in the future complicates a U.S. response.

A core element of this ability to extend A2AD over distance is common to all the scenarios: missiles. Both ballistic and cruise missiles are central to each adversary's A2AD challenge to U.S. force projection. China, which is significantly more capable than Russia and even more so than Iran, is the only power able to hit U.S. ships.<sup>5</sup> This is enabled by long-range C4ISR linked to platforms (e.g., submarines, bombers) that can extend the threat from the mainland. Air-defense missiles are also potent A2AD weapons for Russia and China.

The missile gains attributed to Russia and China call out systems that have already been fielded or that are thought to be in the final stages of development. Moreover, increases in inventory are shown to be as critical as capability improvements. The missile gains attributed to Iran come entirely from increases in its inventory of existing systems or from systems that Iran buys from China or North Korea; no indigenous technical breakthroughs are needed. In all scenarios, these adversaries successfully target fixed locations, which does not require sophisticated C4ISR.

However, adversaries do improve the quality and range of their C4ISR assets over the decade. Whether through enhancements to space-based ISR and communications or by acquiring drones, each adversary's A2AD assets are better able to engage U.S. and allied forces

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<sup>5</sup> In the unlikely case that the Russian economy recovers, Russia has the actual and latent capability to be better than described in the scenarios. The INF Treaty currently suppresses its SRBM capabilities. It has submarine- and air-launched cruise missiles that were not shown in use against U.S. ships.

early and at distance. These improvements also increase the utility of A2AD to as a shield for enemy force projection.

### **The Conflicts Become More Difficult and More Costly over Time**

Although U.S. forces are unlikely to be defeated outright in any of the scenarios discussed here, even in 2025, the risks are much greater in 2025 than in 2015. Each 2025 conflict was longer and costlier, with the outcome somewhat more in doubt and the possibility of unintended escalation higher. This reflects adversaries' growing A2AD capabilities and the fact that these improvements are occurring faster than the United States can sustain its ability to project force at acceptable levels of cost and risk.

The second-order effects are also worrisome. Adversaries could come to see the United States as more easily deterred and thus might be emboldened to take aggressive action. The particulars of each conflict compound this risk because the adversaries arguably have greater interests at stake than the United States: For Russia and China, there are perceived rights in the near abroad, and Iran is driven to defend itself. The scenarios also describe outright aggression, but the reality might be subtler, leaving U.S. leaders uncertain of the threshold for intervention. For example, the adversaries addressed here could focus on coercing or threatening their neighbors without the actual use of military force.

### **The Risk of Escalation Increases**

The scenarios serve to highlight how countering A2AD capabilities can increase the risk of escalation. In each scenario, to overcome A2AD, the United States launches extensive conventional strikes against the adversary's homeland. In general terms, this is escalatory: In the China and Russia scenarios, the United States meets regional aggression against a U.S. partner or ally with a broad U.S. attack. Some operational and tactical elements are also escalatory, with the United States targeting national C2, IAD, ballistic missiles, and other strategic assets. When the adversary has nuclear weapons, the potential consequences of uncontrolled escalation are immense.

Escalatory risk is exacerbated in China in the 2015 case when U.S. forces attack C4ISR facilities on the mainland to prevent China

from finding and targeting U.S. warships. The risk is exacerbated in Russia in the 2015 case when the United States attacks strategic missile defenses near Saint Petersburg because those defenses extend a shield over Estonia.

Unlike Russia, China has a nuclear no-first-use policy. Nonetheless, risks of escalation in the China scenarios increase by 2025, and U.S. forces are under increased pressure to destroy the mainland-based kill chain that supports Chinese A2AD. Yet China also has a greater ability to respond with nonnuclear assets, notably cyber and ASAT. Nuclear escalation is avoided, but a nuclear exchange could not be ruled out had the conflict not stopped when it did.

One escalation dynamic that is *not* captured in any of the scenarios is worth noting. The United States, particularly against an adversary like China, might be motivated—or perceived as motivated—to attack at the first hint of hostilities. This is because the operational benefits of destroying an adversary’s kill chain before it can be put into action could be enormous. In a crisis, this is a dangerous dynamic that leads to instability.

## Conclusions

As offensive force becomes less usable in these critical and contested regions, U.S. reliance on it as the principal instrument of power leaves the United States less able to support its interests and allies, much less to impose its will on adversaries. Note that we do not believe that the declining usability of U.S. offensive force *necessarily* would cause such a decline in U.S. power, but it will necessitate changes in *how* the United States uses power.

In the next two chapters, we offer a series of options for a way ahead, assess those options, propose a portfolio of strategic choices that collectively make up a strategy, and weigh the pros and cons of the different choices.

## Alternative Counter–Anti-Access and Area Denial Strategies

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Having now considered the challenges A2AD presents to force projection and the implications of the scenarios, we examine three broad alternative approaches to the military-operational and geostrategic problems that A2AD poses:

- Preserve the U.S. ability to project offensive military force despite A2AD.
- Reduce the impact of A2AD by enhancing the U.S. ability to project nonmilitary power.
- Adopt a *Blue* A2AD strategy as a way to prevent adversaries from committing regional aggression under cover of *their (Red) A2AD*.<sup>1</sup>

These are not mutually exclusive approaches; moreover, each has its variants. Yet the alternatives differ fundamentally in their thrust and implications. The first would seek to retain offensive force projection as an indispensable instrument of U.S. strategy in contested regions of the world. The second would rely more on nonmilitary powers of coercion and influence to support U.S. interests. The third would shift U.S. overseas military posture from offensive to defensive and increase reliance on allies in contested regions to play a larger role in planning for and investing in their own defenses.

None of these alternatives presupposes or implies a diminution of basic American interests, responsibilities, or role in the world as a

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<sup>1</sup> *Blue A2AD* refers to the collective A2AD capabilities of the United States and its regional allies.

whole or in these regions. Economic integration and the global ramifications of local and regional conflicts preclude U.S. isolation. The United States cannot relinquish the ability to shape affairs and to protect its interests, allies, and stability in regions that are critical to the global economy and security. Thus, the question of U.S. involvement and influence in the world and in these regions is thus not whether but how. At the same time, the declining usability of offensive force projection might require recalibration of interests that warrant its use, an issue to which we will return.

This chapter explains these three broad alternatives and their variants in general terms, with more-detailed discussion of selected ideas in Chapter Seven. We then assess them side by side against common criteria and the scenarios summarized in Chapter Five and presented in detail in the companion volume.<sup>2</sup>

## The Alternatives

### 1. Preserve the U.S. Ability to Project Offensive Military Force

The premise of this response is that the United States *must* be able to project offensive military force decisively into critical regions despite A2AD; therefore, it must contest the adverse technological, economic, and operational difficulties we have identified. Because of advances in targeting capabilities, merely continuing to rely on highly visible, highly valuable platforms will not suffice, especially as their costs climb and numbers shrink. The growing advantages of A2AD over force projection are, to some extent, the product of existing technologies. But technologies advance, especially with purposeful research, development, and innovation, something at which the United States excels. Thus, this broad alternative depends on investment in new technologies that can contest A2AD.

Under this general concept of defeating A2AD, several specific options are to (1A) improve force protection as a way to preserve force-projection options; (1B) target and destroy enemy A2AD capabilities;

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<sup>2</sup> Long, Kelly, and Gompert, in production.

(1C) shift toward less vulnerable platforms; (1D) emphasize long-range conventional strike capabilities; and (1E) shift emphasis from kinetic warfare to cyberwarfare.

### **1A. Improve Force Protection**

As we have argued, strike platforms—aircraft carriers, other surface ships, manned aircraft, operating bases—are becoming increasingly targetable and vulnerable to SSMs, SAMs, SSNs, and other A2AD systems. Moreover, as explained above, persistent growth in the cost of these platforms means that the United States is acquiring and deploying fewer of them. In contrast, the numbers of weapons that can be targeted on these platforms are growing significantly. As the United States faces this mounting problem of smaller numbers of costlier platforms that become increasingly vulnerable to A2AD, a natural U.S. military response is to try to protect them better.

At the moment, protecting legacy platforms is difficult for the basic reason that advances in targeting technologies are making conspicuous objects on or near the earth's surface increasingly easy to find, track, and strike with accurate weapons—the larger and slower the objects, the easier. Investment in proven force-protection technologies might yield diminishing returns as A2AD capabilities improve and multiply. HTK BMD is no match for very large and sophisticated missile salvos, of which China and Russia will be capable; how well HTK can cope with Iran's missile threat depends on the size of Iran's arsenal by 2025. Likewise, ASW has advanced marginally in decades, whereas the SSN threat is growing because of the proliferation of quiet and relatively inexpensive air-independent propulsion (AIP) submarines.<sup>3</sup> The utility of the surface combatant, in the words of one analyst, “could be drastically limited if a submarine threat imposes a no-go area. And as more new AIP subs enter service, denying the problem is less and less of

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<sup>3</sup> ASW has not stagnated, but it is showing signs of disarray. The end of the Cold War stopped the push for quieter submarines on both sides, and the United States scrapped improvements to the P-3 sub-hunting plane and the P-3's replacement. The carrier-based S-3 Viking went the same way. More recently, the United Kingdom retired the Nimrod and canceled its deeply flawed MRA4 replacement sub-hunters. ASW assets and crews have been diverted to reconnaissance missions in overland and littoral wars.

an option.<sup>34</sup> Regarding top-of-the-line IADS, only the most-advanced stealth technology enables penetration by manned aircraft, and it is still to be seen whether even the best available stealth will be able to defeat increasingly powerful and sophisticated radar systems, although these systems could be susceptible to U.S. electronic warfare and cyber measures.

At the same time, some technologies on the drawing board might someday be effective against one or another A2AD capability and could merit investment. To penetrate IADS, drones—actual and decoy—offer the potential of larger numbers, thanks to low and declining cost; are less observable; and are more expendable than manned aircraft. Hypersonic weapons offer much greater speed (up to Mach 25), yet are maneuverable. As for BMD, directed-energy weapons might someday be able to counter large missile attacks to a degree that HTK systems cannot, although initial applications are more likely to be against targets that are slower and more vulnerable than ballistic missiles, e.g., aircraft and cruise missiles.<sup>5</sup> Advances in ASW might depend on non-acoustic detection. We explore these possibilities in Chapter Seven.

The alternative of exploiting new technologies to afford U.S. forces better protection against A2AD is, broadly stated, a concept of growing interest in DoD called the third offset.<sup>6</sup> Our analysis indicates that this is an important idea that deserves to be pursued. However, before new technologies can be exploited, they have to be developed, made practical, produced economically—and profitably—by industry, incorporated into operating concepts, and integrated into U.S. forces. In regard to both nonacoustic submarine detection and non-HTK BMD, it is far too soon to judge whether either can make it through all these gates *and* produce results that match their promise. At the

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<sup>4</sup> Bill Sweetman, “Opinion: Submarine Tech Outpacing ASW,” *Aviation Week and Space Technology*, May 13, 2014.

<sup>5</sup> Sydney J. Freedberg, Jr., “Laser Weapons: Lower Expectations, Higher Threats,” *Breaking Defense*, May 19, 2014.

<sup>6</sup> Deputy Secretary of Defense Robert Work discussed the third offset strategy and its implementation program, the Defense Innovation Initiative, in a speech that can be found at DoD, 2015.

same time, the deterioration of U.S. force-projection capability due to A2AD is a reality, as Chapter Five indicated. While altering that reality by seeking technological breakthroughs is a worthy effort, it seems imprudent to bank on it.

Apart from the inherent uncertainties of investment in new technologies, there are two general problems with the option of relying on improved force protection to overcome the advantages of A2AD. The first is that this likely will take a long time; meanwhile, unfavorable geopolitical conditions in critical regions can set and be hard to reverse. The second problem is that the United States could find itself pouring more and more money into force projection only to slow the rate of decline of its usable offensive force-projection capability. Physical laws seem to suggest that targeting conspicuous objects is easier than defending them. Moreover, the payoff from force-protection investments would be hostage to how adversaries respond; for instance, ships on which BMD lasers could be mounted might become more vulnerable to submarines.

In sum, the pursuit of new “anti-A2AD” technologies, including the third offset, could be an important component of a new strategy, but such a pursuit does not, at this point, clearly obviate the fundamental logic driving the shift in usable power considered here.

### ***1B. Target and Destroy Anti-Access and Area Denial Capabilities***

For the United States, targeting and breaking the kill chain of enemy A2AD is feasible with its current capabilities. Kinetic strike and cyber-weapons can take a large toll on enemy missile launchers, submarine bases, land-based sensor systems, air-defense installations, and C2 centers, as well as on the data networking and processing systems that enable them. As already explained, the most-capable and threatening A2AD consists of complex and fragile systems of systems, the overall performance of which depends on the integrated use of all components. If single components or links between components are broken, the effectiveness of A2AD as a whole can suffer, which would open the way for U.S. offensive forces.

However, what might seem to be a sound warfighting strategy has significant risks.<sup>7</sup> Because the optimal time to attack A2AD is, by its very design, before it can be effectively used against incoming forces, there is a reward in striking first, even preemptively, and conversely a penalty for waiting to be struck. Whether this is U.S. policy, and noting that policies can change faster than investments in force capabilities, pressure to strike before being struck could intensify in a crisis. Because the enemy will make a similar calculation, its incentive to use its A2AD before losing it will increase. Some recent Chinese writings reveal a perception that U.S. military strategy points toward early, if not preemptive, attack on Chinese A2AD.<sup>8</sup> Each side being aware of the other's temptation to preempt, crises could become unstable.

Moreover, because an enemy's A2AD is based mostly on its territory, homeland attacks would be required from the outset. As homeland-based A2AD capabilities are thickened, such attacks might need to become deeper and more extensive and therefore not only more destructive but also more likely to be interpreted as "strategic" in purpose, e.g., the elimination of the enemy state. While this might not be a decisive consideration in regard to war with Iran, it could be in the cases of China and Russia.

Thus, the strategy of killing the A2AD kill chain before it can kill one's forces is potentially both destabilizing and escalatory. On top of these risks, this approach does not deal with the underlying problem of vulnerability of U.S. forces operating in the critical regions examined here. Although attacking A2AD is an option that the United States should have, on its own, it leaves the United States dependent on homeland attacks.

### **1C. Shift to More-Survivable Platforms and Bases**

A way to remedy the vulnerability problem other than to protect legacy forces or to attack the enemy homeland is to complicate the targeting

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<sup>7</sup> See David Gompert and Terrence Kelly, "Escalation Cause: How the Pentagon's New Strategy Could Trigger War with China," *Foreign Policy*, August 3, 2013.

<sup>8</sup> See "Not to Be Misunderstood: Air-Sea Battle Is Officially Directed at China," in Chinese, *Global Times*, January 12, 2012.

on which enemy A2AD depends. Because the success of targeting has depended on the availability of relatively small numbers of conspicuous platforms of highly concentrated value that are now within range of precision weapons, A2AD could be degraded by a diverse mix of different types of platforms and vehicles, emphasizing numbers, elusiveness, concealment, and distribution. Five stand out:

- low-cost advanced missile-launching nonnuclear submarines
- air, surface, and undersea drones
- low-cost, numerous, distributed drone or missile launchers (sea- and land-based)
- more-numerous, dispersed bases
- long-range fires and bombers.

Taking full advantage of IT, the United States could shift toward such hard-to-target, distributed, affordable platforms and vehicles in larger numbers than legacy systems.<sup>9</sup> The effect would be to present enemy A2AD with a far more complex and daunting targeting problem than the one for which it has been designed. This would make the challenges of sensing, targeting, and C2 problems far more difficult, as well as require more weapon systems and ammunition to adequately challenge force projection. A more survivable U.S. force posture along these lines would discourage preemptive attack, obviate the need for U.S. early-in-the-conflict homeland attacks, allow time for a crisis to be defused, and preserve strike capacity—thus enhancing both deterrence and stability.

Of course, shifting to more-survivable platforms and bases has major implications for force structure, force planning, investment, infrastructure, and diplomacy. Although the types of platforms prescribed would most likely be less costly to build and operate than current ones, transition costs could be large and spread over years, if not decades. Current legacy forces have long life expectancies and are not about to be discarded; rather, they would be replaced through attrition.

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<sup>9</sup> A detailed description of what this would mean for the transformation of U.S. naval forces can be found in Gompert, 2013.

Therefore, the more survivable platform posture suggested here is one toward which the U.S. military can, at best, evolve. Although reduced targetability could serve as a principle for force development, current U.S. platforms will continue to form the backbone of its force-projection capability over the coming decade.

Finally, long-range fires and bombers would place U.S. assets out of range of most enemy A2AD systems. We discuss these in the next section.

### ***1D. Emphasize Long-Range Strike***

Because the A2AD problem is a regional one, perhaps it can be solved with intercontinental capabilities. If limited tactical or theater weapon ranges require U.S. platforms to be within targeting distance range of enemy A2AD capabilities, such as MRBMs and AIP submarines, longer-range weapons could negate this disadvantage. This concept is already in play with the outfitting of Trident submarines, previously used only for strategic-nuclear deterrence, with long-range conventional-armed missiles. Also, the United States has a large and diverse fleet of long-range bombers, which can be used for global conventional strikes (as well as part of the strategic-nuclear deterrent force). With existing technology, the United States is capable of fielding new long-range ballistic, cruise, and hypersonic weapons for precision conventional strike and thus reducing dependence on aircraft carriers, other surface strike platforms, and air bases within A2AD ranges.

As a general approach, this one involves numerous complications. First, long-range weapons tend to be perceived and defined as strategic, even if their intended missions are tactical (e.g., enemy conventional forces).<sup>10</sup> Second, the enemy could interpret their actual use as part of a strategic attack, such as a disarming first strike against the nuclear deterrent forces of an adversary, conceivably leading to those forces being launched against the United States. However, it is not clear that using these weapons would be more destabilizing than shorter-range weapons that could also be carrying nuclear weapons, such as those

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<sup>10</sup> Another complication could be whether long-range weapons are to be counted in strategic arms limitation agreements—or, alternatively, would they preclude such agreements (if land-based and with ranges of 300 to 3,400 miles, they are already banned under the INF Treaty)?

launched from submarines. Third, the cost of replicating theater strike capabilities with high-volume global ones would be huge, because increasing range implies increasing costs. Fourth, current long-range (strategic) bombers could have as much difficulty penetrating enemy IAD as theater-range aircraft do.

The fifth consideration is geopolitical: Standoff global strike systems provide no regional presence and thus less reassurance and influence than theater ones. Although the reasons A2AD is becoming increasingly potent would argue for the efficacy of such an approach, the physical presence of U.S. forces in the region communicates commitment the way that extraregional weapons arguably cannot. Allies and adversaries could interpret increasing reliance on global strike as an indication that the United States is disengaging and retreating, striking out only if directly threatened. So the detrimental political effects of A2AD, described above, would occur anyway. In sum, the notion that the United States can replace vulnerable forward forces with long-range standoff ones must take into account the strategic risks and geopolitical deficiencies of such forces.

### ***1E. Shift Emphasis from Kinetic Warfare to Cyberwarfare***

Cyberwarfare offers the United States a new option for projecting power—less violent than physical military force, but potent nonetheless. Already, the U.S. military contemplates cyberwarfare as an aspect of joint operations. Targets could include enemy C4ISR, other A2AD capabilities, force operations, logistics, communication networks, and other war-making systems. (In addition, the United States can be assumed to have capabilities to degrade enemy government services and critical national-economic functions. We consider such non-military cyberoperations later.) Against the well-prepared, large, and sophisticated cyberattacks of which the United States will be capable, defense is difficult and expensive.

The potential adversaries examined here are, to varying degrees, information-dependent: China virtually as much as the United States

and Russia and Iran less so but increasingly.<sup>11</sup> In particular, their A2AD strategies and capabilities, as described here, cannot perform well if the computer systems and networks that integrated them are crashed. Compared with deep, early kinetic attacks on enemy homeland-based A2AD infrastructure, cyberattacks would be less violent, obviously, and perhaps less escalatory.

U.S. cyberattacks would likely produce enemy cyber retaliation (if the adversary had not itself initiated cyberwarfare). If the enemy had initiated cyberwarfare, which is likely given U.S. dependence on information systems for all aspects of warfighting, escalation would be an issue. China and Russia are in the top tier of cyberwarfare capabilities; Iran also has significant capabilities. Networks on which the U.S. military relies, such as those that support global communications and logistics, could be vulnerable—tactical C4ISR less so, for now. Moreover, critical U.S. governmental and commercial functions depend on networks owned and operated by service providers and are vulnerable. It might be in the U.S. interest to confine cyberwarfare to military tactical-operational targets and to avoid “strategic cyberwarfare,” which reliance on this option might cause if enemy strategic assets are struck or the enemy chooses to escalate. Whether and how cyberwarfare can be controlled and contained is not understood. In sum, given the likelihood of retaliation and the danger of escalation, cyberwarfare is a high-return, high-risk approach, to which we return in the discussion of P2C.<sup>12</sup>

## **2. Enhance U.S. Ability to Project Power Other Than by Offensive Military Force**

The U.S. response to the A2AD problem need not be limited to the military realm. Because the United States has relied so heavily on force

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<sup>11</sup> See David C. Gompert and Michael Kofman, “Raising Our Sights: Russian–American Strategic Restraint in an Age of Vulnerability,” *Strategic Forum*, No. 274, January 2012.

<sup>12</sup> See David C. Gompert and Martin Libicki, “Cyber Warfare and Sino–American Crisis Instability,” *Survival*, Vol. 56, No. 4, July 25, 2014, pp. 7–22; Lawrence J. Cavaiola, David C. Gompert, and Martin Libicki, “Cyber House Rules: On War, Retaliation and Escalation,” *Survival*, Vol. 57, No. 1, 2015, pp. 81–104; David C. Gompert and Martin Libicki, “Waging Cyber War the American Way,” *Survival*, Vol. 57, No. 4, July 22, 2015, pp. 7–28.

projection, *force projection* has become virtually synonymous with power projection. But power comes in different flavors. Hard power is essentially the use of military means to force enemy regimes to change their ways or to weaken or change those regimes. Soft power relies on influence, institutions, and such instruments as diplomacy, foreign aid, democracy promotion, and cultural exchanges to persuade other societies to seek what Americans seek and act as Americans act.<sup>13</sup> If hard power compels, soft power co-opts.

Conceptually, there is a third category: using nonmilitary means to make unfriendly states do what they would rather not do.<sup>14</sup> Think of it as an alternative to making war and making nice—a nonviolent way of imposing pain until or unless the target state complies with U.S. demands. We call this the *power to coerce* (P2C), of which the United States has considerable capability, if it uses it skillfully and strategically. To what extent P2C (2A) and soft power (2B) can substitute for hard military power and thus reduce the impact of A2AD is a critical question.

### **2A. Power to Coerce**

Compared with projecting offensive military power into contested regions against A2AD, U.S. P2C can be less difficult, costly, destructive, risky, and thus more usable. P2C includes economic sanctions, punitive political measures, cyberoperations, intelligence operations, resource denial, interdiction of goods and people, military assistance for friendly states and for groups sympathetic to U.S. interests, police actions, and support for nonviolent political opposition. P2C does not literally compel compliance with U.S. aims.<sup>15</sup> Because it leaves the choice to the adversary, the outcome is not guaranteed. But if

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<sup>13</sup> Soft power as a concept and term is traced to political scientist Joseph Nye to describe the use of diplomatic, political, social, and other means of persuasion that do not rely on military force.

<sup>14</sup> P2C is not the same as smart power, which supposes the ability to know when to apply either hard or soft power and implies the willingness and ability to use both.

<sup>15</sup> This section is based on David C. Gompert and Hans Binnendijk, *The Power to Coerce: Countering Adversaries Without Going to War*, Santa Monica, Calif.: RAND Corporation, RR-1000-A, 2016.

the adversary is vulnerable, P2C can be quite prejudicial. While P2C cannot accomplish all the same objectives that hard power can, U.S. experience in the 21st century indicates that it can do things that soft power cannot.

The United States has a variety of nonmilitary coercive options:

- *economic sanctions*: The United States has used economic sanctions as an alternative to force. For example, although it is unclear whether international sanctions can permanently dissuade Iran from acquiring a nuclear-weapon capability, the pain has arguably been strong enough to bring about an agreement to suspend such efforts for the near term.<sup>16</sup> Likewise, financial sanctions appear to have blunted Russia's attempts to destabilize Ukraine. The advantage of financial sanctions is that they can constrict investment, commerce, and any other endeavors that depend on credit and capital. The United States has become adept at this practice, but economic sanctions against China would be highly problematic, given its role in the world economy.
- *coercive cyberoperations*: As already noted, the United States has considerable capacity to conduct cyberoperations against adversaries other than armed conflict. For example, it could interfere with an adversary's nonmilitary computer networks. Of the three potential adversaries examined in this study, China is most vulnerable because it is most dependent on computer networks, followed by Russia and Iran. However, it is unclear how cyberwar could be contained—whether it might escalate in the cyber domain or jump into physical conflict—so its use could be risky.<sup>17</sup>
- *energy*: The shale revolution has made the United States a major international supplier of oil and liquefied natural gas (LNG).<sup>18</sup>

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<sup>16</sup> The Joint Comprehensive Plan of Action requires Iran to limit its nuclear enrichment activities for 15 years. For details, see U.S. Department of State, "Joint Comprehensive Plan of Action," undated.

