



Smarter Power, Stronger Partners, Volume II

Trends in Force Projection
Against Potential Adversaries

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Preface

Until recently, it seemed that no enemy of the United States was capable of successfully opposing U.S. military forces. If the U.S. military could liberate Kuwait, oust hostile dictators (in Panama, Serbia, Iraq, Afghanistan, and Libya), and deliver decisive blows to al Qaeda, all while providing humanitarian assistance to victims of tsunamis, earthquakes, and other disasters, surely it could do whatever was asked of it. The combination of high-quality personnel, operational experience, technological superiority, ingenuity, versatility, and sheer scale lent confidence to the assumption that U.S. forces could meet any challenge anywhere.

The U.S. military remains unmatched, but the disappointing results of wars in Iraq and Afghanistan—experiences that have left a large portion of the U.S. public gun-shy—have shaken the confidence that force always succeeds. Moreover, Americans might be wondering whether their country must be at war so much of the time: The United States has spent 15 of the past 25 years at war, not counting small-scale overseas operations. Looking to the future, Americans' certainty that the United States could decisively defeat any state might erode with the growing ability of at least one power—China—to oppose U.S. forces in its region.

In view of these developments and creeping doubts, it is important to look objectively and comprehensively at the future of U.S. force projection and to address some new and uncomfortable questions: What if technological and economic trends prohibit the United States from projecting offensive force wherever it chooses? Might U.S. mili-

tary superiority become increasingly nominal if the nation cannot use it successfully wherever the United States has interests and responsibilities? Will international peace suffer in regions where the United States cannot be confident of a military victory at acceptable cost? Will the United States still be a true global power if it can no longer project force globally? What alternatives, military or otherwise, does the United States have if the efficacy of force projection dwindles? If such questions sound declinist, U.S. interests dictate that decisionmakers face them nevertheless.

Concern about China's military power centers on its growing ability to strike U.S. forces based in or sent to the western Pacific. A conflict with such a determined, well-resourced, and advanced adversary would pose serious challenges to U.S. force projection, potentially deterring or altogether defeating U.S. operations with sophisticated anti-access and area-denial (A2AD) capabilities. Since the first Persian Gulf War, and with the ensuing transformation of U.S. forces to conduct decisive expeditionary combat operations globally, states with reason to fear U.S. force projection have stepped up investment in A2AD. These capabilities include advanced air defense, tactical air forces, coastal surface and subsurface naval combatants, ballistic and cruise missiles, and cyberwarfare capabilities—not to mention escalation options, such as nuclear and other weapons of mass destruction—all intended to raise the risks and costs to U.S. forces.

The U.S. military has taken steps to mitigate these A2AD challenges, but the focus has been primarily on incremental technical or tactical fixes—more missile-defense interceptors, stealthier aircraft with larger payloads, drones launched from large-deck aircraft carriers, and options to strike enemy forces before being struck. Meanwhile, the problem appears to be growing, whether measured in the proliferation of missiles with increasing ranges and accuracy; the market in advanced air-defense systems; or the advent of cheap, quiet, nonnuclear submarines. Furthermore, the trends seem to favor A2AD in terms of operational capability and cost.

It is unlikely that the problem can be solved at the margin. Rather, the United States needs a different strategic approach, or suite of approaches, that can support its interests and responsibilities without

such a heavy reliance on offensive force. Accordingly, this report examines the motivations, technology, and economics of A2AD. It considers why, fundamentally, A2AD is so hard to counter and, in turn, whether the erosion of U.S. force projection is inexorable. It also assesses how long the United States has to respond or adjust to these changes.

This report is the second in a two-volume series. The primary volume, *Smarter Power, Stronger Partners*, Volume I: *Exploiting U.S. Advantages to Prevent Aggression*, grapples comprehensively with the issues raised above. This volume features a set of warfighting scenarios aimed primarily at supporting a central contention