<sup>17</sup> Gompert and Libicki, 2014.

<sup>18</sup> See, for example, Amy Myers Jaffe and Edward L. Morse, "Liquefied Natural Profits: The United States and the Remaking of the Global Energy Economy," *Foreign Affairs*, September 16, 2013.

Until now, the largest (and lowest-cost) oil producer, Saudi Arabia, has been able to influence world markets by adjusting its production, and the leading natural gas producer, Russia, has manipulated supplies of piped gas for foreign policy purposes. U.S. production and export of fossil fuels could limit such leverage. While it could be counterproductive for the United States to try to manipulate supplies to punish or coerce other states, expanding market strength could permit it to counter those that do.

- *maritime power*: The United States could use its navy to deny more or less any state access to the high seas and navigation through chokepoints, such as enforcing embargoes and stopping illicit trafficking, although this would not be a strictly nonmilitary strategy.<sup>19</sup> All three potential adversaries considered in this study are vulnerable to having their sea access restricted.
- *support for nonviolent political opposition*: The United States has options for both overt and covert governmental aid and encouragement to prodemocracy groups opposed to hostile authoritarian regimes. Such support could pressure, coerce, or bring about reform or fundamental political change. However, it might prove counterproductive, and its effects might be hard to control. As with economic sanctions, U.S. support for political opposition is more problematic in the case of China than in the cases of Russia and Iran.

Although globalization provides the United States expanded options to exert hard nonmilitary power, it also provides reasons to be restrained. In general, the United States relies on and favors the free movement of goods, information, energy, and capital. It opposes the use or denial of the use of the Internet to manipulate or oppress. It wants markets to determine the supply and prices of energy and other commodities. While the selective use of sanctions, for example, will almost certainly be the favored tool of U.S. policy, a broad strategy

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<sup>19</sup> This could violate key elements of the *United Nations Convention on the Law of the Sea*, 1982, which, although the United States is not a signatory, the United States supports in practice.

of exerting leverage through global markets for purposes of coercion could be counterproductive. We return to P2C in Chapter Six.

### **2B. Soft Power**

In addition to these forms of nonmilitary coercive power, the United States does indeed have an impressive arsenal of soft power:

- information, image, example, and ideals
- development assistance
- support for political reform
- multilateral institutions.

The limitations of these elements of soft power lie in their diffused and slow effects. They might be good at shaping attitudes and conditions, but they are not fungible with military power, especially the use of force. Moreover, soft power is most likely to work well in regions and with states that are receptive to U.S. assistance, diplomacy, values, and leadership. It is important to note that the adversaries discussed here want to thwart the ability of the United States to intervene against them, and their putative victims could be neighboring states with a more immediate need for military support, more development advice, and loans. On balance, perhaps U.S. soft power should get more emphasis and more funding, but it cannot be expected to blunt A2AD's primary effects on U.S. force projection.

### **3. Use Blue Anti-Access and Area Denial to Prevent International Aggression**

The scenarios bear out our general proposition that investment in A2AD could yield superior returns, in the form of operational capability, than investment in force projection. The basic problem from the present U.S. point of view is that projecting force against an A2AD-capable adversary is getting harder and riskier. Put differently, the operational defender has the operational advantage, which can, in turn, impart geopolitical advantage.

At the same time, because the United States is the world's leader in STP technologies and capabilities and likely to remain so, it could exploit them to its own greater advantage to strengthen A2AD against

aggression in critical and contested regions. The United States would use its sensors; its capacity for integrating, processing, and distributing data; and its ability to achieve pinpoint weapon accuracy at any range to target and destroy the forces being projected out from its homeland by a potential adversary. It would also encourage, assist in development of, and coordinate operationally with A2AD on the part of its allies and local partners, especially those exposed to aggression.<sup>20</sup> In other words, Blue A2AD recognizes that A2AD works in both directions, that the United States has a greater capability to do it well than any potential competitor, and that the U.S. advantage in alliances and friendships around the world over any would-be competitor and the relative advancement and wealth of those countries implies a significant capability for cooperative A2AD to significantly raise the risks for would-be aggressors.

Although this shift in thinking and strategy can succeed, it implies greater limitations on the purposes for which the United States might choose to use force. Since the end of the Cold War, the United States has used force to change regimes, compel changes in state behavior, gain temporary control of territory, and diminish the capabilities of adversaries. Enhancement of its own and allied A2AD to defeat enemy force projection would not, as such, totally overcome enemy A2AD. Capable nations would still pose significant risks to projected U.S. forces. Thus, unless the United States can create new capabilities that render it relatively immune to modern A2AD, it would be less able and thus disinclined to intervene against hostile states—the way it has in recent decades—although equally and perhaps more able to prevent international aggression under this future.

Such a shift from geostrategic offense to defense might be less deleterious to U.S. interests than it might seem at first. Although the United States favors peaceful change globally and in the three critical regions, the status quo is largely favorable to U.S. interests, obligations,

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<sup>20</sup> We have no illusions about the challenges of doing this well from both technical and policy perspectives. However, overcoming these challenges is possible, even if not to the point of complete interoperability, as U.S. operations with key allies have demonstrated over the years. It would take concerted political and technical effort to do so.

and friends. Insofar as unresolved disputes and instabilities plague these regions, the United States strongly favors peaceful remedies. East Asia has, for the most part, been the world's most successful region in recent history. Trends in former communist eastern Europe have been highly advantageous, politically and strategically. Even in the troubled Middle East and Persian Gulf, U.S. interests are arguably better served by preventing conflict than by causing conflict as a way of effecting change. While U.S. power, credibility, and influence are under challenge in all three regions, and although the status quo is not stable in any of them, the United States has everything to gain from preventing force projection by adversaries and potential hegemons.

The approach discussed here has two components: Develop and deploy U.S. Blue A2AD (3A) and enable local allies' Blue A2AD (3B).

### ***3A. Develop and Deploy U.S. Blue Anti-Access and Area Denial***

The United States has most of the elements of effective A2AD: It has unrivaled, global, and battle-tested C4ISR; a full suite of precision weapons; strong land- and air-based missile defense; the best submarines in the world (all nuclear); diverse airpower; and, in the event that an aggressor is able to penetrate these capabilities, the world's most capable and battle-hardened land forces.<sup>21</sup> Land- and sea-based antisurface missiles are a different matter. The INF Treaty forbids the United States from deploying land-based ballistic missiles with ranges between 300 and 3,400 miles. It has submarine- and surface ship-based cruise missiles with extended ranges, as well as SRBMs, and it is developing air-to-surface missiles with significant range, which could be fielded within a decade.

A crucial question is whether the United States, along with its allies, could rely on Blue A2AD if its forces are vulnerable in critical regions against adversaries with strong A2AD of their own. Recall that perhaps the greatest danger of A2AD is that it could give an adversary in a critical region a shield behind which it could commit local aggres-

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<sup>21</sup> For an example of how these capabilities could be arrayed to prevent regional aggression, see David A. Shlapak, David T. Orletsky, Toy I. Reid, Murray Scot Tanner, and Barry Wilson, *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute*, Santa Monica, Calif.: RAND Corporation, MG-888-SRF, 2009.

sion or otherwise threaten stability or U.S. interests in that region. Preventing or defeating such aggression without having to destroy the shield would depend on Blue A2AD that is not itself vulnerable to destruction. This challenge would require some combination of survivability and reach. Provided that Blue A2AD capabilities were adequate for interdicting an aggressor's forces and not overly vulnerable themselves, an enemy inclined to project force could not gain a significant operational advantage by attacking first. Thus, with neither side incentivized to strike first or preemptively out of concern that the other side might do so, survivable U.S. A2AD capabilities would likely contribute to crisis stability. There would thus be a premium on U.S. A2AD forces that are more distributed and elusive than current forces, as suggested earlier, and that could deploy quickly to any theater, as well as robust partner-nation A2AD capabilities.

Likewise, a strategy based on preventing aggression through Blue A2AD rather than projecting offensive force would reduce pressures for U.S. forces to conduct early, extensive, and deep strikes on an enemy with escalation options, e.g., nuclear weapons.<sup>22</sup> Such a posture would also reduce U.S. dependence on escalatory homeland attacks, because the main targets of its A2AD capabilities would be an enemy's forces projected over water and air beyond its territory. This does not mean that the United States could not attack targets on enemy territory, but the necessity of doing so in many cases would be removed, making this a far less risky strategy.

As noted, a U.S. shift to a Blue A2AD strategy—essentially, operational defense—would leave the United States less able to achieve by military force the offensive purposes for which it has tended to use force, e.g., changing regimes or at least enemy policies, destroying enemy

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<sup>22</sup> A contest with China could be in doubt only if conducted under its A2AD shield. Currently, no mainland of a U.S. treaty ally is that close to China. The only case in which the United States might conceivably resist Chinese aggression under its A2AD shield is Taiwan. In this case, both sides would need to project power to the island if China were to decide to invade and the United States were to decide to contest that, but Chinese A2AD capabilities cover it, while U.S. A2AD capabilities do not in any comprehensive way. This provides China with a decided advantage, particularly because Taiwan has not (yet) optimized its defense forces for A2AD.

war-making capacity, and intervening in internal conflicts. This has important implications for U.S. interests and how to advance and protect them. However, it would not eliminate this capability completely.

### **3B. Enable Local Allies' Blue Anti-Access and Area Denial**

The United States could enable allies and partners of choice with A2AD operational concepts and complementary capabilities that are similar to those of the United States to contribute to the defeat and thus the prevention of aggressive force projection against them. In fact, helping partner nations develop their own defense forces has long been a priority for the United States. Convincing them to do so according to an American defensive concept will be no easy task. Furthermore, many countries do not have the economic, technical, or human capital resources to develop sophisticated capabilities. These would require significant U.S. help or U.S. forces present to help them.

Yet there is much to be gained if this can be done well. For example, multiple states in east Asia possess ASCMs with ranges between 100 and 250 kilometers, but they have limited ISR capabilities to locate and track targets at those distances.<sup>23</sup> The same inexpensive AIP submarines that China and others are acquiring could add to the vulnerability of surface forces engaged in aggression; indeed, several east Asian states are already moving in this direction.<sup>24</sup> Likewise, with U.S. help, air defenses could be integrated and extended with advanced C4ISR. While convincing local partners to make the needed investments would be a significant U.S. diplomatic challenge, the logic of opposing regional force projection and thus preventing aggression is strong.

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<sup>23</sup> These missiles cost in the hundreds of thousands of dollars to the low millions of dollars each. For a more thorough discussion, see Terrence K. Kelly, Anthony Adler, Todd Nichols, and Lloyd Thrall, *Employing Land-Based Anti-Ship Missiles in the Western Pacific*, Santa Monica, Calif.: RAND Corporation, TR-1321-A, 2013.

<sup>24</sup> See, for example, Richard A. Bitzinger, "Recent Developments in Naval and Maritime Modernization in the Asia-Pacific: Implications for Regional Security," in Phillip C. Saunders, Christopher Yung, Michael Swaine, and Andrew Nien-Dzu Yang, eds., *The Chinese Navy: Expanding Capabilities, Evolving Roles*, Washington, D.C.: National Defense University, Institute for National Strategic Studies, Center for the Study of Chinese Military Affairs, December 2011, pp. 23–40.

The prospects for major allied contributions to A2AD in the three critical regions are mixed. In east Asia, several capable states—ROK, Japan, some Association of Southeast Asian Nations members, and Australia—have the potential and perhaps the motivation. Of course, the Chinese would claim that such a strategy was intended to encircle and contain China. If preventing Chinese aggression constitutes encircling China, China would be right. However, from China's point of view, the threat that U.S. forces pose to a China not committed to territorial expansion would be significantly diminished because U.S. policy and strategy would be firmly articulated as prevention of aggression. Prospects for regional A2AD are also good in Europe, where NATO provides a mechanism for planning and, if need be, using force multilaterally and where several U.S. allies, including some in central and eastern Europe, are very competent. Less promising is the Persian Gulf. Friendly Gulf Arab states have not shown that they are capable of major indigenous self-defense. But with U.S. help specifically geared toward defeating Iranian A2AD and force projection, they should be able to contribute to regional A2AD. In any case, the Iranian force-projection threat by 2025 is likely to be substantially less than that of Russia and nothing like what China can pose.

In sum, a two-pronged shift toward U.S. and interoperable allied Blue A2AD is feasible and brings important geostrategic advantages.

## **Assessing the Alternatives**

As noted, these alternatives to U.S. force projection are not mutually exclusive. If decisionmakers understand the respective pros and cons of each, they might be able to bring together elements of the most-promising ones into a composite strategy. The first step is to analyze each. We use two methods to do so. The first is to assess each alternative according to a common set of criteria—feasibility, efficacy, risk, cost, sustainability, and support for U.S. interests. The second is to assess their performance in the scenarios used to test and reveal shortcomings in the current U.S. approach to force projection.

Tables 6.1 and 6.2 present our considered judgments of how each option stands up against the criteria, against the 2025 scenarios, and overall.

## Conclusions

The first broad alternative—*preserve the U.S. ability to project offensive military force*—is attractive in theory but might not be feasible in the near to medium term because it depends on unproven technologies. At best, new technologies and capabilities that can degrade or circumvent A2AD (e.g., improved air and missile defense, submarine and next-generation stealth) will take years to develop, turn into operational capabilities, and integrate into fielded forces. Even then, they might not negate the effectiveness of an opponent's A2AD to hold key assets at risk. Reliance on destroying A2AD on enemy territory is feasible but potentially destabilizing, escalatory, and, against nuclear-weapon states, highly risky. In our judgment, shifting to a standoff global-strike posture would not satisfy geopolitical needs in the three critical regions and would carry its own risks. A heavy reliance on cyberwarfare would raise risks of retaliation and escalation. Improving the survivability of U.S. platforms, and thus strengthening both deterrence and stability, is very attractive in theory, but it would take a decade or longer and a substantial, costly overhaul of U.S. forces.

There is clearly a need for the United States to *develop and use nonmilitary power*. While it is not a substitute for hard power against a determined enemy, P2C, in particular, offers increasingly good options to pressure some adversaries to conform, though at considerable cost and risk to the United States. Although the resourcing and use of soft power should be supported, this will not directly or immediately alter the behavior of determined adversaries. Perhaps the most serious shortcoming of nonmilitary power is the difficulty of using it against China, given the important role it plays in the world economy. Furthermore, it cannot achieve the same results as hard power against an enemy that is willing to absorb the costs P2C can levy.

**Table 6.1**  
**Assessing Strategic Options Against Criteria**

Criterion	1. Preserve U.S. Ability to Project Military Power						2. Enhance U.S. Ability to Use Nonmilitary Power		3. Use Blue A2AD to Deter International Aggression	
	Stay the Course	Protect Legacy Forces	Attack A2AD	Improve Platform and Base Survivability	Cyberwarfare	Long Range Strike	P2C	Soft Power	U.S. Blue A2AD	Enable Allies' Blue A2AD
Feasibility	Green	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Yellow
Effectiveness	Yellow	Yellow	Yellow	Green	Yellow	Red	Yellow	Red	Yellow	Yellow
Sustainability	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Yellow
Risk	Red	Red	Red	Yellow	Red	Red	Yellow	Green	Green	Yellow
Cost	Red	Red	Red	Red	Green	Yellow	Yellow	Green	Yellow	Green
U.S. interests	Yellow	Yellow	Yellow	Green	Yellow	Red	Yellow	Yellow	Yellow	Yellow
Concerns	Could fail by 2025	Uncertain potential	Unstable escalatory	Costly and delayed	U.S. also vulnerable	Costly loss of influence	In tension with global norms	Limited utility in key regions	More-restricted use of force	Uncertain results and reliability

NOTE: Red = the option assesses poorly for the criterion. Green = the option assesses well. Yellow = neutral assessment.

**Table 6.2**  
**Assessing Strategic Options Against 2025 Scenarios**

Country	1. Preserve U.S. Ability to Project Military Power					2. Enhance U.S. Ability to Use Nonmilitary Power		3. Use Blue A2AD to Deter International Aggression		
	Stay the Course	Protect Legacy Forces	Attack A2AD	Improve Platform Survivability	Cyberwarfare	Global Strike	P2C	Soft Power	U.S. A2AD	Enable Allies' A2AD
China	Red	Red	Red	Yellow	Yellow	Red	Red	Red	Yellow	Green
Iran	Yellow	Green	Yellow	Green	Green	Yellow	Green	Yellow	Green	Red
Russia	Yellow	Yellow	Red	Green	Yellow	Red	Green	Red	Green	Green
All scenarios	Yellow	Yellow	Red	Green	Yellow	Red	Yellow	Red	Green	Yellow

NOTE: Red = the option assesses poorly for the criterion. Green = the option assesses well. Yellow = neutral assessment.

*Using Blue A2AD to deter international aggression* is feasible, affordable, and a comparatively low-risk strategy, assuming that it works. As for reliance on regional allies, those in east Asia and Europe have the capacity to do more than those in other regions; the United States will have to continue to bear responsibility for security in and around the Persian Gulf. Militarily defeating Russian aggression in its immediate near abroad will be a challenge even with enhanced Blue A2AD.

Generally speaking, none of the alternative strategies would guarantee a U.S. ability to use force projection against China at acceptable costs and risks, given China's military power, technology strength, centrality in the region, and importance in the world. However, U.S. and allied Blue A2AD could make it very difficult and costly for China to aggressively use force in the region. At the other extreme, the United States has other options to counter Iranian A2AD in and around the Persian Gulf. Although Russia will have options to use force in its immediate vicinity regardless of U.S. strategy, it is vulnerable to P2C and would lose a war with NATO.

The assessment of three broad alternative strategies does not reveal that any one will suffice. However, it does provide a basis for assembling a composite strategy, or portfolio, which would enable the United States to overcome the problems A2AD will increasingly cause.



## An Integrated U.S. Strategy to Project Power and Prevent Aggression

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By 2025, the United States' regional A2AD problem could be grave in the western Pacific vis-à-vis China, worse than it now is in the Middle East vis-à-vis Iran, and worse than it now is in eastern Europe if Russia's economic decline is reversed. The main danger from enhanced A2AD is that U.S. adversaries will attempt to use it as a shield behind which to commit regional aggression, intimidate neighbors, and pursue hegemonic ambitions. Aggressive enemy force projection would vary from region to region: a Russian overland invasion of the Baltics, a Chinese amphibious assault on Taiwan, and Iranian missile attacks on Gulf Arab states or shipping in the Persian Gulf. In addition to the threat of overt military aggression, regional adversaries might use harassment, proxies, shows of force, bogus territorial claims, and other means of pressuring their neighbors. Such patterns are already evident in Russia's involvement in Ukraine, Iran's misconduct from the Persian Gulf to the Levant, and China's muscle-flexing in the East and South China Seas.

The costs of intervention in 2025 will be high enough to influence what actions a future president would consider, if current trends continue, and the trends will not stop at that point. In light of how long it will take the United States to adjust to these developments, it must acknowledge A2AD's corrosive effects in hostile hands and the inadequacy of marginal measures in trying to forestall those effects.

The assessment of alternative responses in Chapter Six reveals no single, simple way for the United States to overcome the A2AD problem. But it does suggest some promising ideas. The United States

has important opportunities it can take to *project power and prevent aggression* in contested regions, provided that it comes to grips with the significance of A2AD and the shortcomings of its current approach. Although A2AD is a particular problem caused by the advance and spread of particular technologies, it should prompt the United States to consider a major shift in strategy. In essence, even as offensive force becomes more difficult to project and use, the United States can reduce the need for it.

The first such way is for the United States to turn the tables on regional aggressors by taking full advantage of STP technologies and capabilities to develop its own A2AD capabilities to prevent *adversaries'* projection of force. Such Blue A2AD would imply a more defensive but still forward and influential U.S. role in contested regions. Second, the United States should endeavor to get its partners to contribute more effectively than they do now to their own defense—and, thus, to regional security—within unified military concepts. Globally and in contested regions, U.S. partners have untapped economic, technological, and military capacity, and threats to their interests are becoming more pronounced. In particular, most have ample resources and competence to contribute significantly to Blue A2AD. Further, in many cases, the United States might have sufficient leverage and leadership to induce them to concentrate their defense efforts more effectively to oppose aggression and intimidation. This will require both gifted diplomacy and convincing partners that they face a threat against which they must act to defend. This is fundamentally different from asking them to support U.S. force projections in areas far from their homelands. Third, the United States has nonmilitary P2C that it can hone and use to affect adversaries, short of going to war with them. P2C might not be strong enough to stop a determined aggressor. However, it can raise the costs of their efforts at intimidation.

In combination, Blue A2AD, stronger partners, and P2C can sustain security in critical regions despite enemy A2AD. This chapter shows how these three ideas can be formed into an integrated strategy whereby the United States can use all means at its disposal to project power and prevent aggression. It has the economic, technological, and political power such a strategy requires, provided that it identifies the

challenges to be met, develops the strategy and plans to do so, and organizes the capabilities for it. To set the stage, we first briefly address the key ideas that inform an integrated strategy. We then explain the components of the proposed integrated strategy before turning to an overview of key capabilities that U.S. and allied forces need to create potent A2AD forces, with the caveat that those forces' requirements will vary greatly depending on the conflict in question; this is something we illustrate in detail in Chapter Eight. Finally, we assess the proposed integrated strategy in terms of the scenarios discussed earlier.

## Key Ideas Informing an Integrated Strategy

The reduced usability of offensive force against advanced countries as a specific consequence of the advance, spread, and declining cost of particular technologies used to target military forces indicates a fundamental change in how power *can* be used in the future. By adopting an approach that recognizes this shift and combines the advantages of A2AD with the United States' strong network of partners and allies and its ability to inflict pain through nonmilitary means, the United States can protect its interests with less reliance on force projection.

Although it poses a serious challenge, a shift to a strategy that puts A2AD at the center of U.S. military strategy does not signify U.S. decline. Far from declining, the United States possesses economic, technological, political, and cyber advantages that will likely be sustainable in the coming decade and can be harnessed to U.S. global strategy. Because offensive force projection has so dominated U.S. strategy for a generation, these other advantages have been eclipsed. But they are now increasingly important, especially as the costs of military systems climb and U.S. defense spending plateaus.<sup>1</sup> Given doubts about rely-

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<sup>1</sup> Under the Budget Control Act of 2011 (Public Law 112-25, Budget Control Act of 2011, August 2, 2011), Pentagon spending will total roughly \$2.5 trillion between 2015 and 2019, compared with roughly \$3.2 trillion from 2009 to 2013, a decline that implies a need for a broader approach to supporting U.S. interests and responsibilities around the world (David E. Mosher, assistant director for national security, Congressional Budget Office, "Prospects for DoD's Budget over the Next Decade," briefing, February 7, 2014).

ing on the projection of offensive force because of A2AD, this suggests that a more comprehensive strategy of *projecting power and preventing aggression* could be promising—a strategy in which military force figures importantly but not exclusively.

From an *economic* point of view, although its share of the world economy has declined, the United States still occupies central positions in the markets and institutions of world finance, trade, technology, information, and, increasingly, energy. Indeed, this is a reflection of the success, not a failure, of the sustained U.S. approach to the world since the end of World War II. This affords it not only the ability to lead but also leverage to isolate, sanction, and weaken states that challenge its interests and partners. The United States has shown itself to be able to muster international support for such a strategy, as it has recently done against Iran and Russia. Although such coercive power is not always an adequate substitute for the use of force, it could become both increasingly important, as A2AD improves, and increasingly effective, as the world economy becomes more integrated.<sup>2</sup>

Behind its economic strength, the United States has a potent blend of entrepreneurship, dynamic markets, capital access, and scale that provides a significant edge in creating and applying new *technology*. The United States spends more than \$400 billion annually on R&D, more than any other country; China is second, at about \$300 billion. Russian R&D spending is less than one-tenth of U.S. R&D spending.<sup>3</sup> Even with China's growing R&D, the United States will invest as much as \$0.5 trillion more than China between now and 2025.<sup>4</sup> America's specialty is innovation, which combines inventiveness, strong laboratories, venture capital, and financial reward. The United States remains dominant in the production and use of IT, which is increasingly essen-

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<sup>2</sup> David C. Gompert and Hans Binnendijk, "The Power to Coerce," *U.S. News and World Report*, July 9, 2014.

<sup>3</sup> Martin Grueber and Tim Studt, *2014 Global R&D Funding Forecast*, Columbus, Ohio: Battelle, December 2013.

<sup>4</sup> Grueber and Studt, 2013.

tial in national power: The United States spends nearly \$1 trillion on IT annually; Japan and China are next at around \$300 billion each.<sup>5</sup>

Superiority in generating technology enables the United States to develop more-advanced military capabilities, cycle after cycle. The United States spends about \$70 billion per year on military R&D; China about \$20 billion; Russia about \$10 billion.<sup>6</sup> Because it will outspend China and Russia combined in defense as a whole by as much as \$1 trillion over the next five years, is committed to R&D, and has the lead in IT, the United States should be able to sustain its edge in creating and applying new technology to defense. While this might not solve the A2AD problem head on, it could help prevent aggressors from exploiting A2AD and enable superior Blue A2AD.

The United States also has matchless *political influence* with most of the world's most able states, thanks to shared interests, formal security agreements, and U.S. sway in international institutions. U.S. standing with most countries is likely to remain strong as an expanding circle of countries adopts similar political systems and seeks cooperative relations.<sup>7</sup> Such relationships exist in the most-critical regions of the world for the United States, especially in Europe and increasingly in east Asia, though unevenly around the Persian Gulf. The United States has close, if complex, relations with its west European allies and is highly regarded by its more-recent central and east European allies. In east Asia, it has both formal allies (Japan, ROK, Philippines,

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<sup>5</sup> Estimates of current annual global IT spending vary widely, from just over \$2 trillion (Forrester Research) to \$3.8 trillion (Gartner). In any case, the United States spends about 25 percent of the world total, and China and Japan each spend about 10 percent. See Chris Kanaracus, "Forrester Downgrades 2014 Global IT Spending Forecast, Citing Weak First Half," *PC World*, August 14, 2014; and Gartner, *Gartner Market Databook, 3Q14 Update*, Stamford, Conn., September 22, 2014.

<sup>6</sup> It is worth noting that Russia's dependence on the export of oil and gas has retarded investment in and development of value-added industries, such as IT, on which real advances in military capabilities ultimately depend.

<sup>7</sup> U.S. political influence does not translate into popularity; according to the Reputation Institute, the United States ranks 22nd in the world in reputation. However, this somewhat negative reading is attributed to envy toward the superpower. The United States remains the country with which others most want to have a cooperative relationship (Susan Adams, "The World's Most Reputable Countries, 2013," *Forbes*, June 27, 2013).

Thailand, Australia, and New Zealand) and eager security partners (Vietnam and Indonesia). Most Arab countries along the Persian Gulf are friendly to the United States, though not always stout when the chips are down. Compare such U.S. partners with the likes of Russia's (Belarus), China's (North Korea), and Iran's (Syria). Of course, this U.S. political advantage depends on partners' confidence in the United States' ability and will to defend allies, friends, and common interests, which could erode as A2AD improves in the years to come (barring a new strategy).

The challenge for the United States is therefore twofold: (1) use its enduring political influence to get allies to bear a fairer share of the burden for security, especially to invest in high-priority capabilities, and (2) focus on the particulars of the threat posed by U.S. allies' region's would-be aggressors and develop approaches and the attendant military capabilities to meet and deter them (much as China did after the U.S. intervention in the Strait of Taiwan crisis of 1995–1996).

Finally, the United States has become a *cyber* superpower. Flowing from its prowess in IT and in spawning ideas, it has unrivaled ability to interpret events, spread the truth, shape opinions, and challenge autocratic rule. In contrast, its challengers fear information. The pervasiveness and democratizing effects of information have placed Russia, China, and Iran on the defensive. They face persistent internal opposition, aided by social networking and, when it so chooses, the support of the United States. The cyberpower of the U.S. government is circumscribed but significant: It uses information to support its diplomacy and promote democracy, it pressures states not to restrict information, and it promotes the security of cyberspace. Moreover, U.S. intelligence capabilities offer global awareness with increasing fidelity and are the envy of all states, friendly and unfriendly.

From this analysis of power and geopolitics emerge three complementary ideas to inform a new strategy to support U.S. interests, responsibilities, and values:

- The main reason for the United States to use military force should be defensive: to prevent regional aggression using A2AD. It is worth noting that the United States has long had a defensive strat-

egy in east Asia, but it is also true that its offensive use of force in other parts of the world since the end of the Cold War has arguably disrupted stability and given rise to some potential foes developing robust A2AD capabilities.

- High-capacity but underperforming U.S. partners can and should take on more responsibility and, with U.S. help and A2AD, improve defense against regional aggression.
- The United States should hone and use its nonmilitary power to prevent regional intimidation and destabilizing behavior short of aggression.

Taken together, these three ideas suggest a more comprehensive power-projection strategy than the narrow force-projection strategy of recent decades. In the next two sections, we detail the elements of an integrated strategy and then the capabilities needed to turn them into an effective integrated strategy.

## Elements of an Integrated Strategy

### Blue Anti-Access and Area Denial

Our scenarios indicate that potential adversaries will improve and extend their ability to target visible U.S. platforms, bases, and forces, creating opportunities and temptations for them to project force regionally behind an A2AD shield. However, the United States and its allies and partners also can exploit the logic and technological and economic advantages of A2AD to deter and defeat force projection by these countries. While China, Russia, and Iran might gain advantages by fielding A2AD capabilities to prevent U.S. intervention, they will be unable to exploit that advantage to threaten others if they too face effective A2AD.

The United States excels in most of the technologies, systems, and skills that underpin effective A2AD. Indeed, U.S. capabilities are unsurpassed in space-based and other extended-range sensors, target identification, and tracking; GPS and other precision-guidance systems; IAD; data networking, fusion, and processing; and integrated

C2. The United States also has growing drone, ASAT, and cyberwar capabilities, all of which can be important in A2AD. U.S. forces also have real combat experience in integrating the myriad elements needed for successful combat operations. Overall, no state can match the United States' ability to target opposing forces—the essence of A2AD.

An important class of capabilities in which some of the United States' potential adversaries excel but the United States lacks is a complete suite of land-, sea-, and air-based ballistic and cruise missiles of short, medium, and intermediate (theater) range—a sizable A2AD gap. As we see in Chapter Eight, although air and sea capabilities are relatively robust when compared with those of potential enemies, U.S. long-range artillery systems (rockets and missiles that fall below the INF Treaty limits) are badly overmatched by Chinese and Russian ones, which denies U.S. forces the ability to strike important classes of targets that could be crucial to the outcome of a conflict. In particular, in a conflict with Russia over the Baltic nations or with China over Taiwan, U.S. and allied air forces would not be able to establish air dominance for some time. Before they could, there would be only limited—or, in some scenarios, no—chances to counter enemy long-range fires or conduct SEAD missions.<sup>8</sup>

The United States should also think through the implications of basing any missiles permanently near China before doing so. It is important that missile launchers be readily and flexibly deployable in ample numbers as conditions dictate and as survivable and evasive as possible. Submarine basing would meet these tests, as would air-deployable systems in most conditions and mobile land-based launchers that do not require large permanent infrastructure. However, just as the Soviets deploying missiles to Cuba in 1962 nearly brought the

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<sup>8</sup> Shlapak and Johnson, 2016. Under the INF Treaty, the United States has given up the right to have land-based missiles with ranges from 500 to 5,500 km. Yet, even with these treaty limitations, there is considerable scope for the United States to develop and deploy sea-, land-, and air-launched ballistic and cruise missiles with which to improve Blue A2AD against regional force projection, as well as ample room for improving the range and capabilities of land-based missiles. With or without the INF Treaty, the United States would be careful about deploying, let alone using, missiles with ranges that China could interpret as strategic.

United States and Soviet Union to war, so China would all but certainly interpret the deployment of certain classes of weapons in its neighborhood as provocative.

Beyond serving as missile launchers, submarines can be important, if not indispensable, in A2AD against naval force projection, which China could mount with amphibious ships and surface combatants. The Chinese (and others) are acquiring large numbers of quiet, relatively inexpensive submarines with air-independent (nonnuclear) propulsion. In contrast, the United States is a special case when it comes to submarines: Geographic distance and patrol requirements have led it to rely on long-legged, nuclear-propelled, very expensive submarines for attack and for strategic-deterrent missions. While the United States is unlikely to acquire a conventional submarine force for Blue A2AD, it could encourage its partners to do so (see the next section). Against China especially, partners' conventional submarines, U.S. nuclear submarines, and theater missiles would present a formidable A2AD capability.

Russia presents a problem that is somewhat different from China's. Although its capability to project force over distance will be less than China's, it has less need to do so over water. Its land forces would be less vulnerable to missiles and only minimally vulnerable to naval forces but more so to other types of force (e.g., modern, well-trained, air-land joint forces). Furthermore, recent RAND war games have demonstrated that advanced and extended Russian IADSs that are fielded today can degrade the ability of U.S. and allied aircraft to engage Russian ground forces in the opening days of a conflict far more effectively than NATO air-defense systems can attrite Russian air forces. Indeed, the U.S. Army has gotten rid of almost all its tactical air-defense units and systems since the end of the Cold War. Furthermore, NATO ground forces currently stationed in Europe are too light to succeed against Russian armored forces, and their indirect-fire systems are far fewer and of significantly less range than Russian systems. In these war games, NATO forces lost every campaign against a strong Russian attack unless heavy U.S. forces were redeployed from the United States and the European powers reinvested in their own forces (tasks that are more difficult to do politically than militarily).

However, should Russian forces not prevail in short order (they took their operational objectives in 36 to 60 hours during every iteration of the RAND war games), they will eventually lose any conflict with NATO. Unlike in the Cold War, when Soviet forces outnumbered NATO forces, the Russian armed forces today are significantly smaller and less modern, have less experience in combat, and so are less capable than NATO forces. (Again, if Russia's economy and state resources cannot be restored, its military threat to eastern Europe could decline rather than increase, as this study assumes.) Furthermore, Article 5 of the North Atlantic Treaty (also known as the Washington Treaty)<sup>9</sup> presents a very significant deterrent to Russian aggression, if Russia believes that the treaty will be backed up—a deterrent not replicated in the western Pacific or the Persian Gulf. In the analysis in Chapter Eight, we assume that adequate NATO forces are readied and deployed to reverse Russian aggression.

Iran does not have military forces capable of projecting force using conventional forces, and, should Iran try to develop and employ them, they would be the easiest target for U.S. forces. Our scenarios suggest that it is unlikely that Iranian IAD would pose a significant threat to U.S. and allied aircraft after the opening hours of a conflict, and fixed or easily identified forces would not last long. However, American difficulty chasing Scuds during the Gulf War and Israel's inability to find and interdict rocket fire out of southern Lebanon in 2006 indicate that Iran would be able to threaten at least some U.S. and partner forces and locations using these types of force.<sup>10</sup> Iran's ability to project unconventional force is also problematic (and does not fall under this construct). Still, the ability to operate out of friendly Persian Gulf countries would significantly enhance Blue A2AD.

U.S. ground forces would also contribute to Blue A2AD. The United States does not plan to fight a large and protracted land war in any of the contested regions other than on the Korean Peninsula. War

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<sup>9</sup> NATO, 2016.

<sup>10</sup> Information drawn from personal experience in Iraq in 2004 and 2006–2007 and from David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, Santa Monica, Calif.: RAND Corporation, MG-1085-A/AF, 2011.

with China on the Asian continent is clearly an unattractive option. Russia has the capability to threaten swift aggression in eastern Europe; however, modest improvements in NATO posture in eastern Europe would provide an adequate deterrent (although, at the time of this writing, there seems little appetite to make these adjustments). Even in a war with Iran, the United States would not be eager to invade, conquer, and occupy that large and unfriendly country.

Still, U.S. ground forces, as part of a joint force, could be indispensable in deterring, blocking, and defeating enemy force projection in many circumstances, which requires that they be able to operate in an increasingly dangerous A2AD environment. This also indicates a growing requirement for high-readiness ground forces that can operate in circumstances that range from armored warfare in Europe to dispersed bases in the Pacific and Persian Gulf. Where forces need to be brought quickly into unprepared theaters, light- and medium-weight forces would be important because they can be moved quickly, although they would need to be up to the task being asked of them and adequately protected for the threat. To provide options for the use of heavier forces without sacrificing response speed, the United States could increase equipment prepositioning in the three critical regions and reconsider its posture in Europe. U.S. ground forces would also be crucial to building the capabilities of local forces and to bolstering and enabling them in a conflict. Finally, as noted, capable SSM and air-defense systems would be very important in many situations in which U.S. ground forces would contribute to Blue A2AD.

Developing Blue A2AD involves more than fielding enhanced missile and submarine capabilities and ground forces: It means developing concepts of operations, joint and combined C4ISR concepts and constructs, U.S.–allied collaboration, training, and deployments around the concept of defeating force projection in critical regions. These concepts will vary for different types of aggression (we consider three canonical types in Chapter Eight: over water, over land, and irregular) and different groups of allies and partners. While there will be challenges in developing such concepts and coalitions, the United States should embrace rather than resist the logic of A2AD, given that current technology and cost trends favor it. Although the issue of a

contest between overlapping enemy and Blue A2AD systems is an important one (to which we return in some detail in Chapter Eight), certain systems that are hard to target and defend against (e.g., submarines, drones, and missiles), could remain operative even within enemy missile ranges. In addition, for reasons already articulated, Blue A2AD is less risky than responding to enemy force projection by launching deep and extensive attacks on enemy territory, although, of course, this would remain a U.S. option.

Finally, it is worth explicitly noting that no bright line divides all force types and weapon systems that are useful for force projection and A2AD. For example, submarines, missiles, aircraft, and many types of land forces can and will play parts in both operational constructs. But some force types are primarily for strike purposes (e.g., aircraft carriers, stealth bombers), and the operational concepts and ways forces are used (and so developed and, in the case of multirole systems, armed) will differ. These are important distinctions.

### **Partner Up**

To realize the full potential of Blue A2AD, the United States will need to get allies and partners to do more for their own and the common defense—something U.S. officials have been trying to do for some time. U.S. partners' potential contribution to Blue A2AD, with U.S. help, should not be underestimated; for those in contested regions, it is a matter of self-defense. To illustrate, some east Asian nations possess ASCMs with ranges of 100 to 250 km and could supplement these with SRBMs, yet they have limited capabilities to find and track targets at those distances.<sup>11</sup> A Chinese invasion force approaching a country with these missiles would face significant threats for an extended period. If integrated with long-range ISR and advanced C2 of the kind the United States has, even countries of modest wealth and capability could pose a significant threat to the Chinese overwater offensive force projection. Although the Chinese have begun to develop missile defenses, they would be unable to achieve the level of effectiveness

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<sup>11</sup> These missiles cost in the hundreds of thousands to the low millions of dollars each. For a discussion of capabilities and systems in the region, see Kelly, Atler, et al., 2013.

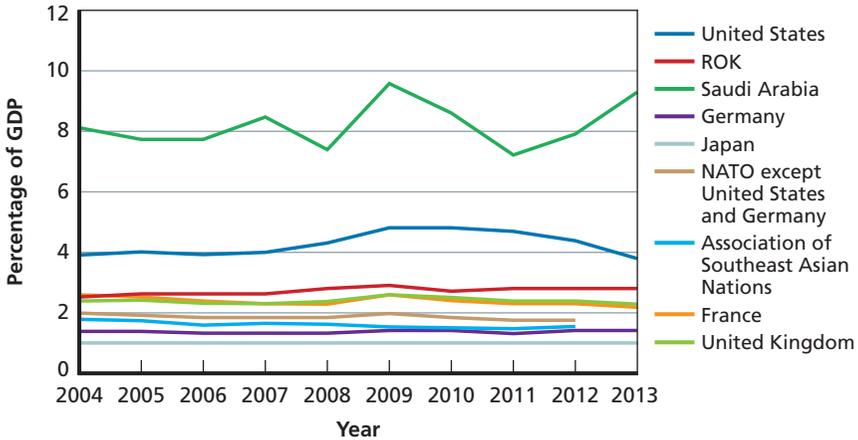
against large missile attacks that continue to elude even the United States. Provided that missiles launchers are hard for China to target (e.g., being mobile land-based or submerged), not only would the United States and its partners realize operational advantages; deterrence and stability could also be enhanced.

Similarly, advanced air defenses are within the capability of most U.S. partners, provided, in some cases, that the United States assists with the integration. Such systems would make it virtually impossible for an aggressor to extend air threats against contested land or waters unless it were able to mount a dominant series of cyber and strike operations to take out this IAD—akin to the U.S. air–sea battle concept—or destroy these capabilities in some other manner. Having such capabilities could render such adversaries unable to provide air coverage for forces projected over land or sea. In the context of IAD, U.S. partners can provide extensive and extended SAM coverage.

Most U.S. partners have the capacity to acquire and operate key A2AD elements, such as submarines, ballistic and cruise missiles, and air-defense systems. Whether they are prepared to commit the resources and set the right priorities to develop formidable A2AD forces over time, much as China has done in reaction to its inability to respond to U.S. intervention during the Taiwan Strait crisis of 1995 and 1996, is a significant challenge that will require strong U.S. political influence and diplomatic competence to overcome. U.S. efforts will be needed to improve partners' capabilities by working with them to identify the roles their and U.S. forces are likely to play, designing forces that can do that, making corresponding investments, improving interoperability, and training and preparing together. These are expensive, long-term endeavors.

As shown in Figure 7.1, U.S. partners have substantial unrealized potential. Defense spending as a percentage of GDP is a good indicator of the importance a state places on defense. Figure 7.1 shows the sizable gap between the United States and its principal allies in this regard. Saudi Arabia is an anomaly, with vast government revenues, spending 9 percent of GDP on defense, but its actual capabilities likely fall far short of what it would need to prevail in a conflict with Iran. ROK, facing a clear and immediate threat from North Korea, spends about

**Figure 7.1**  
**Defense Spending by Key U.S. Allies and Partners, as a Percentage of Gross Domestic Product**



SOURCE: SIPRI, undated, for 2013 data.

NOTE: ROK = Republic of Korea.

RAND RR1359-7.1

3 percent of GDP on defense. Otherwise, U.S. allies spend a weighted average of less than 1.5 percent of GDP on defense.

If this average were raised to 2 percent, U.S. allies would contribute roughly \$160 billion more per year to defense. This would go some distance toward rectifying the imbalanced burden-sharing and would provide ample resources for improving allied capabilities to overcome the challenge that enemy A2AD poses. Russia’s increasingly menacing behavior in eastern Europe and China in the East and South China Seas makes such a target seem achievable (depending on Germany and Japan, respectively).

Region by region, the prospects for improved allied defense contributions vary greatly. The United States has had mixed success in getting European allies to take more responsibility for defense in key regions, including Europe itself. Military spending by European NATO allies has declined steadily as a percentage of GDP since the end of the Soviet Union, even after 9/11. At the same time, these allies together spend about three times what Russia does on defense (\$291 billion, compared

with \$88 billion for Russia in 2013<sup>12</sup>) and, for the most part, have high-quality forces. As important as getting European allies to spend more is, the United States should try, as it already does, to get them to stress usable forces, especially those that can defeat aggression. The United States should intensify its efforts to get European allies to stress professional joint forces that are designed and funded to defeat Russian aggression. This would require a focused look at Russian military plans and structure, as well as at their specific geographic, political, and economic situations. For example, it would be good if allies increased air and ground capabilities to destroy advancing enemy forces on NATO's eastern outskirts and increased drones to help locate and overwhelm advancing forces and defeat IAD. As for naval forces, the highest priority, from the Blue A2AD standpoint, would be advanced conventional submarines to patrol waters adjacent to contested areas, e.g., the Baltic and Black Seas, and serve as platforms from which to launch missile attacks on Russian forces.

Of all European allies, Germany has the greatest headroom to increase its defense efforts and contribute important forces, although this might not be in the political cards. After all, Germans have seen their security improve despite reduced defense efforts, in part because of U.S. commitments. Even *without* substantial increases in the defense spending of European allies, they have ample resources, technology, human capital, skilled forces, and interoperability with U.S. forces to confront Russia with the prospect of defeat should it attempt to commit large-scale aggression in eastern Europe. Of course, this does not preclude the low-grade, irregular force and intimidation Russia has used against Ukraine, which underscores the importance of the types of coercive instruments discussed under P2C in the next section.

In contrast to underwhelming European defense efforts, east Asian partners, including nontreaty ones, are mostly increasing defense spending, as well as modernizing their forces—albeit slowly.<sup>13</sup> This is in response to the growth in Chinese military power, compounded by doubts about the United States. Cases in point are the current Japa-

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<sup>12</sup> SIPRI, undated, for 2012 data.

<sup>13</sup> IISS, 2014, p. 205.

nese government's decision to seek a constitutional amendment permitting Japan's involvement in so-called collective defense, its breaking through the symbolic cap of spending more than 1 percent of its GDP on defense, and improvements in naval forces on the part of southeast Asian states. With its excellence in information technologies, Japan could team with the United States to strengthen and sustain dominance C4ISR and thus strategic and operational knowledge.

Looking at partners' ability to deter aggression over water, and assuming, as we do, that the United States will continue to concentrate on SSNs, a high priority for Asian partners should be conventional submarines. Chinese seaborne aggression would face great difficulty in the face of a robust U.S.-allied submarine threat. Similarly, ballistic and cruise missiles that could strike Chinese ships and ports of embarkation, particularly if tactically mobile and well operated, would be important. Finally, land and air forces capable of fighting an airborne or amphibious landing force in case these other measures did not succeed would also be important.

Whether Asian defense momentum continues might depend on whether the United States articulates a credible and sustainable alternative to traditional force projection. Assuming that the United States embarks on a better strategy and current threat trends force regional cooperation, east Asian military interoperability, which is difficult though not impossible because of the lack of a regional security organization like NATO, could be important. Of course, China is likely to see (and sure to depict) marshaling and organizing an east Asian collective response to Chinese force projection under the cover of A2AD as part of a U.S. containment and encirclement strategy. This will be a challenge for U.S. diplomacy. However, Chinese aggressive posture might lend U.S. diplomats a hand as they try to build a network of partners. Then again, U.S. military commitments in the region must be carefully calibrated so that the actions of partners with more-aggressive policies do not force the United States into a war it does not want to fight.

On the whole, Asian allies and partners are capable and predisposed to work with the United States in preventing Chinese regional force projection. However, of the three critical regions, the western

Pacific involves the most powerful potential adversary, the most severe A2AD problem, and the greatest difficulties in the event of conflict. This suggests that U.S. military cooperation with its east Asian partners is more crucial than ever. To the extent possible, the United States should seek to link multilaterally the defense cooperation it has with separate Asian partners, both for more-rational force planning and for combined operations.

Efforts to bolster the defense capabilities of Iran's Arab neighbors have yielded disappointing results. The problem has not been lack of spending or acquisition of modern capabilities. For instance, in 2013, Saudi Arabia has the world's fourth-largest defense budget (after the United States, China, and Russia) and has invested heavily in advanced combat systems. The problem has been lack of skilled military personnel, command, doctrine, training, and confidence. There are also larger doubts about the reliability of Persian Gulf partners to enter a conflict than about European and east Asian allies to do so; providing military facilities might be the main contribution of most states that fall under the shadow cast by Iranian aggression, conducted under the cover of Iranian A2AD. The principal exception is Israel, which could contribute importantly to deter and defeat Iranian aggression; whether it would be in the United States' interest to have Israel join it in the event of war with Iran is a judgment that can be taken only in actual circumstances. In this region, a strategy designed to encourage not only robust capabilities but the will to use them in constructive approaches would be important, in addition to focusing on the right types of capabilities for the threat at hand.

On the whole, U.S. strategy should seek but not count on substantial increases in partners' defense efforts, with the possible exception of Japan. With or without increases in allies' defense spending, the United States should be able to get European and east Asian allies to focus resources and forces where they matter most, Blue A2AD. This implies a focus on a specific threat; the challenges it poses; the capabilities needed to deter and, if needed, defeat it; and investment and readiness strategies to put those capabilities into place. These allies include some of the world's most-advanced and capable states, largest economies (Japan being third and Germany fourth), and effective

military forces. They have as much interest as the United States does in overcoming force projection under the cover of A2AD.

### **Power to Coerce**

As noted earlier, coercive power (or P2C) might include economic sanctions, punitive political measures, cyberoperations, intelligence operations, resource denial, interdiction of goods and people, military assistance for friendly states and for groups sympathetic to U.S. interests, police actions, and support for nonviolent political opposition.<sup>14</sup> P2C does not literally force compliance with U.S. aims. Because it leaves the choice to the adversary, the outcome is not guaranteed. But if the adversary is vulnerable, P2C can be quite effective.

Because of its central role in global markets and systems, the United States is well positioned to isolate and penalize recalcitrant states.<sup>15</sup> It can use its P2C to deter or punish aggression, compel retreat, or send a signal to other would-be aggressors. P2C might also be able to weaken a target state, leaving it less able to threaten others and perhaps more anxious about its own hold on power. P2C instruments are inherently flexible and, being contingent on behavior, serve as both sticks and carrots. P2C can also provide the United States and its friends with an important rung on the escalation ladder—signaling will while leaving the threat of force, the next step, as an added inducement for an enemy to back down.

U.S. P2C instruments of special interest in the context of comprehensive U.S. power projection include economic sanctions, manipulation of energy supplies, support for nonviolent democracy opposition

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<sup>14</sup> This section draws on RAND research by David Gompert and Hans Binnendijk.

<sup>15</sup> Although the United States can employ P2C, it is not alone. Several rivals are using it quite to their advantage. Russia uses paramilitary operations outside its territory to shut off gas supplies, to conduct cyberwarfare, for propaganda and social networking, and for political intimidation. China uses cybertheft, political intimidation, fishing vessels, maritime law enforcement (coast guard), and oil rigs to reinforce its disputed territorial claims. Iran foments unrest around the Persian Gulf, uses proxies to threaten Israel and Arab governments, manipulates the domestic politics of Iraq, and has warned that it will close the Strait of Hormuz and cut off oil commerce. A noticeable pattern for these states is to try to coerce neighbors in the belief that this option is less likely than others to trigger U.S. intervention.

to hostile regimes, and coercive cyberoperations. The United States has specialized in economic sanctions, which include trade embargoes and financial isolation.<sup>16</sup> Economic sanctions have an uneven history: They were successful, if slow, in freeing South Africans and Rhodesians from apartheid and East Europeans and Russians from communism, but they have failed so far to break the Castros' grip on Cuba or the Kims' on North Korea. Sanctions might not work without international consensus and wide participation, which might defeat or at least dilute them.

Increasingly, though, it appears that well-orchestrated economic sanctions can deter, compel, punish, and weaken adversaries. With the United States as maestro, they have induced Iran to negotiate at least a temporary cessation of uranium enrichment activities that could lead to nuclear weapons. Also, by demonstrating the impact of targeted sanctions and by threatening to impose more, they might have given Putin pause in trying to gain control of eastern Ukraine by outright invasion (although, as of this writing in 2014, he was still trying other ways).

These achievements are possible because the United States has improved its P2C methods. Following the 9/11 attacks, the U.S. Department of Treasury and intelligence community sharpened their teeth against al Qaeda in finding, tracking, squeezing, and shutting down flows and holdings of money, thanks in part to the globalization of banking systems.<sup>17</sup> It is getting harder and harder for states, groups, companies, and wealthy individuals to hide and move money. Deny hard currency and international credit, and the result is a sharp contraction of transactions, trade, investment, production, and eventually growth, as has been the case with Iran. Thus, although other economic sanctions, e.g., on imports or exports, are also available, financial sanctions can have similar effects and are easier to impose and monitor.

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<sup>16</sup> Brent Radcliffe, "Ukraine–Russian Sanctions: The Gift That Keeps on Giving," *Investopedia*, March 31, 2014.

<sup>17</sup> See Mark Dubowitz and Annie Fixler, "Book Review: Warriors in Gray Suits," *Journal of International Security Affairs*, No. 26, Spring–Summer 2014. Also Juan C. Zarate, *Treasury's War: The Unleashing of a New Era of Financial Warfare*, PublicAffairs, 2013.

Hand in hand with the enhanced ability to find and track money, the United States and its partners have been able to bring most banks, domestic and foreign, into line with financial sanctions. A combination of moral suasion and, perhaps more important, the implied threat to tarnish the reputation of noncomplying banks has enabled the architects of financial sanctions to gain the cooperation of most institutions. The U.S. Treasury Department has the authority to label any bank as complicit in money laundering and, by implication, tax evasion.<sup>18</sup> Even the vaults of the famed Swiss secret-account system have been affected. Once most banks are on board, stragglers are under intense pressure to join or face isolation from global financial networks, which can affect their viability.

Financial sanctions can target individuals, companies, industrial sectors, and entire national economies. They can be especially effective against states that depend heavily on global banking networks and capital markets—states for which isolation can be extremely punishing. Of course, financial P2C requires multilateral cooperation. Against al Qaeda and Iran, it has not been difficult for the United States to enlist other advanced democracies in targeting assets and flows multilaterally. The problem, once again, comes when United Nations Security Council authorization is sought. The only way to circumvent the obstacles that China and Russia pose is to bypass the Security Council. The Group of 7, now that Russia has been cast out, is a practical alternative multilateral mechanism, although it lacks international legal standing. At the same time, the strategy that the United States leads does not really require international consensus or authorization, only the participation of key financial powers.

As the United States becomes the world's largest producer and a major exporter of hydrocarbon fuels, this could provide a new P2C option.<sup>19</sup> However, even the most-bullish estimates of U.S. shale depos-

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<sup>18</sup> Under Public Law 107-56, Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001, October 26, 2001, Section 311.

<sup>19</sup> See Edward L. Morse, "Welcome to the Revolution: Why Shale Is the Next Shale," *Foreign Affairs*, May–June 2014.

its do not imply that the United States would be able and willing to curtail energy supplies—not without the collusion of other suppliers, which it is unlikely to get, not least because major suppliers tend to depend heavily on the revenues from gas and oil sales.

However, a major position in world energy markets could put the United States in a position to use energy supplies as defensive P2C. U.S. capacity might enable it to reduce global dependence on unreliable suppliers; undercut predatory pricing; and reduce Russian and Iranian revenues, which are critical to their economies and improving their military capabilities. Increases in the production and supply of LNG are of particular importance because they can break the lock that certain suppliers—again, Russia and Iran—have because of regional limitations on point-to-point pipeline delivery. Even without adopting a strategy to do so, the United States can reduce adversaries' coercive power. Beyond that, it can expand and direct shipments to neutralize specific attempts to use energy as a weapon, e.g., Russia against Europe. The market would bear the cost of this form of defensive P2C.

Prodemocracy opposition movements are appearing widely, owing in large part to new means of social networking, communicating, and organizing. Although outside actors have had some involvement, we have seen in Iran, Egypt, and Russia that even—perhaps especially—tough authoritative regimes are susceptible to resistance, nonviolent or violent. Although these cases also underscore the odds against success against these regimes, the rising potential for democratic opposition and the opportunity to support it offer an option for P2C. We distinguish here between supporting regime opponents as an adversarial means of coercion or drastic change and prodemocracy institution-building, aid, and encouragement, which are forms of soft power.<sup>20</sup>

Of course, if the goal of such opposition is to change the internal political order, it becomes more than an instrument of this type of coercion. Furthermore, if the United States supports a prodemoc-

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<sup>20</sup> Even though, of these three examples, only one actually saw a change in government, which has since changed back to something approaching the original regime displaced in the Arab Spring uprisings in Tahrir Square, political opposition movements in these countries arguably had an effect on regime behavior and are seen as threats by each.

racy movement to apply pressure, deter, or penalize an adversary that is harming U.S. interests, withdrawing such support is not easy if the adversary adopts more-responsible external behavior.

Support for internal opposition is a traditional tool of the intelligence community. It is intended to be deniable, not only because intelligence operations customarily are but also because an opposition movement would likely be discredited if tied to U.S. intelligence. In fact, movements are often accused of being agents of foreign intelligence whether they are or not. China, Russia, Iran, and others seem to overestimate the ability of the United States to seed domestic opposition, which provides them with plenty of motivation, as well as a political excuse, to crack down on them. U.S. fingerprints on opposition movements abroad can boomerang against both the movements and the United States.

Because a political challenge can be very threatening to a regime, this is a potentially strong P2C instrument, though difficult to control. While it can alter hostile international behavior, it can also be aimed at producing favorable changes to an adversary's domestic policies. Of course, it might lead to a hardening of internal rule, as it did in Iran; detrimental external behavior, as it did with Russia; or uncontrollable events, as it did in South Vietnam. Furthermore, the downside of unpredictable outcomes could very well outweigh possible gains and so make such an approach unappealing, which is arguably the case in China. Paradoxically, the stronger the political opposition is, the less controllable it might be. At the extremes, it could end in brutal crack-down, as it did in Hungary in 1956, or chaos. In sum, this is a potentially high-return but likely high-risk P2C "weapon."

As it improves its capability to conduct offensive cyberwarfare as an extension of military operations, the United States will also be able to disrupt computer networks on which adversaries rely for non-military functions, such as public services, state control, telecommunications, banking, and energy distribution. Attacks or threats against these networks could have significant coercive value for the United States, such as in gaining the upper hand in a regional confrontation. China is especially vulnerable because its economy depends vitally on the movement of information; Russia is vulnerable because cyber-

war against its energy industry could throw the entire economy into reverse; Iran is less dependent, although, as we know from the Stuxnet experience, not immune.

There are, however, serious problems with using cyberwar for coercion. The United States is itself vulnerable to retaliation—worse, it might not be able to control escalation from limited attacks to extremely damaging all-out cyberwar. By and large, it favors norms against attacks—cyber or otherwise—intended to cause harm to civilian life. Indeed, it is in the interest of the United States to regard cyberwar as war, no less than armed conflict is. For these reasons, the United States likely will limit cyberoperations to the military domain and at times of war.

Overall, the United States has options to influence the conduct of belligerent states without using offensive military force. Of course, P2C is no panacea: Coercive cyberoperations risk retaliation, escalation, and damage to vulnerable U.S. networks; U.S. manipulation of the supply of gas and oil could, at best, be a counter against manipulation by hostile suppliers (e.g., Russia, Iran); and efforts to change the political nature of a hostile state through support of indigenous actors could result in unpredictable outcomes, even if successful. Given the difficulty of controlling the effects of support for internal regime opponents, this instrument of coercion must be used judiciously. The most attractive, and the one showing promising results, is financial sanctions, which do not require international consensus and can be crippling. These could work against the states that are developing A2AD, although the difficulty, costs, and risks of using P2C against China could be especially high. Of course, the United States and its allies cannot count on P2C to impose their will or to prevent aggression. Yet as we have stressed, it will take a power-projection portfolio with multiple options to offset the rise of the relative utility of A2AD and the attendant decline in U.S. ability to project offensive force; P2C should have its place in such a portfolio.

To summarize this prospectus of power, opportunities, and options, the United States can afford to rely on force mainly to stop adversaries from projecting force in critical regions. To this end, it can turn to its advantage trends in military technology and costs that favor

A2AD. It has many able partners with potential to complement U.S. capabilities to prevent aggression. For opposing intimidation and other hostile behavior that does not involve force projection, the United States can use its P2C.

## Enabling Capabilities for an Integrated Strategy

Although improving partners' capabilities and making use of non-military means of coercion are important, the ability of U.S. forces to defeat aggression with Blue A2AD is the sine qua non of a new strategy. To this end, there are some force improvements the United States should pursue—some with proven technologies and some with unproven ones.

### Improving U.S. Forces with Proven Technologies

We have already examined the utility of short- and medium-range ballistic and cruise missiles in Blue A2AD. The United States has the ability to field large numbers of such weapons on ground, air, and naval launchers, as well as the sensors to find enemy targets and the means to strike them accurately at any range. Ground-based missiles should be rapidly deployable and field mobile. Air-launched missiles should have sufficient range to stand off beyond enemy IAD. Missile-launching submarines have the advantage of invulnerability. All else being equal, diversification of launch platforms, ranges, and trajectories would give U.S. missile forces flexibility, survivability, insurance against missile defense, and effectiveness in A2AD roles.

The specific importance of A2AD missile-launcher survivability can be generalized to all Blue A2AD capabilities. Indeed, a U.S. shift in emphasis from offensive to defensive missions does not obviate the need to reduce the vulnerability of U.S. forces, because they still have to operate in contested regions. To the extent that enemy A2AD can target and strike U.S. A2AD forces, the latter will be less able to defeat enemy force projection (and vice versa). *With this in mind, we can conclude that four critical capabilities, based on proven technology, are submarines, drones, mobile missile and long-range rocket launchers, and IADs.*

Submarines are likely to remain very survivable because of the difficulty of mounting an ASW attack. Submarines can be used to attack surface ships, strike land targets, track and kill other submarines, and perform certain ISR roles. The U.S. Navy has already expanded the role of its nuclear-powered submarines for long-range precision strike with conventional ballistic and cruise missiles. Yet numbers matter. As surface ships become increasingly vulnerable at increasing ranges, large numbers of quiet nonnuclear submarines (e.g., those with AIP) should be affordable, would keep vulnerability of the submarine fleet low, and therefore are needed. Because the case for a robust, and costly, fleet of U.S. nuclear-powered submarines will remain strong, it is unrealistic to expect the United States to invest in a large fleet of conventional ones, particularly under current budget constraints.<sup>21</sup> One option is for the United States to encourage key allies in critical regions to increase investment in, and operation of, advanced conventional submarines. The largest payoff would be in the western Pacific, where antisurface, anti-A2AD, and strike missions of submarines could be expanded. The deterrent effect of such a fleet on would-be aggressors could be significant.

Going hand in hand with making U.S. targets less visible is complicating enemy targeting. More-numerous, diverse, small, fast, and stealthy strike platforms (and decoys) would be a major challenge for an A2AD targeting system that is designed to find and target a few, big, slow, and unmistakable high-value ones. Drones are far less costly and more expendable than manned systems (and, if lost, do not result in pilots as prisoners of war). In larger numbers, and in combination with diverse strike platforms, they can confound enemy targeting, C4ISR, air defense, and ASW. Launching and recovering aviation drones does not require large-deck CVNs, which are becoming vulnerable to missiles and submarines. The United States and allies should consider developing smaller, cheaper, and far more-numerous alternative drone launchers. Moreover, the United States could proliferate and use small

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<sup>21</sup> Given its global interests and obligations, the United States operates its attack and strategic submarines over especially great distances and extended periods from their home bases. This constraint favors nuclear propulsion.

drone-launching bases on land, thus reducing dependence on large and easily targeted regional air bases and vessels.

Many of the problems that A2AD creates for U.S. force projection come from new generations of smart missiles and long-range, accurate rockets. Yet in this area, U.S. land forces lag significantly behind those of China and Russia. This is not just a matter of compliance with the INF Treaty: China is not so bound. It is also a matter of investment strategies. The ability to strike targets accurately at reasonable ranges and, in some cases, with large salvos of rockets at ranges in the hundreds of kilometers, is something U.S. forces largely lack. In the past, this has been because U.S. air forces could provide what was needed. However, in an era in which U.S. airpower cannot be immediately established against all potential enemies and, in which having many mobile, dispersed, and hard-to-find and -target assets are critical, U.S. ground forces might want to reconsider investments in these available and proven systems. Integrating ASMs into U.S. or partner arsenals could be particularly important in some scenarios.

The problem that IADS poses is growing, mainly as a function of increased radar power and improved SAM guidance and range. As the power of radar increases, IADS might be more effective against stealthy manned aircraft. This can reduce the efficacy of U.S. airpower in Blue A2AD. Although the United States has the option of destroying enemy IAD infrastructure, parts of it are normally mobile; moreover, attacking it could require extensive attacks on the homelands of states with nuclear and other escalatory options. Therefore, it is important to be able to defeat IADS by penetration. Drones offer the possibility of saturating IADS because, being much less expensive than manned aircraft, they can be acquired and used in much larger numbers. They can provide extensive overhead sensing, provide certain strike options, and act as decoys. Although drones cannot perform all missions as well as manned aircraft can, they can occupy a growing share of the mix. They might also be less expensive than high-end anti-aircraft missiles, particularly decoy drones, which could cause the A2AD side to adopt a cost-imposing strategy (or other means of destroying them). U.S. rockets and missiles can also help in this regard, though with caution so as to be clearly nonnuclear in nature.

Similarly, U.S. IADS is critical to establish to prevent foes' air and limited missile strikes. Just as enemy IADS capabilities are increasing to the point at which they might soon call stealth technology into question, so too must U.S. IADS (another area of limited U.S. investment in recent years) improve as enemy stealth capabilities come on line. Although U.S. airpower will remain unquestionably superior to that of any would-be foe in the foreseeable future, if U.S. systems cannot find, track, and defeat enemy stealth aircraft and provide the coverage necessary to protect key facilities and systems, then U.S. forces face potentially crippling blows.

Most of the capabilities stressed here have merit whether the United States intends to use force offensively or to defeat aggression. Submarines, drones, numerous and diverse drone launchers, mobile and submerged missile launchers, and extended-range ISR offer both A2AD capabilities and survivability. The most significant additional requirement implied by Blue A2AD is a large and diverse missile and long-range rocket arsenal.

### **Improving U.S. Capabilities with Unproven Technologies**

In considering how unproven technologies could improve its military capabilities, the United States can and should be less constrained in the missions it anticipates while being cautious about being overreliant on technologies that are not yet mature. What contributes to Blue A2AD might also contribute to defeating an adversary's A2AD and thus enable force projection. In this regard, technologies that can improve the performance of U.S. forces against enemy missiles, submarines, satellites, and computer systems could be important in any case. A2AD is effective in part because defending against two of its primary weapon systems—missiles and submarines—is difficult and costly with proven technologies, notably HTK BMD and ASW.<sup>22</sup> *Insofar as adversaries rely on space- and computer-based capabilities to support A2AD and force*

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<sup>22</sup> In the near future, stealth aircraft will need to be added to this list as potential enemies field them. We do not discuss ways to defeat stealth in this document but recognize the importance of this challenge.

*projection, U.S. ASAT and cyberwarfare capabilities could offer military-operational advantages, though with significant complications.*

The limits of HTK BMD are known. Constraints on reload capacity, speed, and the cost and numbers of interceptors mean that saturation attacks (hundreds of missiles or decoys) can overwhelm HTK missile defenses. This more or less rules out broadly effective HTK defense against large Chinese and Russian ballistic-missile attacks, and it could prove inadequate if and as Iran expands its theater ballistic-missile arsenals.<sup>23</sup>

Three parameters must be considered when setting BMD R&D priorities: (1) vulnerability to adversaries' current and emerging capabilities, (2) ability to handle saturation attacks, and (3) cost of development and deployment. Regarding BMD platforms, China and Russia might be able by 2025 to degrade U.S. space-based BMD assets—for example, using hard-kill ASAT or interference with links and signals. Drones might be resilient platforms to support BMD. A large-enough number of drones can create its own communication network (as relays) and operate autonomously in degraded electronic environments. Regarding kill mechanisms, directed-energy weapons (e.g., lasers) have long been of interest. Improvements in energy efficiency, weight, reload speed and capacity, and cost could make this a better option than HTK, deserving of high priority in R&D.<sup>24</sup> Non-HTK could also be important as lesser enemies, such as Iran, expand the sizes and extend the ranges of their ballistic-missile arsenals. Furthermore, new HTK technologies (e.g., rail guns) could also be introduced into the portfolio of capabilities if they are made operationally viable.

With these considerations in mind, we believe that BMD R&D priorities might include long-endurance drones capable of payloads that can substitute for communications and observation satellites and carry nonkinetic missile-intercept systems; secure data links; high-powered

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<sup>23</sup> This analysis of non-HTK BMD technologies is informed by input from former director of the Missile Defense Agency, LTG (ret.) Patrick J. O'Reilly.

<sup>24</sup> Some fundamental physics problems would also need to be solved, such as using lasers—heat-producing energy—to destroy missiles hardened for atmospheric reentry. This would not apply to cruise and other air-breathing systems.

lasers (initially effective against soft targets, e.g., cruise missiles and ballistic missiles in boost phase); rail guns for terminal missile defense of surface ships and fixed installations; and cyberweapons to interfere with enemy missile systems and operations.

The limitations of ASW as currently practiced are largely attributable to the laws of physics: Submarines that take advantage of oceanic thermal layers, usually by staying deep, can thwart acoustic detection. The return on additional investment in acoustic detection might yield less benefit than increased R&D in nonacoustic options. At the same time, breakthroughs in the latter have long eluded the U.S. and other navies. Detecting magnetic disturbances or underwater wakes has been of particular interest. Use of satellites or drones to provide high-fidelity overhead sensing could be fruitful. Breakthroughs in ASW would enable the United States to foil one of the most important A2AD capabilities, yet adversaries would presumably be unable to exploit such advances against U.S. and allied submarines for some time. If they could, they could negate a significant U.S. advantage.

The United States has multiple options to degrade enemy use of space as part of A2AD and force projection. It can develop hard (HTK) options: Because enemy satellites are relatively few, have predictable locations, and are fragile, they are easier targets than missiles are. The United States can also acquire soft ASAT means, e.g., jamming satellite signals or using directed-energy weapons to disable satellites. Apart from the cost and difficulty of achieving such ASAT capabilities, the main issue the United States faces is the criticality and vulnerability of its own satellites, including some that support military operations, e.g., sensing, GPS, and communications. As of this writing in 2014, the only country besides the United States with a demonstrated current ASAT capability is China. This being the case, the United States might, in the event of war with China, choose to withhold but threaten use of its ASAT capabilities to deter China from using its ASAT capabilities.

Although the Soviets once tried to develop ASAT, the effort was unfruitful and abandoned. However, given its mature space program, Russia could join the United States and China as an ASAT-capable power. Iran will not be able to field effective ASAT capabilities, hard or soft, during the period we consider here. Yet both Russia and Iran

will rely increasingly on satellites to extend the effective range of their A2AD and enable force projection. It follows that the United States could have and opt to use an important asymmetric ASAT advantage over Russia and Iran. Because U.S. deterrence of Chinese use of ASAT would benefit from a robust U.S. ASAT capability, it follows that development of ASAT technologies should be a high priority.

Lastly, the United States could further develop its ability to penetrate, disrupt, and disable the computer networks on which adversaries will increasingly rely for force projection and A2AD. As noted earlier, the United States is and ought to be exceedingly careful in using cyberwar against civilian networks and functions to coerce adversaries short of war. However, in the context of war, the United States can gain important operational advantages by attacking networks, which enable enemies to move and use their forces and to target U.S. and allied forces. Although risks of retaliation and escalation exist in military cyberwar, the United States has to assume that serious potential foes—China, Russia, and Iran—would resort to cyberwar regardless of U.S. action. Indeed, there is a case to be made that the United States needs superiority in military cyberwar capabilities and operations to control escalation and maximize the probability of overall military success.

*In sum, of all the areas in which the United States should make R&D investments, the most important are advanced missile defense, submarine detection, ASAT, and cyberwarfare.* Although advances in these areas might not completely restore the U.S. ability to defeat an adversary's A2AD and project offensive force, they could make it harder and riskier for adversaries to project force in critical regions. Aspects of this component of the recommended approach are similar to the third offset that DoD is exploring, though not necessarily focused on the same technologies. However, because the value and timing of unproven technologies are uncertain, by definition, their pursuit must be part of an overall strategy that rests on proven technologies.

## Assessing the Proposed Integrated Strategy

The strategy we propose would focus the nation on preventing international aggression but retaining the ability to intervene directly when necessary to protect vital U.S. interests. It would accomplish this by

1. using Blue A2AD to significantly increase the risk for would-be regional aggressors (this is the central pillar of this approach)
2. doing so in cooperation with willing partners, some of which will need assistance to develop capabilities
3. using P2C to deter regional aggression by imposing costs on those that threaten U.S. and allied interests.

Further, we observe from our scenarios and a review of threats around the globe that there are three distinct types of aggression for which A2AD would be useful, although important aspects of what is needed for effective A2AD differ between them. These are A2AD to prevent aggression across water, across land borders, and using irregular means, primarily unconventional warfare and long-range fires.

It turns out that there are some important capabilities that U.S. forces would need in each (e.g., IADS, C4ISR capabilities able to operate the STP complex—joint and combined—from sensing through the direction to strike targets, long-range fires, capable tactical air forces), as well as some capabilities that would not be needed in all cases (e.g., submarines, large armored land forces). Force structure, investment strategies, and R&D priorities will be driven largely by the threats the United States faces, the willingness of partners to bear parts of the burden, and priorities set by senior leaders in the executive and legislative branches.

In Chapter Eight, we examine the specifics of what land forces will require to contribute to A2AD. There, we select a scenario that represents each of these three canonical types of aggression and see how U.S. forces stack up. This yields a list of capabilities and, in many cases, shortfalls that will be critical for success. We do not examine in any detail specific changes to the force structure of any service required to implement the A2AD strategy, or acquisition strategies, or required

stocks of key munition types. These are important issues that should be addressed if the nation decides to adopt this or similar strategies, but they are beyond the scope of this effort. Nonetheless, with the exception of the shortfalls in the ability to defeat incoming missiles, the technologies and methods needed to implement all aspects of our proposed integrated approach exist and are understood.

In the remainder of this chapter, we examine the general strategic approach more carefully; in Chapter Eight, we provide specifics on requirements for land forces. To do this, we need to answer some key questions: Could this strategy enable the United States to support its interests, responsibilities, and values at acceptable costs and risk if challenged in critical regions? Using the same criteria against which we assessed specific responses to the A2AD problem in Chapter Six, we offer our judgment on how a new integrated approach, based on sustainable U.S. advantages (Table 7.1, second column), compares with sticking with the old (and current) approach (Table 7.1, first column).

Note especially the expectation of major improvement in effectiveness with at least some improvement in cost. The reason is straightforward: Technological and economic trends favor A2AD over force projection because they favor targeting over targets—particularly expensive ones that are increasingly few. From another perspective, a strategy that exploits U.S. power and opportunities more comprehensively, including partnering up and P2C, is bound to perform better than one that relies disproportionately on one instrument of power whose efficacy is in decline.

The proposed integrated strategy, although better than the current approach, would not solve all the problems associated with A2AD (as signified by yellow). In particular, the transition costs of this portfolio are significant, especially those for acquiring more-survivable platforms and Blue A2AD capabilities and for investing in R&D on new technologies. At the same time, the steady-state costs of this strategy are hardly likely to exceed those of maintaining, operating, and protecting legacy forces, e.g., surface ships and manned fighter-bombers. Indeed, one of the reasons to shift in the direction of this strategy is that the cost comparison of power projection and A2AD is getting progressively worse. Moreover, U.S. costs can be offset if partners do

**Table 7.1**  
**Proposed Integrated Strategy**  
**Versus Current U.S. Strategy**

Factor	Current	Proposed
Feasibility	Green	Green
Effectiveness	Yellow	Green
Sustainability	Red	Green
Risk	Red	Light Green
Cost	Red	Yellow
U.S. interests		
Overall	Yellow	Light Green
China	Red	Yellow
Russia	Yellow	Green
Iran	Light Green	Green

NOTE: Red indicates that the strategy in question could fail. Yellow indicates that the United States can succeed but with difficulty, uncertainty, and time. Green indicates that the United States can succeed with minimal difficulty. A color between two colors indicates an outcome between the two colors.

more, and, although many might be skeptical about investing in force-projection capabilities to attack formidable neighbors, they all have clear vested interests in defeating aggression aimed at them.

Another potential shortcoming of the integrated strategy proposed here is that it does not provide the United States with the same degree of confidence in the use of offensive force as it has had since the end of the Cold War. Being focused on deterring or defeating enemy force projection, the United States might not be as able to compel regimes to comply with U.S. demands, to intervene in internal conflicts, to change regimes, or to take out potentially threatening military capabilities. In this respect, it does not serve especially well U.S. interests

that require using force against states that are not involved in aggression. However, this shortcoming is mitigated by three factors:

- The main U.S. interest in each contested region is to prevent international aggression and intimidation, as explained earlier in this chapter.
- The ability of the United States to use force other than to prevent aggression is being eroded *anyway* by A2AD, so the proposed strategy would leave the United States no worse off in this regard.
- Other options, especially P2C, could be used to break the will or weaken the capabilities of hostile states even as the threat to use offensive force against them declines.

Shown at the bottom of Table 7.1, a new strategy to prevent aggression and project power looks, on the face of it, to be more effective against Russia and Iran than against the far stronger and more important China. Of the three, China will possess superior A2AD, force-projection, military-technological capacity, resources for defense spending, cyberpower, and ASAT. It will also be the hardest to coerce by nonmilitary means, given its economic strength and importance. However, it also has the hardest task—aggression over water. This is far riskier than the other two types of aggression, unless China comes up with a way of defeating the U.S. Navy—a prospect that does not appear on the horizon—or other contingencies cause U.S. forces to become tied down in other parts of the world (e.g., Russian aggression in the Baltics with the threat of horizontal escalation could cause many of the most-important Navy assets for preventing Chinese overwater aggression to be tied up elsewhere). That said, questions about effectiveness against China A2AD are serious, and Chinese A2AD has the largest implications for U.S. interests.

However, this shortcoming is mitigated by several factors. First, U.S. allies in east Asia are more predisposed than U.S. allies elsewhere to increase their defense contributions. Most states in the region have reacted to the Chinese A2AD with more apprehension and determination than deference and accommodation. Short of attempting to create an anti-China regional alliance, the United States has and is pursu-

ing opportunities to strengthen key states and its ties with them from northeast to southeast Asia. Japan in particular has the capacity to play a larger role in collective security, and doing so within its alliance with the United States is the only way to do so without raising regional suspicions.

Second, Chinese force projection might have to be across or from the water (with the possible exceptions of Vietnam and ROK). This would expose Chinese forces to the Blue A2AD of the United States and its regional partners. Indeed, the geography of east Asia and the western Pacific is such that the United States would have more flexibility and possibilities to operate forces and to make them less vulnerable.<sup>25</sup>

Finally, it is worth noting that, although the trends that favor A2AD and discourage offensive force projection appear to be worsening with respect to states that have significant resources and capabilities, the United States will still be able to project offensive force against lesser states with relative impunity should its interests be seriously threatened in other areas of the world. Threats emanating from most places in the world will be easily defeated using methods similar to those used since the Cold War, should they be important enough for U.S. leaders to act. Genocide, attacks by terrorist groups, or the rise of extremist organizations in most places could be met with the forces of today or those proposed for tomorrow.

## Gray-Area Aggression

So far, we have considered conflicts between conventional armed forces. However, conflicts often manifest through different types of force. In fact, recent history suggests that U.S. adversaries will try to expand

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<sup>25</sup> Although it is not specifically related to the effectiveness of a U.S. strategy that relies on A2AD, conflict with China might be less likely. In contrast to Russia and Iran, China offers the United States important avenues for cooperation based on overlapping interests. Most Chinese and American policymakers believe that cooperation is worth pursuing on a global basis even as interests conflict and crises might occur in the western Pacific. Though technologically, economically, and militarily stronger than Russia or Iran, China has a greater stake in avoiding conflict with the United States.

their influence, gain advantage, and control events behind a veil of ambiguity and below a threshold of force that would trigger a U.S. military response. Their purposes are more likely to involve harassing, subverting, or otherwise pressuring their neighbors than affronting U.S. forces or sovereign interests directly. The measures they use might not involve regular military forces. To be complete, we briefly address these gray-area threats.

According to a recent RAND study, “the U.S. appears to be increasingly vulnerable to these measures.” In particular,

Russia used covert action, limited military incursions, and propaganda to effectively seize parts of Ukraine; China has used diplomacy, economic pressure, and limited yet aggressive military demonstrations to expand its influence in the East and South China Seas; and Iran used covert action, economic investment, and religious pressure to further its interests in Iraq at great U.S. expense. At least through mid-2015, the U.S. responses to these actions have been halting and—arguably—for the most part, ineffective. This is due in part to the predilection of some U.S. strategists to rely on outmoded and ineffective linear models of war thresholds. . . .<sup>26</sup>

Having identified this defect in U.S. strategy, these states will continue to innovate, observe each other, and test the ability and will of the United States and its allies to respond effectively. Russia’s use of proxies in eastern Ukraine bears a resemblance to Iran’s reliance on its Quds Force and Hezbollah in Iraq, Syria, and elsewhere, while China’s creeping attempts to extend its control over vital international waters could be a model for Iran’s ambition to make the Persian Gulf Persian in more than name.

Despite its military superiority, the United States has not responded with decisive force to stop these encroachments and violations of international order (nor do we mean to suggest that it should

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<sup>26</sup> Ben Connable, Jason H. Campbell, and Dan Madden, *Stretching and Exploiting Thresholds for High-Order War: How Russia, China, and Iran Are Eroding American Influence Using Time-Tested Measures Short of War*, Santa Monica, Calif.: RAND Corporation, RR-1003-A, 2016, p. x.

have). In all cases, it has used measures short of war. As this is written, it appears that P2C—notably, U.S.-led economic sanctions—helped contain Russia’s gray-area Ukrainian intervention. Although the West has pressured Iran to curtail its nuclear-weapon program, it has not prevented Iranian skullduggery in the Levant and around the Persian Gulf nor clearly succeeded in its aim to curtail Iranian nuclear advances (though it apparently has succeeded in pressuring Iran to accept the Joint Comprehensive Plan of Action). From all indications, China’s attempts to establish de facto control of the East and South China Seas are not lessening.

This pattern will be affected by the A2AD problem and how the United States responds to it. As China, Russia, and Iran improve their A2AD capabilities to defend against U.S. military intervention, they might see growing opportunities and declining risks in gray-area aggression behind an increasingly strong A2AD shield. Indeed, increased gray-area aggression could be one of the most serious consequences of U.S. failure to solve the A2AD problem in general. It follows that any proposed U.S. strategy to counter the effects of A2AD must be tested by how well it could address growing gray-area threats. Current U.S. strategy, with its heavy reliance on force projection, enabled by increasingly costly and vulnerable platforms, could allow the gray-area problem to worsen.

As explained, Blue A2AD could create conditions of *mutual* A2AD in critical and contested regions. Theoretically, the effects of this would be to discourage offensive force projection by adversaries, just as their A2AD discourages that of the United States. This condition is better than asymmetric (Red-dominant) A2AD for purposes of preventing gray-area aggression but only insofar as Blue A2AD can be used against such aggression. Keep in mind that Blue A2AD is designed to prevent or defeat enemy force projection, yet gray-area aggression is *not* a lesser-included case of force projection—it is different in kind. To illustrate, the submarines, air defenses, antisurface missiles, and drone waves that make up Blue A2AD are not necessarily usable against paramilitary infiltrators, training and arming of proxies, or strategic placement of oil rigs. Even if Blue A2AD could be used to deter or resist gray-area aggression, one cannot expect the United

States to use regular military forces whenever and wherever tested by irregular means.

Thus, although Blue A2AD is needed to prevent Red A2AD from creating conditions even more favorable to gray-area aggression than now, it is not sufficient to eliminate the gray-area problem as it already exists or under conditions of mutual A2AD. In effect, the cancellation of respective force-projection capabilities could shift confrontations and conflicts to a lower level, at which the United States struggles to field effective responses. However, the elimination or reduction of a threat's capability to back up gray-area aggression with conventional forces, as Russia has done in Ukraine, could significantly help the host nation address gray-area aggression with its own domestic means. The United States could lower, and make known it was lowering, the threshold for military intervention to include gray-area aggression. This might strengthen its hand in countering such behavior or in deterring it in the first place. However, this ignores that A2AD is making U.S. military intervention increasingly difficult and risky.

Responding to increases in gray-area aggression with regular military force means that the United States would have to be prepared to use force, if anything, more readily than it has in recent decades. Moreover, reliance on force projection to counter gray-area aggression leaves unclear where, when, and in what circumstances the U.S. intervention threat would apply, either reducing its deterrent value or raising unrealistic expectations. Then too, reliance on military intervention to defeat gray-area aggression could give third parties, including U.S. allies, an incentive to behave imprudently and even to draw the United States into war. In the worst case, a U.S. threat to use decisive force in such circumstances could prompt an enemy to take preemptive military action.

P2C measures—e.g., financial sanctions or stirring up internal opposition—afford some U.S. leverage against gray-area aggression. However, these might require international support, which can be more difficult to gain in ambiguous circumstances than in cases of naked aggression. Moreover, other RAND work suggests that P2C

cannot be counted on to deter a determined aggressor and that it could be more effective against Russia and Iran than against China.<sup>27</sup>

Other RAND work has identified general U.S. responses to the gray-area problem: improved tools for and speed of response, holistic (e.g., whole-of-government) options, training in the use of measures short of war, and inclusion of demands for measures short of war in military force planning. We highlight four specific, complementary measures within the general recommended strategic framework:

- being organized and willing to use especially harsh P2C methods, e.g., economic isolation, coercive cyberoperations, armed support for internal opponents
- improving the military capabilities of partners to thwart gray-area aggression, as an additional priority for their defense programs
- developing options to conduct gray-area counteroperations (e.g., covert action) to raise the costs and certainty of success of this type of aggression—gray-area horizontal escalation
- making counter-gray area an explicit mission of a particular U.S. entity,<sup>28</sup> responsible for developing and executing doctrine and means to neutralize gray-area threats.<sup>29</sup>

Any strategic response to this problem must be enabled by highly capable U.S. intelligence-gathering. Gray-area aggressors depend on ambiguity in their instruments and intentions and seek to preserve it. Russia's intervention in Ukraine, Iran's meddling throughout the Middle East, and Chinese attempts to intimidate others in East Asian waters would be all the more insidious if the states' roles remained obscured.

This study did not set out to review in depth and offer considered responses to the gray-area problem. However, it follows from our analy-

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<sup>27</sup> Gompert and Binnendijk, 2014.

<sup>28</sup> Candidates include U.S. Special Operations Command and the intelligence community.

<sup>29</sup> This could take a form like the clarification of counterinsurgency (COIN) doctrine in the mid-2000s or of the creation of the National Counterterrorism and National Counterproliferation Centers reporting to the Director of National Intelligence.

sis that the gray-area problem will get worse if the United States does not respond effectively to the A2AD problem. To counter the latter with a strategy of U.S. and allied Blue A2AD combined with stronger P2C would help prevent the A2AD problem from getting worse. However, even with adversaries' current A2AD capabilities, the gray-area problem is growing more serious. Thus, the strategy we recommend is the point of departure for, not the last word on, how to counter threats short of war.

## Conclusions

Our earlier analysis and warfighting scenarios show that Chinese, Russian, and Iranian A2AD can, to varying degrees, produce unfavorable outcomes for U.S. force projection at increasing distances over the next ten years. Again, the danger that lies in this trend is that such adversaries could feel less inhibited from committing aggression in their regions. The ideas presented here would not “solve” the A2AD in a narrow sense; rather, they would create conditions in which A2AD does not lead to successful aggression or intimidation.

By 2025, it is possible to have a new military status quo, in which A2AD diminishes the efficacy of offensive force for both the United States and its potential adversaries. While this might not match the lopsided advantage the United States has enjoyed since becoming the only superpower, it meets the fundamental criterion of U.S. strategy: that the United States can support its interests, responsibilities, and values at an acceptable cost and risk.

## The Role of the U.S. Army in the Proposed Integrated Strategy

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We have articulated the challenges of securing U.S. interests in the face of trends that favor A2AD over force projection, as well as a proposed strategy for how to deal with these and related security challenges. If adopted, the three pillars of the proposed strategy, as well as the supporting developments in means, will cause changes in the way the U.S. government and military thinks about and prepares for conflict. These pillars are as follows:

- Use Blue A2AD to significantly increase the risk for would-be regional aggressors.
- Do so in cooperation with willing partners, some of which will need assistance to develop capabilities.
- Use P2C to deter regional aggression by imposing costs on those that threaten U.S. and allied interests.

Building such a strategy would enable the United States and partners to leverage the trends in cost and operational effectiveness that favor A2AD over force projection and to ratchet up the costs of threatening aggression by using P2C before resorting to force.

In this chapter, we discuss the implications of such an approach for the U.S. Army; outline important Army roles; and provide recommendations for how the Army should examine and prepare for them, including Army roles in improving, enabling, and operating with partners to develop and enhance Blue A2AD capabilities.

To do this, we examine three canonical scenario types derived from the preceding analysis: aggression across water; across land bor-

ders; and via irregular means, such as unconventional forces or long-range fires (missiles and rockets). To examine these canonical scenario types, we extract observations from the scenario analysis in the companion report, *Smarter Power, Stronger Partners*, Vol. II: *Trends in Force Projection Against Potential Adversaries*.<sup>1</sup> However, because those scenarios were developed to demonstrate how A2AD would increasingly dominate offensive force projection over time rather than how the United States and its partners could use a similar approach to deter aggression, they cannot be used directly. Nonetheless, the discussion of relative capabilities of the opposing forces provides many of the insights needed for this discussion of the Army roles. In addition, for the case of Russian aggression in Estonia, we rely heavily on RAND war games that consider a very similar Russian attack of the Baltic states.<sup>2</sup> As a result, we consider a Chinese invasion of Taiwan for the overwater scenario type, a Russian invasion of the Baltics for the overland scenario type, and the Iranian threat in the Persian Gulf region for the irregular-means scenario type.

In addition to the A2AD-versus-force projection element that has been our central focus until now, in each case in this chapter, we also consider the problem of overlapping A2AD shields—that is, the operational challenges that occur when a regional aggressor’s A2AD shield overlaps with the defender’s A2AD shield. This is an important problem because the weapons and operational concepts designed to defeat offensive force projection can, in many cases, also be used to defeat or detract from the enemy’s A2AD. Many of the weapon systems developed and deployed for A2AD also have some inherent strike capabilities. For example, submarines are particularly effective at sinking the ships of an invading fleet but are also useful for sinking an enemy’s submarines operating in a defensive manner to clear the path for an invasion, as well as for launching ballistic missiles at targets on land, and ballistic missiles can be used to strike at the bases and (in some cases) afloat platforms of the side projecting force but are also very effective offensive weapons. Then again, some platforms, such

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<sup>1</sup> Long, Kelly, and Gompert, in production.

<sup>2</sup> Shlapak et al., 2009.

as aircraft carriers and stealth bombers, have primarily an offensive character, yet operationally offensive actions will inevitably be part of a strategically defensive effort. Importantly, overlapping A2AD shields, especially if developed with a specific foe in mind, could be used both to increase the risks of the aggressor's offensive actions and to decrease the effectiveness of the aggressor's defenses. For example, in the scenario involving a Russian invasion of the Baltic states, Russian A2AD would include sophisticated IADS to counter the use of NATO aircraft and missiles to attack key targets, such as NATO IAD sites, airfields, and troop concentrations. NATO A2AD would seek to interdict these missiles and shoot down Russian aircraft that were being used to counter NATO air operations and support an invasion. In some cases, we might see mutual A2AD in which not just offensive action but some forms of defensive action could be challenged.

In examining these scenario types, we address two critical sets of considerations: For what should land forces be prepared as an element of a joint and combined force in A2AD and associated operations to stem regional aggression, and how might the Army be asked to help partners prepare their own defense forces to conduct such operations before they are needed? To do this, we outline how threats could manifest in the three canonical scenarios, the types of forces and concepts needed to defeat them, and the issue of U.S. versus partner roles. Doing this comprehensively would require a broad examination of threats, the capabilities of all potential partners, and the challenges of creating a U.S. force capable of working collaboratively with several different partner forces. We do not attempt such an effort. Rather, in each case, we summarize requirements for U.S. and partner capabilities for the class of threats that are likely to be encountered, based largely on our 2025 scenarios in the companion volume<sup>3</sup> and other work done at RAND or elsewhere, and provide insights into what is needed to improve U.S. and partner land-force capabilities using the construct

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<sup>3</sup> Long, Kelly, and Gompert, in production

from Chapter Seven. With respect to Blue A2AD, we consider the following:

- how a conflict might play out, with an emphasis on the role and capabilities of land forces
- how to improve the A2AD capability of land forces with proven organizational, doctrinal, or technological capabilities and approaches (with the lessons from the scenarios in mind).

Subsequently, we examine the role of partners and the need to help them develop their capabilities. Here, we consider the following options:

- Develop new U.S. and partner force capabilities with the assistance of currently available and promising new technologies.
- Increase allied defense capabilities.

## **The U.S. Army in Joint and Coalition Anti-Access and Area Denial Operations: How Conflicts Might Play Out**

Designing an A2AD approach for various areas of strategic interest for the United States will require considering the unique political, geographic, military, and other circumstances for each potential conflict. Identifying what is needed and developing the requisite capabilities should follow logic similar to what China appears to have applied to the problem after the Taiwan Strait crisis of 1995 and 1996. When it was unable to deter or defeat U.S. carrier strike groups operating in the vicinity of Taiwan, China resolved to find ways to counter the specific forces that the United States could project at it. Focusing on U.S. force-projection capabilities and the operational concepts they employed, China developed concepts for how to defeat them and invested in the technology and force structure necessary to do this.

In what follows, we employ a similar approach. Whether these are the exact operational concepts U.S. and partner forces adopt or not, we believe that this approach is sufficient to illustrate key capabilities that land forces, as part of a combined, joint force, would want to consider

developing and fielding to help partners establish and participate in viable Blue A2AD defensive plans in each of the canonical scenarios.

As with the previous scenarios, the outlines in this section are meant to be plausible and indicate the types of capabilities that would be required, rather than predictive. More-detailed analysis would be needed to identify important aspects of what the force would need and to provide estimates of quantities of the capabilities that are critical. For our purposes, it is sufficient to map out the capabilities required and types of innovations the Army should consider.

### **Blue Anti-Access and Area Denial to Counter Overwater Aggression**

For this case, we chose the most substantial threat of this type on the horizon, a Chinese attempt to invade Taiwan using the 2025 capabilities discussed earlier. In this section, we discuss the capabilities needed to thwart Chinese aggression without regard for whether they would be deployed by the United States or Taiwan or whether they are worth considering for U.S. forces—the point is to illustrate what capabilities would be required, not who would field them.<sup>4</sup> This allows us to understand what land-force capabilities the United States would need to develop to counter overwater aggression by a formidable foe.

In this case, we explored a situation in which China attempts an amphibious and airborne assault on Taiwan. Preparations for doing so and the movement of troops cannot easily be disguised, but we assume that China decides to risk crossing the Taiwan Strait under its A2AD shield, believing it to be robust enough to ensure a successful crossing. As such, we assume that China believes that it could concentrate enough forces in the disputed airways and waterways to successfully contend with the U.S. and Taiwanese forces sent to defeat it. Given these conditions, sophisticated Chinese A2AD capabilities based in its homeland would be able to cover most, if not all, the intermediate air

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<sup>4</sup> While it is very unlikely that substantial U.S. forces would be deployed to Taiwan, it is not impossible. For example, if a flashpoint elsewhere led to a general war with China, it is not inconceivable that the United States would entertain a Taiwanese invitation to deploy forces there; the argument against doing so, that it would start a war with China, would be a fait accompli. Furthermore, it is illustrative of capabilities that could be useful elsewhere to deter regional aggression over water.

and sea lanes. For example, with the purchase of Russian S-400 anti-aircraft system announced in the summer of 2014, Chinese IAD will be able to cover the entire island out to approximately 100 km past its eastern side, and China's PLA Rocket Force (formerly the Second Artillery Corps) could cover roughly the same areas with rocket fire and far greater distances with missiles. This would significantly assist in protecting China's invasion fleet, although the fleet would still be vulnerable to U.S. and Taiwanese naval and air forces that could launch weapons at the Chinese invasion fleet from submarines or at standoff distances.<sup>5</sup>

Given that the overwater assault would entail relatively short ranges (e.g., approximately 100 miles of water), we assume that Taiwan's A2AD defense would engage the Chinese invasion in concentric circles by targeting the following assets, as generically depicted in Figure 8.1:<sup>6</sup>

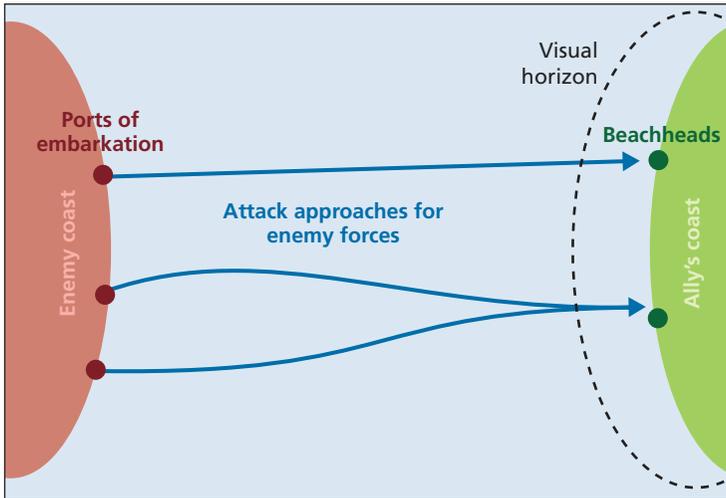
- major points of embarkation (e.g., ports, airfields) and known routes to these points, but not other targets on the Chinese mainland on which attacks could be misinterpreted as escalating the conflict, and only after hostilities are begun by China
- firing and fire-control units used to attack Taiwan and IAD sites engaging coalition aircraft in proximity to the Chinese coast (counterfire and SEAD)
- Chinese forces attempting to cross the strait before they can be seen from Taiwan's coast
- Chinese forces cresting the visual horizon (or otherwise coming within range of shorter-range land-based sensors and firing systems)

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<sup>5</sup> By 2025, the United States will likely have fielded the Long Range Anti-Ship Missile, which is expected to have a range of approximately 1,000 km. See John D. Gresham, "LRASM: Long Range Maritime Strike for Air-Sea Battle," *Defense Media Network*, October 2, 2013.

<sup>6</sup> The defensive approach in Shlapak et al., 2009, motivates our operational concept for how to resist such an invasion. The authors' concept of concentric rings of engagement forms the general outline of the approach under consideration here, though we have modified it somewhat to reflect more-recent developments.

**Figure 8.1**  
**Generic Overwater Aggression Attack Zones**



RAND RR1359-8.1

- Chinese forces landing and attempting to establish a beachhead
- Chinese forces as they leave the beachhead that attempt to conquer the Taiwan homeland.

We note that, in this scenario, the proximity of the two countries implies that their A2AD envelopes overlap and are in contention. China's A2AD would limit the ability of U.S. forces to assist Taiwan, while the coalition A2AD envelope would put Chinese invasion and supporting forces at great risk.

Before considering the concentric-rings approach, we make some observations about the challenges of overlapping A2AD shields.

First, naval and air forces in the region would already be engaged, in ways very similar to those discussed in the Taiwan scenario in the companion volume.<sup>7</sup> It would be challenging for U.S. air forces to operate out of Taiwanese airfields, given the certainty that they would be badly damaged and under fire from Chinese missile, rocket, and

<sup>7</sup> Long, Kelly, and Gompert, in production.

air forces.<sup>8</sup> We note that, should significantly improved air and missile defense systems be developed and fielded either by Chinese or U.S. forces (and at U.S. bases elsewhere, should they be attacked), this could significantly improve the ability of U.S. and allied forces to protect their bases and use airpower not only over Taiwan but also over the strait and Chinese territory. However, current approaches that depend on relatively small numbers of expensive interceptors will not be effective against this threat.<sup>9</sup>

The decision on when and where to begin efforts to interdict Chinese forces would be a critical one. Under a strategy built to deter and defeat regional aggression using the A2AD-centric approach described above, force would not be used before China initiated hostilities. As such, the first point of interdiction could be against Chinese air and long-range fire assets as they seek to suppress coalition defense forces. As previously noted, there are issues of stability and escalation to be considered in the decision to strike back at targets inside of China. Developing forces optimized for Blue A2AD should make them more robust under attack and limit the premium on striking the Chinese homeland first. But once China begins to fire on Taiwanese targets, critical decisions will have to be made. If the United States and its partners do not have the ability to defeat large missile and rocket attacks by 2025, which, barring some unforeseen technical advance, they will not (and recognizing that the logic of Blue A2AD is strongest if such attacks can be avoided), one can assume that some restrictions on coalition forces attacking targets in mainland China would be lifted. Many of these targets could be inland from the Chinese coast, but many should be central to force projection but not necessarily to other aspects of China's defense (that is, striking them should not be viewed as striking strategic targets). U.S. theater and national ISR assets and Taiwanese intelligence and military assets would need to provide targeting

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<sup>8</sup> However, coalition air forces could use highways as landing strips, if logistical and air control preparations were made for such a contingency. Taiwanese air forces practice for such a contingency.

<sup>9</sup> See, for example, Mark Gunzinger and Christopher Dougherty, *Changing the Game: The Promise of Directed-Energy Weapons*, Washington, D.C.: Center for Strategic and Budgetary Assessments, April 19, 2012.

information (some of these assets will be at fixed locations and some mobile), this information would need to be deciphered and response priorities set, and coalition responses would need to be initiated. Specifically, the logic of Blue A2AD would not be totally abandoned if these attacks were directed solely against those assets being used to strike Taiwan. Of course, all would depend on the coalition's ability to defend against missile and air attacks and China's response to attacks on its forces directly involved in the campaign. In particular, the potential for escalation would need to be managed carefully as targets were selected. In particular, there would be no strategic premium on early deep, broad strikes.

Suppressing Chinese air-defense forces (air force and sea and land based) would pose particularly difficult decisions. Given the range of modern air-defense systems, extensive attacks at ranges of up to 300 km into China proper could be required to permit coalition air forces to operate over not only Taiwanese territory but also over the strait. However, doing so would pose real risks of escalation. Whether such strikes would be necessary or not would depend at least in part on the strength of Blue A2AD's ability to defeat incoming air and missile threats, as well as the viability of strategies to use large numbers of inexpensive unmanned systems to overwhelm PLA IAD and cause them to exhaust their (significantly more expensive) stockpile of interceptors. This would be challenging and take time. Even if permitted by the U.S. national command authority, U.S. strike aircraft would have trouble operating over China, and Taiwan's aircraft would face enormous challenges because of their limited capability.

Rather than relying on aircraft, an alternative means of responding would be by using long-range fires to strike key targets once hostilities commenced. This would limit the risk to coalition aircraft but would carry with it the escalatory pressure associated with any homeland strike and raise the possibility that China would interpret incoming missiles as nuclear and escalate before it was evident that they were not. This decision would need to be informed by detailed intelligence and political judgment.

It is useful to note that land-based fire systems (long-range rockets and missiles) are usually tactically mobile and therefore would pose

a significant problem for China's sensing, targeting, and strike assets. Given the distance from China, it would be possible for these systems to fire and move quickly to avoid counterfire. Furthermore, rocket systems are relatively accurate even when not guided (e.g., useful for hitting large targets, such as troop concentrations and ports); inexpensive to fire; and able to deliver large volumes of fire, particularly when compared with other means of delivering either smart or dumb munitions. In particular, they do not suffer from long-duration reload times like naval systems and do not have to fly in from thousands of kilometers away like airborne systems (particularly at the outset of hostilities, before air superiority can be established). As such, their ability to deliver ordnance is likely to be many times that of other delivery systems if appropriate levels of munitions are stocked in Taiwan and can be protected from Chinese strikes.

However, it is likely that China's land-based missiles would have significantly longer range than coalition missiles (if any are present on the island), and Chinese rockets have several times the range of Taiwanese or U.S. systems and, by some reports, a longer range than even the U.S. Army Tactical Missile System (ATACMS) short-range missile.<sup>10</sup> As a result, China will be able to range critical targets in Taiwan with large volumes of fire without friendly forces being able to respond in kind, unless the coalition forces upgrade to more-capable rocket and missile systems. This could put coalition forces at a significant disadvantage given the short times to respond to rocket or missile strikes before the launchers can be moved (response would need to be in a small number of minutes). We note, however, that, because of the potential for escalation should the United States employ missiles on

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<sup>10</sup> Publicly available estimates of the range of the Chinese WS-2 multiple-rocket launcher are between 200 km and 400 km ("WS-2," *Military Today*, undated; "WS-2 Multibarrel Launcher," *Pakistan Army*, August 2, 2008). In contrast, U.S. multiple-launch rocket system (MLRS) range is reported to be 45 km ("MLRS [Multiple Launch Rocket System], United States of America," *Army-Technology.com*, undated). The U.S. ATACMS missile has a range of 300 km (Headquarters, U.S. Army Field Artillery School, *The Army Tactical Missile System [Army TACMS] Family of Munitions [AFOM]: Tactics, Techniques and Procedures*, Fort Sill, Okla., Special Text 6-60-30, January 5, 1998, Chapter One).

Taiwan, most, if not all, of these systems would have to be owned or stocked by Taiwan or arrive in Taiwan after hostilities are imminent.

Because China has formidable air defenses and a strong air force, coalition air forces would struggle to establish air dominance immediately given the geography and distances. As a result, it would be important for the coalition to suppress Chinese IADs with long-range fires to assist coalition air forces in their operations. However, as noted above, current long-range fire systems would almost certainly not be able to do much to help with this given their inferior ranges and limited numbers.

Similarly, ground-based air-defense systems are likely not up to the task of countering PLA Air Force forces. Current U.S. air-defense capabilities include limited numbers of high-end systems (Patriot and Terminal High Altitude Area Defense) and shoulder-fired man-portable air-defense systems, with not much in between. As a result, operational units and even some strategic sites would likely have limited ability to defend themselves from PLA Air Force attacks.

As Chinese forces move to coastal areas and prepare to embark on troop transports, a series of targets would be available for interdiction by coalition strike assets able to target them. (Less could be done about possible airborne embarkation sites because they are typically further inland). These include movement corridors that these forces use, actual embarkation points, and the facilities that support them. However, these targets would be out of range or coalition MLRSs currently in the U.S. or Taiwanese militaries because they could not fire across the strait. U.S. ATACMS could range across the strait but are few and likely would not be on the island. Unless coalition long-range land-based fires are upgraded, the coalition response will depend on limited numbers of air and naval assets able to interdict Chinese forces as they approach and embark on transports. (A more formidable defense would be presented when they try to cross the strait.) But it is worth noting again that the challenges of using air and naval fires before amphibious ships set sail would be significant because it would, in many cases, require penetrating the most-concentrated and capable elements of China's A2AD. Furthermore, although air and sea assets could be effective, they would have other targets to service as well (e.g., in efforts to eliminate Chinese IAD). And given the distances, the

combined effort would be significantly enhanced if large-volume land-based fires could support them.

As soon as amphibious ships put out to sea, the full weight of all allied fires could engage them. Currently, this includes U.S. and Taiwanese air and naval assets, to the extent that they could operate within the ranges of their weapon systems at acceptable risk, and land-based fires capable of hitting ships at sea (currently limited to one battalion of Taiwanese ASMs).<sup>11</sup> To engage amphibious shipping would require a robust STP complex and, in particular, the ability to deconflict target selection with commercial and other nonmilitary shipping that might be in the area (although this would likely only be an issue in the opening hours of the conflict, because this shipping will no doubt seek to get out of the way as quickly as possible). Theater and national assets could play a role here, but coalition submarines and ships, tactical UAVs, and other assets, such as OTH radars (if fielded by them), could also play important roles.

Coalition land-based ASMs, if present in large numbers and effectively employed, could play a significant role.<sup>12</sup> ASCMs are relatively inexpensive and can be mounted on tactical and some commercial vehicles and aircraft. Many types can range the strait with kilometers to spare, and they often have terminal seeking capabilities (i.e., do not depend on external targeting data once they are inside a reasonable radius of a target).

Coalition air forces and long-range air-defense forces would engage airborne invasion forces if not suppressed by PLA A2AD. Sending airborne forces would be a significant gamble on China's part, because the types of aircraft required to drop airborne forces must fly slow and low to make the drops. In addition to the large and more-capable air-defense systems that would surely be the target of China's suppression efforts, smaller systems, man-portable air-defense systems, and even small arms could be effective against such aircraft.

Tube and rocket artillery would engage amphibious ships as they crest the visual horizon or are otherwise identified to firing units within

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<sup>11</sup> IISS, 2014, p. 280.

<sup>12</sup> Kelly, Atler, et al., 2013.

range, and precision-guided rockets and other antitank weapons would target landing craft as they come within range of these systems. Finally, the land forces would engage Chinese forces if they were to land and attempt to break out of a beachhead.<sup>13</sup>

All coalition forces would need good tactical mobility and protection to survive in the very lethal environment that China's long-range fires (missiles and rockets) and air forces could and surely would attempt to fire against Taiwan. This requirement implies that these should be heavy- or medium-weight forces or lighter forces dug in or otherwise under protective cover. Light forces would not be nearly as tactically mobile as heavier forces, would be very vulnerable when moving (which might be important to do often to survive if China has good ISR), and would—at least for those forces that would fire directly at an invasion force as it approached the shore—be in predictable positions.

Once on shore, the fight would transition to both a continuing effort to interdict forces traversing the strait and a traditional land battle. In the next section, we discuss what would be needed for the latter.

For any coalition forces to operate and to protect critical assets, such as operational and strategic-level C4ISR assets, air- and missile-defense capabilities would be critical. Today, such systems are based on interceptors of some sort that cost roughly the same amount as the missiles they seek to intercept (although far less than advanced aircraft) and could be fired in salvos to increase the chances of intercepting incoming missiles. Given China's ability to launch salvos of its own at critical targets, the chances of successfully protecting critical or large targets from all significant damage are slim (although drawing up plans to disperse targets, absorb strikes, and repair critical assets would be

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<sup>13</sup> Under most scenarios currently envisioned, if China were to establish a beachhead, Taiwanese forces would be unable to prevent them from breaking out, and U.S. forces would not be deployed to counter them. However, ongoing RAND analytical efforts are exploring how Taiwanese forces could be configured to fight this conflict for DoD. So, in keeping with this as one of our canonical types of conflict, we continue to explore how this conflict might play out to illustrate this type of aggression and what A2AD assets would be required for Blue A2AD to be effective.

wise). Furthermore, given current approaches to equipping the friendly forces, even if HTK systems could, in theory, suffice, it is unlikely that enough munitions would be purchased in peace time to make this possible because of the expense or that there would be enough launchers to fire them if they were purchased. As such, air and missile defense is a critical capability that will be, at best, partially effective.

A spectrum of sensors, including UAVs that service ground forces, would be critical because they would conduct a significant portion of the operation to thwart an invasion in this construct. The ability to not only collect, decipher, and use this information but also to plug into the joint and combined C4ISR construct would be challenging but essential. Clear policies and technical solutions to such challenges as sharing intelligence; queuing firing systems; and commanding and controlling joint and combined operations would be needed. These challenges include interdicting targets in China proper (e.g., troop ships loading, missile firing sites), sinking a fleet moving across the Taiwan Strait, opposing an amphibious landing, and fighting a land war with those forces that successfully land. This would be a multidomain conflict that would be challenging for U.S. forces alone to undertake. Doing so with partners and allies would be even more challenging.

Establishing good interoperability and C4ISR between U.S. and Taiwanese forces would also be important, even if no U.S. land forces were introduced onto Taiwan, because of the combined, complex nature of the campaign. Should U.S. land forces be introduced, the full suite of logistics capabilities required for them to operate would also be required. While some of these functions (e.g., C4ISR) could happen to some degree off the island, other elements would need to be local. This implies not only significant advanced planning but also efforts at creating interoperability.<sup>14</sup>

In summary, the operation would require joint and combined capabilities on a high order, as well as the systems needed to carry it

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<sup>14</sup> For close allies, full interoperability might be possible (even if difficult). For example, the ability to operate on each other's C2 networks, fire the same types of ammunition, burn the same fuels, and use the same spare parts would make such operations significantly easier. However, workarounds exist that are less effective but still make coalition efforts possible, and they have been used in the past. These are well known so are not discussed here.

out. Little of this is in place now. Critical functions could include not only efforts to directly confront an aggressor invasion force but also efforts to secure the defender's leadership (without its leadership safe and in touch with the armed forces and population, Taiwan's efforts to resist could crumble) and key facilities should U.S. forces be given those missions. Using the Taiwan case to illuminate the general capabilities required to defend a partner from a determined aggressor, we find that key elements of land forces would include

- robust air- and missile-defense capability—current capabilities are inadequate to the BMD challenge, and current technical capabilities likely do not permit what is needed.
- an improved suite of sensors capable of identifying targets at long ranges—at least the width of the strait, or the ability to link existing ones into land-based firing units. Small, cheap, and numerous UAVs would be one useful asset for this task.
- missile forces capable of interdicting key targets in the aggressor's homeland once a conflict begins—current U.S. capabilities fall far short of those of possible aggressors, but this is at least partly because of self-imposed restrictions created by U.S. treaty obligations and investment decisions. As previously noted, whether and when to use these would have significant effects on the trajectory of the conflict. In particular, missile attacks on a nuclear-armed state with second-strike capabilities are a very dangerous proposition because they could be misinterpreted as strategic. Significant care would be needed in targeting and weapon selection if such strikes were pursued. That said, having them would provide a significant deterrent effect and capability should their use be judged prudent.
- rocket artillery forces capable of ranging aggressor ports of embarkation, troop concentrations and main supply routes, ships at sea in the strait, and ships and landing craft that approach the defender's coast. Current U.S. capabilities fall far short of those of potential adversaries and the requirements of this scenario.
- the ability to employ shorter-range artillery and direct-fire systems to engage aggressor amphibious ships as they come within

range and landing craft as they are launched. These would include guided systems (e.g., antitank missiles), artillery, and high-velocity cannons, such as those on main battle tanks, which can fire a large number of very accurate rounds in a short period of time.

- adequate maneuver forces to protect key sites and contend with whatever aggressor forces succeed in making the crossing—heavy and medium-weight forces would be needed given the expected lethality of the environment and the need for tactical mobility.
- C4ISR capabilities that can task, receive data from, and interpret the fused input from all sensing and targeting assets and provide the basis for sound decisions. This capability would need to be interoperable, or at least function compatibly, with defender forces.
- logistical and other enablers required to support combined operations.

It is worth reiterating that the land forces discussed above might not be from the U.S. Army. In the Taiwan case, in particular, the circumstances in which the United States would consider deploying land forces to Taiwan are few and extreme. However, the capabilities called for in this case might be ones the United States desires for current or potential future conflicts that require the ability to defeat a capable foe's aggression over water.

Because of the size and complexity of this endeavor, the U.S. Army, if deployed, would want to have headquarters capable of commanding complex and nonstandard land forces, even if under a joint task force (JTF) commander from another service. This would likely imply the need for a division or corps headquarters if a major landing had to be contested in a partner's homeland. Although the force initially might not look much like a division (e.g., initially being very heavy on air defense and long-range fire units), only a command with a robust, capable staff that could plan for and manage an operation of this complexity would suffice.

Finally, should Army forces be required but the political situation of a specific scenario or fiscal considerations prevent a posture that would see them either stationed or present on a rotating basis in a

partner's homeland, creating prepositioned equipment sets would significantly cut down on the amount of warning needed to get appropriate forces to the region (although, in some cases, such as Taiwan, even these would be provocative). A concept of operations, battle plans, and force structure to execute the plan would be needed to determine what was needed in these preposition sets. Appropriate locations for them in the defender's homeland would be required. And lastly, such sets themselves could be targets of adversary A2AD; the risk would have to be weighed against the risk and time involved with other modes of deployment.

### **Blue Anti-Access and Area Denial to Counter Aggression Across Land Borders**

The threat of a capable aggressor force invading a partner over land is significantly different from the threat that overwater aggressors pose. Indeed, it looks much more like a classical air–land campaign, such as those studied in depth and over decades during the Cold War, but updated to consider new technologies and capabilities, not to mention the loss of the significant advantages that the United States has enjoyed because of the second offset (i.e., a monopoly on the long-range STP complex). We use a hypothetical Russian invasion of the Baltic states to illustrate.<sup>15</sup>

Again, we assume here that Russia will reverse the accelerating declines in its economy and state resources. In that case, Russia could, in some circumstances, put NATO forces at risk and seriously threaten U.S. Baltic allies. Furthermore, the potential for escalation might be higher for Russia than for China because Russia has a declared nuclear first-use policy and this conflict would play out near Saint Petersburg, Russia's second-largest city and, in general, an area of great military, political, and social significance.<sup>16</sup> Furthermore, if Russia were to

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<sup>15</sup> For a detailed discussion of how a Russian invasion of the Baltic States might play out, see Shlapak and Johnson, 2016. The series of war games that informed this work was conducted from 2014 through 2015.

<sup>16</sup> James T. Quinlivan and Olga Olikier, *Nuclear Deterrence in Europe: Russian Approaches to a New Environment and Implications for the United States*, Santa Monica, Calif.: RAND Corporation, MG-1075-AF, 2011, p. 19.

annex parts of the Baltic states like it did in Crimea, these areas could fall under its nuclear umbrella, and trying to take them back would further raise escalation risks.

RAND war games indicate that, given current NATO and Russian postures, Russia could achieve its objectives before NATO could field a robust defense and then raise the cost of winning the Baltics back to such a level that NATO would either have to risk general war with Russia with the real potential for escalation or yield between one and three NATO nations to the Russians. Russia knows this and would not lightly entertain such a conflict given the real disparity in capability that exists between NATO and Russia, unless Russia believes that it can create such a *fait accompli*. As such, the effort would likely either look like a blitzkrieg or be undertaken by irregular forces. (We address the latter later.)

Because the Baltic states (individually and collectively) are so small (approximately 250 miles across at their widest point from east to west), Russia could overrun them before NATO forces could be put in place and organized to provide a capable defense. Furthermore, because this is a cross-land border attack, the two sides' A2AD shields would overlap significantly. As a result, the A2AD capability required to defend the Baltics against a determined Russian invasion force would have to be in place on short notice or face significant challenges of getting there under active Russian A2AD. So, these forces would need to be supplied entirely by the Baltic states themselves (which is not realistic), by them and NATO forces stationed there, or by the Baltic states and other NATO forces able to move into the region quickly upon warning of an impending invasion.

Unlike the overwater case, a concept like the concentric-circles construct for waves of engagement presented in Figure 8.1 is not as clear (although a logical, geographic, and temporal structure is useful, as discussed later). Overland invasions can take many forms, as Russia's actions in 2014 in Crimea and eastern Ukraine demonstrate. Additionally, given Russia's ability to mass forces on its side of the border without violating the peace or necessarily providing clear signals of an intent to invade, there also are more ambiguities than in the overwater case (in which very large numbers of troops gathering at ports,

boarding ships, and sailing in a partner's direction provides at least several hours, if not days, of unambiguous warning). For a large-scale example of this, recall Egypt's ability to surprise Israel in the 1973 Yom Kippur War by feigning a training exercise when Egypt intended an invasion. Furthermore, depending on how much clear warning is available; whether the aggressor is a nuclear-armed nation (which Russia is) and, if so, whether it has a first-use nuclear policy (which Russia has); whether it has other escalation options (which Russia does have) and, if so, what types; and the appetite of U.S. and the defender's political leaders to bear the costs of stationing forces overseas or for prolonged deployments, heightened readiness, and even strikes into Russia territory, there is less time for error, greater risk, and more opportunities for surprise in this case.

Depending on how the Baltic states' defenses are structured, logical points of attack are, in some ways, similar to the concentric circles of the overwater case and can be derived from the Cold War doctrine of air-land battle.<sup>17</sup> That doctrine, recognizing the need (and ability) to strike deep in enemy territory to "stretch" the battlefield, and, anticipating the revolution in military affairs that would permit precise targeting deep behind the front lines (which the STP complex would bring to fruition by the first Gulf War), it envisioned attacking enemy forces in contact, enemy forces flowing toward the battle (in subsequent echelons, in the language and structures of the Cold War), key C2 (and other facilities), and long-range fires deep behind enemy lines. Although the multiecheloned tank armies of the Cold War no longer exist, current technologies that permit both sides the STP complex and very long-range fires (by either rockets or missiles) provide a battlefield with geographic depth similar to that of the envisioned Cold War battlefield, even if with very different target sets and lethality. Key "echelons" for consideration, then, could be envisioned as follows:

- forward forces at or crossing the border
- critical supply routes and border-crossing points

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<sup>17</sup> Headquarters, U.S. Department of the Army, *Operations*, Field Manual 100-5, Washington, D.C., May 1986.

- key sites that enable A2AD and, in particular, IAD radar and firing systems and long-range fire (missiles and rocket) sites, many of which would be mobile
- C2 centers
- air bases.

Important for this scenario are escalation risks. During the Cold War, deep strikes on Soviet forces would have landed in Warsaw Pact countries, not the Soviet Union proper. In this case, deep strikes would necessarily be into Russia proper and could be conceived as strategic. In either case, the risk of nuclear escalation would be a real and critical consideration.

As in the case of China and the overwater invasion, extreme care would be needed to prevent escalation. Importantly, China has no first-use nuclear policy, whereas Russia does. Furthermore, Russia's second-largest city and one of its most important cultural centers, Saint Petersburg, is very near what would be the front lines of this conflict and would likely have important air-defense positions that could be used in the Russian A2AD shield for such an invasion in its neighborhood. These factors make long-range strikes into Russia, even if directed at units firing at NATO forces, very risky.

Because this situation would be characterized by overlapping A2AD envelopes, U.S. strategists and planners would need to account for the fact that Russian IAD forces have both some of the most advanced air-defense systems available on the world arms market (e.g., the Russian S-400, with ranges of 400 km and capabilities that increase as range decreases),<sup>18</sup> as well as a significant SSM capability (ballistic and cruise) and long-range rockets that could range all or most of the Baltic states from Russian or Belarusian territory. Furthermore, Russian forces would be capable of overrunning their strategic objective in very short period of time if NATO capabilities did not significantly stiffen the Baltic states' A2AD—NATO heavy forces could not get

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<sup>18</sup> For a brief discussion of some of the S-400's capabilities, see, for example, Wendell Minnick, "Time Running Out for Taiwan If Russia Releases S-400 SAM," *DefenseNews*, May 25, 2013.

there in time if not already stationed there or very close by. Furthermore, Russia understands that, if its forces cannot secure its strategic objectives before U.S. forces arrive, they will fail; they would then face not only the operational problem of defeating a far more capable and experienced U.S. joint force but also the potential for strategic escalation with the United States.<sup>19</sup>

As a result, the key roles for the A2AD forces of both sides would be to deny the other side's strike assets (e.g., aircraft, missiles) a free hand, thus enabling their conventional forces (in this case, heavy ground and air forces), as well as those that take advantage of the advances in STP, to decimate the forces of the opponent. This implies a premium on not only defeating the other side's strike forces (which, in addition to air and missile forces, would all but certainly include armored and mechanized units and long-range fires) but also its A2AD forces (to permit friendly strike assets a free hand). Eliminating the other side's IADSs would be particularly important for permitting joint operations, in which U.S. forces excel.

As noted in Chapter One, we use the term *A2AD* here in the literal sense, not as used in most contemporary discussion in national security circles. If denying access to a region to an enemy's forces is the goal and those forces consist of heavy armored land forces operating in conjunction with a modern air force and supported by robust IADS and long-range fires, then similar forces would likely be required to deny them access. A shortfall in any one of these capabilities, as well as the sensing, targeting, and C2 assets needed to maximize their effectiveness and orchestrate the campaign, could be disastrous.

NATO ground maneuver forces would play two essential roles. The first role is deterrence: The mere presence of multinational NATO forces in the Baltics would help deter Russian aggression by presenting a tripwire to guarantee deeper NATO (and particularly U.S.) involve-

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<sup>19</sup> Shlapak and Johnson, 2016, shows that even three heavy U.S. BCTs and four lighter U.S. and NATO brigades can significantly limit what Russian forces could achieve should they invade the Baltics, though not stop them from conquering the Baltic states that do not contain a BCT. Light forces are not adequate for this task, given their limited firepower, mobility, and protection. Without this, at least two, if not all three, Baltic countries would be overrun in less than 60 hours.

ment. That deterrent effect would be stronger if the forces were also operationally relevant. Furthermore, Russia is not the only side that might escalate. Having capable forces in place ready to contest a Russian invasion would raise the prospect of NATO escalation and add to deterrence. The second role is to defeat Russian forces should deterrence fail: To mount a successful defense of the Baltics and to effectively halt the invasion, heavy NATO forces would have to be in place before the Russians cross the border (which, according to analysis by RAND analysts, could be over in as little as 36 but no more than 60 hours). Having heavy forces in place would force Russian forces to focus on them or risk being flanked and defeated, whereas lighter forces can be fixed and bypassed because they have neither the mobility nor the organic firepower to defeat a heavy force. Such a heavy force would also serve as a major ground element in the NATO joint force that could pose real danger of comprehensive defeat to Russian ground forces, once Russian IADSs were defeated and joint operations to destroy the invasion force could begin in earnest. In this sense, A2AD against Russia would be very like a modernized version of traditional force-on-force operations in the Cold War to defend Western Europe.

Should Russia nonetheless invade, the first order of business would likely be to eliminate or reduce Russian A2AD to permit NATO strike forces freedom of action and prevent Russian forces from doing the same—air and missile forces for long-range strike and conventional ground and air units for the close-in fight. Although NATO strike forces would be essential, they would have to operate inside the Russian A2AD shield extending over the Baltics. Air and sea insertion of forces would be extraordinarily risky, and land forces approaching from the south would come under Russian A2AD strikes as they approached from Poland and perhaps even in Germany. If in the inventory in sufficient numbers and in the Baltic states before hostilities commenced, long-range fires and survivable or expendable drone aircraft (for strike and targeting) would give U.S. and allied forces some latitude to focus on Russian maneuver forces and forgo homeland strikes on Russian A2AD. However, some homeland strikes might be necessary. Logic similar to that discussed in the Taiwan case above should prevail, in which Blue A2AD would seek to eliminate an enemy's ability to pro-

ject force rather than render it defenseless to attack by comprehensive homeland attacks. Also, like in the case above, barring some technical advances that do not appear to be near fruition, it would be impossible to do this using purely defensive approaches and so some strikes on firing units, IADS, and associated assets would be necessary. Every effort would be necessary to do this while avoiding strikes that could be viewed as escalatory.

Although such a decision is fraught with dangers, it would be required if NATO is to meet its obligations to come to the Baltic states' aid. Russian IAD and SSMs, and possibly air forces in Russia, would be both critical to interdict and dangerous to strike for fear of escalation (although these latter could be interdicted as they enter Baltic states' airspace rather than in Russian air space, at least initially). This would have to happen concurrently with efforts to stop and destroy its conventional ground invasion force. Air forces, in particular, would be at high premium and high risk because they would actively engage in a hostile air conflict and be subject to attack from IADSs in ways that they have not experienced in 70 years. Having the capabilities and operating concepts to do this well would be critical to deterring Russian action, like it was in the Cold War. Doing so would (1) permit NATO forces to operate freely, move forces into the country, resupply the Baltic states and other friendly forces, and (2) keep Russian forces from doing the same things.

As in the Taiwan case discussed above, the operational concept of fusing intelligence from sensors, adjudicating targets in ways that provide operational advantage without unduly risking strategic escalation, and having the systems that could perform both the long-range strike and the close-in fight as Russian forces cross the Russia–Baltic frontier would be central to success. Unlike in the Taiwan case, NATO forces have a long history of working to achieve interoperability (although diminished somewhat by the addition of new NATO countries and the loss of focus since the end of the Cold War). This includes a NATO command structure that, if activated and operational in time for the conflict, would be central to orchestrating the A2AD defense. Nonetheless, a smoothly executed operational concept would need to be planned for and trained against to work optimally.

As part of the joint effort, Army long-range fires could play a significant role should air operations in support of ground forces be limited because of Russian IAD. (RAND war games indicate that Blue air forces do not establish air dominance for several days after the initiation of hostilities and that the Russian attack achieves its operational objectives in two to five days<sup>20</sup>). Here, as in the overwater-aggressor case, Russia's long-range rockets outmatch U.S. ones (although not as badly as China's do). Russia's land-launched ballistic and cruise missiles would fall under the same arms-agreement constraints as American ones, although recent reports indicate that Russia is developing cruise missiles that violate the INF Treaty.<sup>21</sup> Better abilities to conduct ISR and synchronize firing assets on the battlefield would be important.

This should not be seen as something that would unfold as a preliminary, long-range air and fire battle followed by a ground campaign, as U.S. campaigns have done in the past two decades. Rather, it is likely that Russia would use its A2AD and strike assets to suppress NATO air and long-range strike at the commencement of hostilities while launching a ground invasion. In other words, this scenario looks very much like an STP-enabled conventional campaign conducted by a Russian force.

This would be a multidomain, complex fight that would involve all services and cyber assets. However, an explicit goal of the Blue A2AD approach is to lessen the possibility of nuclear escalation, so all efforts should be made to prevent this.

It is worth noting that enhancing resilience, including the cyber-resilience of military and civilian networks (especially given past cyberattacks on Estonia emanating from Russia), would also enhance deterrence by denial. Although we do not consider it here in detail, this could be an important factor.

Although the Supreme Allied Commander Europe would command all forces, the U.S. Army would need a capable command to manage the ground efforts. As a result, C4ISR, robust joint and NATO

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<sup>20</sup> Shlapak et al., 2009.

<sup>21</sup> Hans M. Kristensen, "Russia Declared in Violation of INF Treaty: New Cruise Missile May Be Deploying," Federation of American Scientists, July 30, 2014.

synchronization from the tactical to the operational level, and the ability to adjust to a very dynamic situation would be required. As envisioned, an Army corps headquarters would be required.

Army forces of particular importance in this scenario look very much like the Army's current divisional and BCT structure, augmented by significant additional ISR, air defense, and long-range fire assets to bolster NATO A2AD as well.

Lastly, if no NATO heavy forces are present initially and the Russian invasion is successful, ground maneuver forces would be critical to rolling back the aggression. Such forces would need U.S. units deployed from CONUS at their core, plus a significant European force. The complex joint campaign that would ensue would be, in essence, an act of force projection, but one made more potent and less risky by Blue A2AD emanating from surrounding NATO countries. The challenges of trying to recover the Baltic states or whatever part of it constituted Russia's objective after an invasion had run its course would be far more difficult than stopping (or deterring) it early. The risks of escalation once Russia takes its operational objectives would be significantly higher than if they are prevented from doing so in the first place. If it follows the script it used in Crimea, Russia could declare at least the Russian enclaves part of Russia proper, so defending them would permit it to threaten, if not use, nuclear weapons under its first-use doctrine. As such, deterring such an invasion or defeating its initial thrust would be of strategic importance.

For this case of counterattacking to roll back Russian gains once they have secured their objectives, the U.S. Army should consider capabilities similar, although in varying levels of importance, to those in the previous case. Russian forces in the Baltics would enjoy the advantages of the defender (less a sympathetic population) and the ability to move its A2AD assets into the Baltic states proper. Ejecting them once ensconced would be challenging.

In closing, we note that successfully prosecuting this campaign would require new concepts for fighting that would combine the A2AD capabilities usually referred to under this heading (long-range STP capabilities) with traditional ground and air force capabilities. This is, in effect, an updated version of air-land battle, the 1980s doctrine

that envisioned engaging Soviet forces in Europe over the depth of the battlefield. New concepts and a new doctrine for doing this against a foe with strong A2AD are needed to successfully win a campaign such as that envisioned above, all while minimizing the threat of escalation and increasing stability.

As we did at the end of the overwater scenario, we present some general capabilities that might be required based on this consideration of a Russian invasion of the Baltic states. Although details of how they would be employed must await the new concept above, it is clear that the following are essential:

- robust air- and missile-defense capability—current capabilities are adequate for the threat that most possible aggressors pose, although today’s capabilities could not counter an aggressor with significant missile and rocket forces, such as those in the Russian (and Chinese) military. As with the overwater-aggression scenario, current technologies might not be adequate in that case.
- a suite of sensors capable of identifying targets at medium ranges, mostly on land, and in a complex and cluttered landscape. Again, small, cheap, and numerous UAVs would be one particularly useful asset for this task. However, the challenge of making sense of this sensing data would be significantly more complex, given that they would be collected over land with all the likely “clutter” rather than principally over water.
- missile and rocket forces with weapon systems capable of ranging and very rapidly engaging the aggressor SSM and multiple-rocket launchers and key IAD targets; in this, U.S. systems are significantly outranged by those of some other nations. As noted above, if the aggressor is a nuclear-armed state, and particularly if one with a first-use policy, using such systems becomes very risky, and target selection will be of paramount importance if used.
- the C4ISR capabilities to work with all joint sensing and targeting assets and make sound decisions
- adequate maneuver forces to deter and defeat a determined mechanized attack before air superiority is established, and the ability

to station them where needed or get them there on time (details not examined here)

- the logistical support to the operation, including medical assets to treat and evacuate casualties, the infrastructure and transportation nodes to move forces into and across Europe, and all capabilities needed to do the many functions required of an operational-size command. This would not exist in most partner nations unless part of the rotational or stationing plan. Some of this could be provided by the host nations, but their assets will also be swamped with indigenous casualties, military and civilian, and evacuation of casualties under fire should not be expected. The United States would need the ability to station these assets where needed or get them there on time.
- a JTF-capable headquarters capable of operations as part of a larger coalition effort
- adequate force prepositioned in the defender's homeland to deter and react to these threats; in this case, the outcome of the conflict could be decided by presence.

### **Aggression Perpetrated Principally Via Irregular Means**

Should an aggressor adopt an irregular approach to achieving its goals—that is, use irregular forces or long-range fires without a conventional invasion capability to attempt to coerce, deter, or destabilize a U.S. partner or ally—the challenges of defeating it would differ from those discussed above for overwater or overland aggression. Rather than defending against a conventional invasion launched under a capable A2AD shield, the challenge could be characterized as winning a contest of competing and overlapping A2AD envelopes (so long as the U.S. partner or defender has the internal security capabilities to handle irregular actors).<sup>22</sup> Doing so would enable host-nation security forces to deal with the irregular threats while the host nation defends its forces and populations from long-range strikes using conventional or nuclear

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<sup>22</sup> If the conflict were to occur far from the aggressor's territory, there would be no concern with overlapping A2AD umbrellas, and the problem could reduce to a COIN, foreign internal defense, or counterterrorism effort.

weapons. Some might argue that this does not strictly address the definition of A2AD because no conventional force seeks to invade, but, given the melding of irregular and conventional threats in numerous recent conflicts (most notably, Russian incursions into Ukraine), it is an important case to address.

Such a conflict could happen in a variety of geographic circumstances, including across land borders only, across sea borders only, or some combination of the two. (Here we use the Persian Gulf scenario to motivate this discussion.) As noted in the Persian Gulf scenario, Iran is working to establish an A2AD shield that includes moderately sophisticated IADS, ASMs, and fast boats to keep naval forces away from its shores and SSMs to strike airfields and other important operational targets to deter conventional retaliation while it uses irregular approaches to perpetrate aggression. This could take the form of attacking key assets of the Cooperation Council for the Arab States of the Gulf (commonly called by its original name, Gulf Cooperation Council, or GCC) countries; shutting down economic activity, such as interdicting commercial traffic in the air or shared waterways; or otherwise threatening key state functions.<sup>23</sup> The United States' commitment could include both supporting GCC countries to defeat the threat from Iran's A2AD and assisting with the irregular threat—here, we focus on the former, along with that portion of the irregular threat from long-range fires (SSMs and ASMs) and efforts to interdict commerce in international airspace or sea lanes.<sup>24</sup>

To identify the threats that U.S. and coalition land forces would need to counter—moderately sophisticated IAD, ASMs, fast boats, SSM systems, and irregular threats—U.S. planners need to consider the key characteristics of not only these systems but the operating envi-

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<sup>23</sup> An example of this type of aggression would be the “tanker war” that played out in the Persian Gulf during the Iran–Iraq War of the 1980s. If conducted with modern weapons, such efforts could be significantly more damaging.

<sup>24</sup> There is an argument to be made here for discussing insurgencies and COIN strategies. While this is an important discussion, oceans of ink have been spilled on this in the past decade, and we will not try to either reproduce or summarize those discussions here. Furthermore, the U.S. Army is currently manned, trained, and equipped for exactly this type of conflict, so there is little to be gained from such a discussion in terms of policy implications.

ronment. First, an important assumption is that the various Iranian missile systems (ASMs and SSMs; firing units and guidance systems) would be mobile. Furthermore, guidance systems (for ASMs in particular) would be separate from firing units. They would enjoy several potential launching sites previously identified as extensively prepared. They would have missiles prestocked at several locations, some of which could be hardened.<sup>25</sup>

If the conflict were to include an overwater component, numerous Iranian fast boats could interdict maritime economic traffic and coalition navel assets and would enjoy several ports from which to operate. These would likely be among the civilian boats and shipping that work the disputed waters, and some of these initially would be among the clutter of commercial shipping infrastructure (although much of that shipping would stop after the conflict commenced). They would operate close to civilian boats and shipping and enjoy some situational awareness from nonemitting devices that would help them know when to sail to harass or attack shipping, including U.S. Navy ships (e.g., cell phone traffic or other signals from sympathetic local boats and ships).

As context, finding mobile rocket or missile launchers in even a relatively small geographic area in time for firing units or air forces to strike them is a tough ISR mission, and the Iranian coast is quite large (approximately 1,500 km long). The Israel Defense Forces failed at this during the 2006 war with Hezbollah in a small geographic area of southern Lebanon (by comparison, less than 50 km across from east to west and north to south),<sup>26</sup> and U.S. forces were not terribly successful in finding Iraqi Scud launchers in Desert Storm, Serbian ground force targets in Kosovo, or insurgent rocket-launching sites in Operation Iraqi Freedom. However, although some rocket-launching sites are “fire and forget” (the equipment is set up before the launch, is dispensable, and does not require a human operator to be there at the time of launch), this is not the case for modern military rocket systems, such as multiple-rocket launchers, or for missile sites, which will be manned and contain launchers important to preserve for future fire missions.

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<sup>25</sup> See Johnson, 2011.

<sup>26</sup> See Johnson, 2011.

The logic of Blue A2AD would still apply, with an emphasis on disabling Iran's ability to project force rather than rendering it defenseless to attack (or subject to regime change). However, in this case, the nuclear threat should be less; if Iran has nuclear weapons, the potential for escalation would have to be carefully weighed. As a result, firing units would once again be fair game, and it would be important to intercept missiles (if this is technically possible) and hit launchers and radars before the team can move to a new location.

As a result, for both missile launchers and fast boats, quick reaction will be critical. The ability to deliver ordnance on target within a very few minutes from identification of a launch site (which are exposed upon launch) or a fast boat in port or at sea is required for a good outcome. In the case of land-based systems, the distances could be moderately far, such as across the Persian Gulf. As such, observations from the overwater-aggression case on the disadvantages of shorter ranges of U.S. systems apply in the same manner here as well. In the case of fast boats at sea, ASMs might be important and would therefore require a sensing, targeting, and tracking system able to support them, but air assets (manned or unmanned), if on station, would be helpful as well. This could be supplied by UAVs operated by ground force or assets from other U.S. military services or coalition partners.

Air forces that were on or nearly on station would interdict all these systems because the destruction of the Iranian air force and air defenses would be accomplished as soon as possible once hostilities begin. However, the border or coastline of Iran is quite long, making constant air availability challenging. Furthermore, Iranian SSMs could be well inland, operating hundreds of kilometers from the coast. Even ASMs of some types in some locations could be quite far inland. It is unlikely that these systems could be found and interdicted quickly by air assets alone, given these distances. To date, Iran has no top-flight air-defense weapons, but recent tensions could lead Russia to sell them to Iran. However, after these Iranian systems fire or are otherwise located, land-based assets could deliver ordnance on target within a very few minutes of target identification (e.g., if linked to sensors that could provide near-real-time detection of a launch and able to calculate

a firing solution and launch immediately)—much more quickly than air assets that were not on top of a target.<sup>27</sup>

Similarly, ASMs provide an appealing solution to the problem of fast boats. Coupled with ISR assets, ASMs (air, sea, or land launched) with ranges in the hundreds of kilometers could pose a very significant threat to an adversary's fast boats. These are inexpensive and could be deployed in relatively large numbers by U.S. or partner land forces. However, excellent target identification and tracking would be needed to avoid hitting civilian shipping in crowded waterways. Attack helicopters would also be useful in this mission because fast boats cannot move as quickly as aircraft and might be easier to track once located than launchers on land. They would also have the advantage of having eyes on the target to avoid hitting other shipping in the area.

Missile defense would also be at a premium until Iranian SSMs could be destroyed or were expended. Unlike in the case of China and Russia, HTK systems might be adequate against the threat Iran could be expected to field. These could threaten not only GCC country airfields and naval assets but also partner population centers. New and better ways of doing this, similar to those discussed in the overwater-aggression case, would be desirable even if not strictly necessary, and Army air-defense systems would be important contributors. This would be even more important if Iran were to develop a nuclear weapon that a missile could deliver.

Iranian irregular forces would pose a terrorist threat to coalition bases and GCC countries, but it would not amount to a threat to overrun a base or conquer a country. Nonetheless, securing U.S. bases, firing positions, and other assets that these actors threaten could amount to a considerable demand for forces. U.S. forces could also have some role in securing critical GCC bases, although this would likely be limited. Depending on the U.S. and partner order of battle, the forces would need to provide adequate security, including countering rocket fire, conducting patrols, securing supply routes, and under-

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<sup>27</sup> The time of flight of ATACMS out to its maximum range of roughly 300 km is approximately five minutes, according to unpublished RAND research that has examined the challenge of interdicting these firing units in very short time frames.

taking the myriad of tasks required for force protection in contested areas. One need only recall the threat posed to U.S. bases and convoys in Iraq from 2003 to 2010 to understand what could be required.<sup>28</sup>

In summary and generalizing from this scenario, key elements of Army forces could include

- robust missile-defense capability—current capabilities are probably adequate for the threat that many would-be aggressors posed in 2015, but a significant increase in Iran’s missile forces could call that into question. An aggressor with capabilities similar to China’s or Russia’s would pose a challenge for which current technologies might not be adequate.
- a suite of sensors capable of identifying targets at long ranges—at least at the range of coalition rockets and missiles—to identify fast boats and land-based targets for some distance inland. Small, cheap, and numerous UAVs would be one useful asset for this task.
- missile and rocket forces with weapon systems capable of ranging and very rapidly engaging aggressor SSM and ASM assets before they can fire and move (although, as previously discussed, the risk of escalation if the aggressor is a nuclear-armed state would be critical to consider).
- ASM capabilities that can attack fast boats—these could be land based or launched from rotary-wing aircraft.
- the C4ISR capabilities to work with all joint sensing and targeting assets and make sound decisions and to work under an agreed-upon C2 structure and otherwise coordinate with partner forces
- adequate maneuver forces to protect key sites from irregular attacks<sup>29</sup>

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<sup>28</sup> These threats were principally from improvised explosive devices, as well as rocket and mortar attacks on installations.

<sup>29</sup> Should it become necessary to put ground forces into aggressor territory to find and eliminate missile-launch sites, the task would be very large. In this analysis, we do not consider this contingency.

- the logistical support to the operation, including medical assets to treat and evacuate casualties and do the many functions required of an operational-size command
- a ground force headquarters capable of commanding operations at the operational level of war as part of a JTF and possibly acting as the JTF headquarters.

Unlike the cases above in which a large conventional invasion was threatened, having U.S. forces stationed in a defender's homeland would be less critical because it would presumably be able to hold out against irregular threats until U.S. forces arrived. Building partner forces would be critical. That said, U.S. ground force equipment sets could be useful in deterring and reacting to these threats.

### **Improving the Survivability and Anti-Access and Area Denial Capacity of Land Forces with New Organizational, Doctrinal, and Technological Approaches**

The discussions above indicate that, in most cases, some progress can be made with current technology if new approaches are adopted (promising ones outlined below), but more-profound advances could be made if new technical breakthroughs are discovered (discussed in the next section). Those that could be implemented with current technology include the following.

First would be the most-robust air- and missile-defense systems possible under existing technical and fiscal constraints. Other than high-end systems for limited threats, the U.S. Army has not had a significant requirement for air and missile defense since the end of the Cold War. Critical units and facilities, such as C2 centers and logistical nodes, have faced no real threats. However, current approaches are unlikely to prove adequate for a missile threat similar to what China could present and might be challenged by Russian capabilities as well, assuming Russian economic recovery. But they could do more against most other threats (e.g., the Iranian threat) with more investment in force structure and munitions. Furthermore, innovative uses of existing

systems (across services) and technology would likely result in better outcomes, if this is a priority. The delta between what can be done with current technology and approaches and what is needed to counter large-scale threats that require new technical developments should affect DoD's and the Army's investment decisions.

There is also a need for UAVs that can provide ISR to ground forces in a reliable, responsive manner. The target sets that the Army will need to address are liable to be complex and large. Although any ISR (and resulting fire) needs to be coordinated with joint assets, the ability to get dedicated input that is adequate to the operational task at hand is critical.

Long-range fires (rockets and missiles) that permit high-volume, responsive interdiction of tactically mobile aggressor A2AD and strike systems are also needed. First, the U.S. MLRS is not capable of competing with those of either China or Russia in range and, thus, is at a significant disadvantage when range is important. To the extent that Iran can acquire MLRSs from countries that produce longer-range, accurate ones, they too could pose a significant threat (although their IAD capabilities are not nearly as robust as either China's or Russia's, so all of their systems would be vulnerable to air strikes—with the caveat noted above that finding them is a challenge). Better systems could be developed by the United States or purchased from other producers.

Second, the INF Treaty limits U.S. ballistic-missile systems, yet those of most potential adversaries are not. However, there is room for significant improvement even within the INF Treaty limitations, and, in many cases, additional range beyond 500 km might not be critical. The operational advantages of longer ranges should be considered in the light of the strategic implications of the United States abrogating the INF Treaty, which are many and important. As always, striking targets in an enemy's homeland should be avoided where possible, with efforts focused mostly on striking projected forces.

Third, smart munitions at all levels are needed that can hit adversary systems on land or at sea.

ASM systems (or the ability to work with partner systems) capable of interdicting ships, fast boats, and amphibious forces are widely available on the world market and use existing, proven technology.

U.S. systems in development for air and sea launch (e.g., rockets in the family of MLRS munitions, Long Range Anti-Ship Missile) should be considered for modification for the ability to hit vessels, the range to meet INF Treaty restrictions, and the ability to launch off of land platforms (e.g., MLRS and High Mobility Artillery Rocket System platforms). If this could be done by modifying existing systems and without demanding additional force structure, the benefits to the joint force of fielding them could be large at a modest cost.

Methods for making maneuver forces both strategically and tactically mobile and protected will require new prepositioning arrangements and additional fast sealift unless the United States and its partners agree to station forces overseas in critical areas. In some places, this could be difficult (e.g., Taiwan) or undesirable (e.g., Saudi Arabia). In the cases discussed here, light forces can arrive on time but are not adequately mobile or protected to fill the need in at least two cases (overwater aggression and overland aggression). In all cases, additional analysis would be needed to determine what changes in prepositioned stocks and airlift and fast sealift would be needed and what the threat to forward-positioned stocks might be.

Logistical and other enabler systems that are either in place or strategically mobile and can operate in lethal environments are needed; although not discussed in detail, this is needed both for land forces and the entire joint force (and provided to the joint force in large part by the Army).

There is also a need for robust operational and planning staffs at division and corps levels able to plan for and employ nonstandard formations to create sophisticated A2AD envelopes in conjunction with other elements of the joint force and with partners. Although not primarily a technical problem, organizing and training staffs to plan and conduct nonstandard campaigns and operations such as these is critical.

Finally, there is a need to develop the operational concepts and training plans required to prepare the Army for these missions.

## Increasing Allied Defense Capabilities

In addition to the requirement to create A2AD forces that can deter regional aggression, the second element of demand for U.S. Army forces is to help partner nations prepare their own A2AD capabilities. Doing this well assumes partner nations' willingness to recognize the need to prepare for this type of conflict and determine what they need for their specific situation. This also implies direction from partner-nation political leadership to develop strategies for building A2AD capabilities; the allocation of resources (people and funding) to create military forces focused on defeating regional aggression through A2AD strategies and plans; long-term investments in technology, weapon systems, and force structure; and a willingness to work with U.S. forces to develop all of this, as well as combined plans. If the United States decides that such an approach is promising, senior U.S. military personnel and diplomats will play a large role in helping convince partner nations to adopt such a strategy. Soldiers will help partner armies develop the tactical and operational capabilities needed for these missions. Interactions with partner military leaders and efforts to train their forces are a routine part of the U.S. military repertoire, but, in a Blue A2AD construct, these interactions should be focused, at least in part, on developing and training for a comprehensive approach, from the most senior military leader down to the squad level, and on helping partners create the operational capabilities to implement it.

For all the potential aggressors depicted above, U.S. forces would seek to help several countries develop A2AD strategies and capabilities to deter aggression. For example, although we looked at a possible Russian excursion into the Baltic states in the companion volume<sup>30</sup> and earlier here, Poland would surely be interested in concepts for creating its own A2AD, and other non-NATO countries might be as well. Depending on the future of Ukraine, NATO members Romania, Hungary, and Slovakia, as well as non-NATO Moldova, would also likely be interested. Several Arab states in the Middle East and several countries in east Asia might be keen to develop more-effective ways to

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<sup>30</sup> Long, Kelly, and Gompert, in production.

deter regional aggression. As a result, rather than focus on a country-by-country assessment of what is needed and the likely U.S. appetite for providing assistance, we focus on the capabilities listed above and discuss what is needed to produce forces capable of conducting these missions.

The plans for how to conduct A2AD against a regional aggressor rely on specific conditions of that country and region and on requisite capabilities. While it is possible to develop plans and work and train with allies using capabilities not in the U.S. inventory, there are clear advantages to having as many of these capabilities as possible. Furthermore, having these capabilities would help U.S. senior commanders and their staffs develop plans that thoroughly take into account the capabilities these systems offer, a task that is more difficult if they are not in the U.S. inventory. Some of these already are in the Army inventory (e.g., forces required to protect against irregular attacks), while others that could be useful in some scenarios are not (e.g., ASMs) and still others are in the inventory but could be altered to improve their usefulness across scenarios (e.g., SSMs with ranges longer than 300 km and shorter flight times, MLRS with longer ranges).

Because planning for the creation of A2AD envelopes tailored to deter and, if necessary, defeat potential regional aggressor capabilities has not been a U.S. military area of focus in most parts of the world since the end of the Cold War, doing so well might require the Army to make adjustments to how it approaches security problems. It is worth noting that generations of military officers and strategic thinkers focused on little else during the Cold War because deterring and, if necessary, defeating a Soviet invasion of Europe was of utmost importance. What is required to rediscover this way of thinking about national security is an effort to ask and address the right questions. Two models for doing this well are China developing the ability to hold at risk U.S. force projection after the 1995–1996 Taiwan Strait crisis and NATO during the Cold War.

U.S. Army planners at the Army service component commands for the Pacific (U.S. Army, Pacific Command), the Middle East (U.S. Army Central Command), and Europe (U.S. Army, European Command) will need to work with their combatant commands and regional

partners and allies to help develop operations and contingency plans, as well as theater security cooperation plans with A2AD in mind. Training exercises that are focused on developing interoperability in key skills required for A2AD operations would also be useful.

## Conclusions and Implications

The summaries make clear that, although the side seeking to project force bears the most-significant risks, in many cases, the competition between overlapping A2AD shields will be a principal challenge. The side that has its A2AD shield in place at the start of hostilities is likely to enjoy a distinct advantage if there is significant A2AD shield overlap, because the side that is not set will need to move forces into theater to establish its A2AD in the face of the other side's concerted efforts to prevent it—efforts that bear strong similarities to offensive force projection, especially across land borders because the overlap is so significant. As such, the ability to receive early warning, global posture, prepositioned equipment sets, and strategic mobility might all be essential in a future conflict dominated by A2AD.

Although each of the potential conflicts above has different characteristics, they also have similar requirements for Army forces. In particular, the following seem to be particularly useful, and U.S. Army should consider them carefully:

- Develop the joint and Army operational concepts needed to conduct A2AD missions against formidable foes. While the specifics of the scenarios and how to address them might differ, working through a detailed analysis of what is required in each type is essential.
- Given the operational concepts developed through campaign design and planning, determine the capabilities required to successfully interdict potential aggressors' offensive force projection and engage and defeat its A2AD systems when they overlap with U.S. A2AD, including the requisite weapon systems and force

structure, by focusing on specific threat capabilities and plans. Resource and train for these missions.

Finally, it is worth noting that these new strategy and campaign concepts, if adopted, would not alter many other functions the Army provides to the joint force. In particular, these significant requirements would remain, and the changing nature of how the entire joint force adapts to the requirements of this new strategy could affect these Army functions as well.



## Findings and Recommendations

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### Findings

The United States will face heightened costs and risks in using offensive military force in critical and contested regions by 2025, owing to improved A2AD capabilities enabled by the spread of technologies that permit targeting of traditional military platforms. This effect is most pronounced in the case of China and the western Pacific, where U.S. surface naval forces and air bases are already vulnerable. However, if Russia reverses its economic decline and menaces ex-Soviet states in its European near abroad, it can also be expected to enhance its A2AD capabilities to check NATO's response. Iran is and will remain a distant third in the ability to oppose projected forces, but its ability to strike soft but important targets in and around the Persian Gulf in reaction to U.S. threats will improve.

If these trends continue, there is a growing danger that adversaries will use A2AD as a shield behind which they can commit aggression. In the China and Russia cases especially, such A2AD capabilities as advanced long-range air defenses; accurate, precision-guided ballistic and cruise missiles; submarines; extended-range sensors; and digitized C2 could delay and degrade intervening U.S. ground, naval, and air forces, allowing overwater or overland invasion of neighboring states. However unlikely war with China, Russia, or Iran might be, the United States' declining ability to bring forces to bear in these regions and against these countries could have deleterious geostrategic consequences. U.S. deterrence would be eroded. Regional states, including U.S. partners and allies, could become more exposed to intimidation,

which could, in turn, affect their freedom of action and even their alignment. Ultimately, adversaries could gain a degree of hegemony in regions of critical interest to the United States if they can project force behind their A2AD shield while keeping U.S. forces out of the region by increasing risk to an unacceptable level.

As important as the ability to bring force to bear against aggressors is the type of force the United States chooses and prepares. We found that current U.S. options to maintain the ability to conduct offensive military operations in these regions are risky, and the trends are not promising. One such option is to plan to destroy A2AD capabilities on enemy territory. Although the strike forces needed to do this exist and are worth maintaining, attacking enemy territory could lead to unacceptable escalation risks, especially against nuclear-armed states. Likewise, improvements in U.S. strike platforms with proven technologies (e.g., HTK BMD, sonar, and stealth) cannot keep pace with improvements in A2AD capabilities (missiles, submarines, and increasingly capable radars and air-defense systems, respectively). Finally, if these developments lead to U.S. reliance on the ability to strike adversaries with long-range weapons launched from beyond the reach of A2AD and, in particular, to real questions about the United States' ability to intervene in other ways to support partners and allies, this would call into question allied confidence and U.S. influence and could introduce the risk of an enemy perceiving an attack with these long-range weapons as strategic and reacting accordingly.

Because the ability to project offensive force has been the linchpin of U.S. global security strategy since the end of the Cold War, the decline of that ability warrants reconsideration of why and how the United States uses its sustainable advantages to support its interests, responsibilities, and values. In this regard, we find that the United States could embrace a broader concept of power projection while concentrating militarily on preventing enemies from projecting power under the shield of their A2AD—in brief, a concept that entails exploiting U.S. advantages to prevent aggression. Such an approach would be based on enduring U.S. advantages in developing and applying new technologies, in synchronizing operations across multiple domains, in maintaining and cooperating with capable partners, and in using non-

military capabilities to isolate and coerce aggressors—advantages that become more important as the costs and risks of U.S. force projection grow.

Specifically, we discussed a multipronged strategy to exploit U.S. advantages to prevent aggression:

- Use Blue A2AD to significantly increase the costs and risks for would-be regional aggressors (this is the central pillar of the strategy).
- Do so in cooperation with willing partners, some of which will need assistance to develop capabilities.
- Use P2C to deter regional intimidation and low-grade aggression by imposing costs on those that threaten U.S. and allied interests.

Some implications of this strategy include that the United States should sustain and exploit its superiority in the technologies that enable superior A2AD, especially targeting; work with its partners to upgrade and focus their defense capabilities on Blue A2AD as a common bulwark against regional aggression; and use P2C, denying adversaries access to financial markets and imposing other means of economic isolation, supporting democratic opposition groups, and employing cyber means to impose costs. Hand in hand with this strategy, the United States should place higher priority on more-survivable military systems, e.g., submarines, drones (including diverse drone carrier-launchers), and on achieving breakthroughs in technologies that could diminish the effectiveness of regional aggression under the cover of A2AD, such as non-HTK BMD, nonacoustic ASW, and non-HTK ASAT.

A U.S. strategy that focuses militarily on preventing aggression, relies more on partners, and uses nonmilitary power would be a major shift from the heavy reliance on offensive force of the period from 1989 to 2015. As six decades of NATO experience indicate, this approach will succeed if partners are adequately motivated by their own defense needs. The emerging threats by capable nations might bring this to pass.

It is, to be clear, a more defensive global military posture that recognizes the geopolitical status quo as fundamentally beneficial to

the United States and relies primarily on nonmilitary means to effect changes in the world order that might be advantageous. Specifically, with more-capable partners and more-effective nonmilitary coercive power, the United States can afford to concentrate its military power on preventing adversaries in critical regions from altering the status quo by projecting force under the shield of A2AD. Importantly, a more defensive and survivable military posture would not mean a diminution of U.S. engagement and influence in these regions. Rather, it would mean a shift in how the United States engages and influences, by exploiting the full range of its advantages as offensive force projection becomes less “usable.” Finally, this strategy would exploit the trends that favor A2AD rather than resisting them, as current strategy does. In sum, it is politically, technologically, and economically superior and sustainable.

If the strategy outlined here is indeed better than current U.S. approaches, this should be apparent in considering how well the United States could fare in future crises and conflicts. For this purpose, Table 9.1 returns to the several 2025 scenarios presented earlier and compares expected outcomes based on today’s U.S. force-projection strategy (base case) against outcomes achievable if the United States were to adopt the proposed integrated strategy to exploit its advantages to prevent aggression (new case). To repeat, the integrated strategy includes enhanced capabilities absent or not emphasized in the base case: survivable U.S. A2AD, partners’ contributions to Blue A2AD, and P2C. The new cases illustrate how the integrated strategy might apply in the event of a conflict; Table 9.1 compares the outcomes of these options and those of the base case (the current U.S. strategy) and provides a narrative justification for these assessments. As we did in the earlier chapters, we use color coding: Red means that the United States suffers major losses and could fail; yellow means that the United States can succeed but with difficulty, uncertainty, time, and loss; green means that the United States prevails after some time and loss; and blue means that the United States prevails over A2AD quickly and at little loss. Crosshatching means that our assessment falls between the two colors used in the crosshatches.

**Table 9.1  
Proposed Integrated Strategy Versus Current U.S. Strategy in Four Conflict Scenarios**

Scenario	Base Case	New Case
United States versus China in Taiwan, 2025	<ul style="list-style-type: none"> <li>• U.S. air bases and major surface combatants are at serious risk from Chinese long-range strike.</li> <li>• Chinese IADSs pose significant challenges to U.S. aircraft attempting to interrupt the kill chain by hitting ISR and C2 nodes.</li> <li>• The United States receives basing access from Japan but little additional materiel support from regional allies in penetrating or degrading China's A2AD.</li> <li>• Chinese surface assets prosecuting the blockade are held at significant risk, especially by U.S. submarines.</li> <li>• U.S. cyberoperations will degrade Chinese C4ISR and support systems.</li> <li>• The conflict culminates when U.S. attacks on the Chinese mainland prompt a response against early-warning radar in Alaska and space targets, raising an immediate danger of nuclear escalation.</li> <li>• The blockade is lifted but at high cost.</li> </ul>	<ul style="list-style-type: none"> <li>• Mutual A2AD prevails, working to the disadvantage of Chinese naval and air control.</li> <li>• Despite the vulnerability of U.S. carriers, surface combatants, and regional air bases to Chinese submarines and missiles, the Chinese surface fleet will be very vulnerable to expanded Blue submarine forces, missiles, and drones.</li> <li>• Chinese IAD will be unable to defeat Blue drone-augmented airpower.</li> <li>• Japan will make major contributions to Blue ISR and conventional submarines.</li> <li>• U.S. cyberoperations will hold at risk and, if needed, degrade Chinese C4ISR and support systems.</li> <li>• A blockade cannot succeed without a survivable Chinese fleet.</li> <li>• Blue kinetic attacks on the Chinese mainland are minimized, limiting the risk of escalation.</li> <li>• Blue prevails despite costs.</li> </ul>

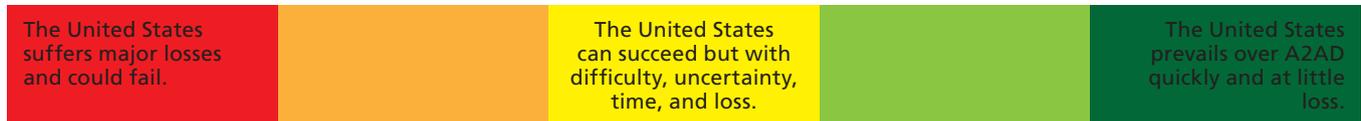
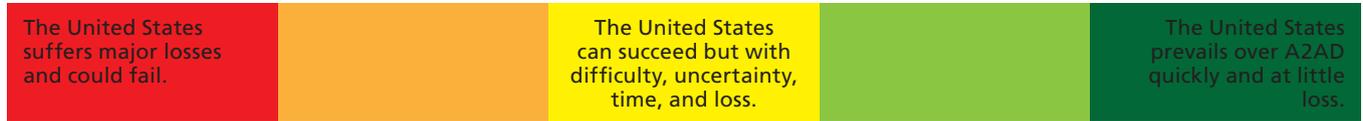


Table 9.1—Continued

Scenario	Base Case	New Case
United States versus China in the SCS, 2025	<ul style="list-style-type: none"> <li>• U.S. air bases and major surface combatants are at risk from Chinese long-range strike. The distance of the area of operations from the Chinese mainland mitigates U.S. risk.</li> <li>• Chinese long-range strike is sufficiently effective to require strikes on the mainland, raising the danger of escalation.</li> <li>• U.S. Air Force flying from bases in Philippines and Guam, carrier-based aircraft, and submarines deplete the Chinese surface combatants needed to seize and hold contested islands. Chinese ships operate outside the mainland-based IADS or counterair shield.</li> <li>• Escalatory fears lead to a cease-fire. China’s conflict objectives are decisively denied, but China retains the capability to contest the SCS.</li> <li>• Blue prevails at modest cost.</li> </ul>	<ul style="list-style-type: none"> <li>• Chinese action is interpreted as the start of a campaign to take control of the SCS. Vietnam, Singapore, and Malaysia side militarily with the United States and the Philippines.</li> <li>• Mutual sea denial prevails. Despite the vulnerability of U.S. carriers and surface combatants to Chinese submarines and missiles, the Chinese fleet is vulnerable to nuclear and partners’ conventional submarines and missiles.</li> <li>• U.S. cyberoperations degrade Chinese operations.</li> <li>• Even with its enhanced A2AD, China is left with no way to seize islands.</li> <li>• Blue prevails at little cost.</li> <li>• Blue kinetic attacks on China are minimized, limiting the risk of escalation.</li> </ul>

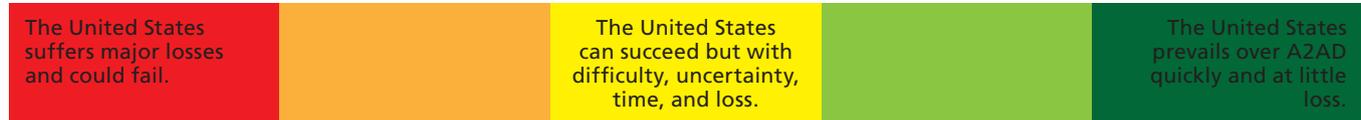


**Table 9.1—Continued**

Scenario	Base Case	New Case		
NATO versus Russia in Estonia, 2025	<ul style="list-style-type: none"> <li>• NATO forces cannot respond in time to prevent Russia from overrunning objectives in Estonia.</li> <li>• The Russian IADS provides a protective shield over forces in Estonia. NATO air forces strike numerous targets in Kaliningrad and Russia proper to lift the shield.</li> <li>• Ballistic missiles directed at air bases and transit hubs impose costs on and delay the NATO response.</li> <li>• Major NATO ground forces, centered on U.S. Army units arriving from the continental United States, are eventually introduced to Poland. They march on the Baltics and lead to a Russian retreat before a decisive engagement.</li> </ul>	<ul style="list-style-type: none"> <li>• U.S.–NATO P2C sanctions and isolation worsen Russia’s weak economy (even as aggression proceeds).</li> <li>• Diverse LNG supplies weaken Russian leverage over the European Union (though this cannot happen quickly).</li> <li>• Germany, Poland, and others partner up with ground, air, and missile forces.</li> <li>• Russian IAD extended over Estonia is defeated by U.S.–NATO drone-manned airpower, leaving Russian invasion forces exposed.</li> <li>• U.S.–NATO short-range ballistic missiles and countermeasures, if deployed in time, increase the vulnerability of the Russian IADS and invasion forces.</li> <li>• U.S. cyberoperations will degrade Russian operations.</li> <li>• Blue avoids or minimizes kinetic attacks on Russia proper.</li> <li>• NATO’s posture to deter Russian aggression improves.</li> <li>• Conditions exist for successful U.S. and NATO ground-force operations against Russian invasion forces.</li> </ul>		
The United States suffers major losses and could fail.		The United States can succeed but with difficulty, uncertainty, time, and loss.		The United States prevails over A2AD quickly and at little loss.

**Table 9.1—Continued**

Scenario	Base Case	New Case
United States versus Iran in the Strait of Hormuz, 2025	<ul style="list-style-type: none"> <li>• Iran threatens the Persian Gulf states and U.S. air bases with ballistic missiles and shipping with cruise missiles.</li> <li>• U.S. air forces can largely suppress Iranian IADS but, despite significant airborne effort, cannot defeat the missile threat.</li> <li>• An extensive bombing campaign, economic isolation, threat of ground invasion, and demonstration of the U.S. Navy's ability to transit the Strait of Hormuz eventually compel Iran to abandon the effort to close the strait.</li> </ul>	<ul style="list-style-type: none"> <li>• The availability of diverse non-Persian Gulf oil and LNG sources cushions the effect of the Iranian threat to Persian Gulf oil production and shipping.</li> <li>• Isolation of the Iranian economy, including energy, creates extreme hardship and unrest.</li> <li>• U.S. HTK and non-HTK missile defense degrades the Iranian missile threat.</li> <li>• The drone-manned mix overwhelms Iranian IAD.</li> <li>• Cyberattacks paralyze Iranian military C4ISR and political control.</li> <li>• P2C support for regime opponents creates growing internal distraction.</li> <li>• Blue minimizes kinetic attacks on Iran, reducing the chance of escalation.</li> <li>• Iran launches but cannot sustain proxy threats in the region.</li> </ul>



We note that, for the analysis presented here, we assume that the new strategy is adopted now and implemented expeditiously. While we obviously cannot be confident that a strategy's prescribed capabilities will all be in place by 2025—for example, those requiring new platforms or technological breakthroughs—we assume that substantial progress will be made on all aspects of the strategy. This includes partners' positive response to U.S. inducements, as well as help to acquire complementary defense capabilities. But we do not assume breakthroughs in game-changing technologies, such as non-HTK BMD or ASW.

All scenarios compare favorably under the recommended strategy, owing to a combination of enhanced Blue A2AD, more-capable partners, and strategic use of P2C. The most problematic scenario, as could be expected, is a China threat to Taiwan, which might require at least limited strikes on Chinese territory, land warfare on Taiwan, and offensive cyberoperations. Yet even that case is improved by the Blue force's ability to deny China use of the air or sea. The scenarios also show the disadvantages of one-sided A2AD; mutual A2AD is the better environment for the United States to project power (as opposed to just force) and prevent aggression.

The Army would have a major role in implementing a U.S. strategy of projecting power and preventing aggression, provided that it has the enhanced capabilities to do so. For Blue A2AD, the Army would need to provide extended-range IAD, a suite of SSMs and possibly ASMs, enhanced long-range rockets, and an arsenal of drones to help defeat projected forces. The Army would also be expected to set a high priority on the improvement of, and interoperability with, partners' Blue A2AD contributions. The Army's emphasis on Blue A2AD and cooperating with partners would also need to be reflected in enhanced interoperability of its and partner C4ISR, logistics, organization, doctrine, and training. Finally, because of the inherent limits of Blue A2AD in terms of defeating an enemy invasion on partners' territory and critical U.S. role in such operations, the Army needs to have a diverse set of maneuver forces (from heavy to special operations) to contribute to improved A2AD.

Importantly for the Army and the rest of the joint force, a shift to such a strategy would require a new way of thinking about strategic and operational problems. It would affect the types of equipment procured; the research in which they invest; and how they develop leaders, train units, and design campaigns.

## Recommendations

As the United States plans for future contingencies and operational needs under constrained budgets, it will need to look toward cost-effective solutions that will maintain or improve the capabilities of U.S. forces while utilizing them efficiently.

To facilitate a transition to the proposed integrated strategy focused on preventing aggression and based on enduring U.S. advantages, we propose the following changes to American strategic thinking:

1. Acknowledge that deep trends beyond U.S. control favor A2AD over force projection, especially vis-à-vis China.
2. Anticipate risks to U.S. interests in east Asia, eastern Europe, and the Middle East.
3. Admit that these trends and risks imply reduced utility of offensive force projection.
4. Reassess sources and forms of U.S. power and how they can be used.
5. Regard the prevention of international aggression as the principal reason to use force, and recognize that meeting these challenges requires asking and answering questions that differ in important ways from those of the past 25 years.<sup>1</sup>
6. Count more on partners, and help develop their capabilities where needed.
7. Enhance and use strategically nonmilitary powers of coercion.

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<sup>1</sup> We note in particular that preventing aggression has been a principal pillar of U.S. policy in east Asia for decades, particularly in regard to threats to ROK and Taiwan.

Building on these shifts in political–military approach, DoD would benefit from pursuing the following initiatives:

1. Identify the approaches and forces needed to counter aggression in each area in which U.S. interests are threatened.
2. Invest in key U.S. Blue A2AD capabilities, with special attention to land- and sea-based short- and medium-range missiles, mobile missile launchers, extended-range rocket systems and air defense, diverse drone carrier-launchers, submarines, and cyber-resilience.
3. Encourage regional partners to concentrate on complementary A2AD capabilities, including short-range missiles, long-range rocket launchers, drones, IAD, AIP submarines, and special operations forces.
4. Elevate the priority of U.S.–partner bilateral and multilateral military interoperability in all three regions addressed here.
5. Examine how changes to posture help facilitate Blue A2AD.
6. Intensify R&D for technologies that could be advantageous in enhanced A2AD environments, especially non-HTK BMD and nonacoustic ASW.
7. Prioritize planning, preparations, and allied cooperation for P2C options, with a particular emphasis on financial and other economic sanctions.
8. Develop a full set of options for offensive cyberoperations while recognizing that the risks of retaliation and escalation must be weighed in decisions to use them.

The Army would have a key role in the strategy of exploiting U.S. advantages to prevent aggression, and we make the following recommendations:

1. Contribute directly to Blue A2AD with mobile land-based SSMs, longer-range rockets, and extended-range IAD to defeat enemy land, sea, and air force projection.

2. Maintain capable maneuver forces to exploit Blue A2AD, and defend partners against overland, overwater, and irregular attacks.
3. Develop and acquire large numbers of drones to augment ISR and A2AD capabilities.
4. Preposition sufficient materiel to enable fast, short-warning deployment to crisis areas.
5. Assist, enable, and interoperate with partners' defense forces.
6. Maintain C4ISR capabilities that are interoperable with or that can, at a minimum, work with joint and partner capabilities.

DoD will also want to closely examine its force structure and system for capabilities that are no longer needed or not needed in the quantities that currently exist in the force. Systems or forces that are particularly vulnerable to advanced A2AD capabilities should be high on the list for consideration. It might be that they could still play important roles in military operations against nations or nonnation threats that do not possess sophisticated A2AD capabilities, but their importance to the national defense should be weighed in light of these findings.

## Further Research Required

This report offers an initial profile of the costs and risks the United States is likely to face in the future as the A2AD threat increases. It also points to several places in which there is a need for further research and analysis. Before pursuing a new strategy to address future A2AD threats, it will be important to answer the following questions:

1. What types and ranges of theater missiles does the United States need to implement Blue A2AD, and which require Army investment?
2. What tasks must the Army undertake to enhance partners' A2AD capabilities?

3. How does highly capable adversary A2AD affect Army strategic mobility capabilities and intent, including prepositioning?
4. What measures are needed to mitigate the risks of escalation associated with offensive cyberwarfare?
5. What contributions could the Army make to non-HTK BMD and extended-range air defense?
6. What changes to Army leader development are required to ensure that commanders and planners are knowledgeable about the strategic and operational challenges associated with addressing types of threats that U.S. forces and regional allies are likely to confront?



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The proliferation of anti-access and area denial (A2AD) capabilities threatens to undermine the viability of offensive force projection. Thus, certainty that the United States could decisively defeat any state in all circumstances could be eroding. The U.S. military has taken steps to mitigate these A2AD challenges, but the focus has been primarily on technical and tactical fixes to maintain offensive force-projection capabilities. Meanwhile, the problem is growing, and strong underlying factors favor A2AD over force projection economically and operationally. The research reported here examined trends in military capabilities among potential U.S. adversaries, and the report proposes an alternative way for the United States to secure its interests. Specifically, after accounting for the underlying motivations, technology, and economics of A2AD, the authors argue that countering A2AD will require a new and fundamentally different strategy. Informed by case studies involving China, Russia, and Iran that are detailed in a companion volume and expanded on here, the authors conclude that the United States should, with its partners, adopt a military strategy based on using A2AD to prevent aggression to defend its interests rather than defeating A2AD outright. This strategy would seek to prevent international aggression by enhancing U.S. and allied A2AD capabilities (Blue A2AD), pursuing new approaches to limiting the vulnerability of U.S. and allied forces to enemy A2AD, and employing nonmilitary means of coercing would-be aggressors. They conclude that such a strategy would be more effective and likely less expensive than the current approach to securing U.S. global interests.



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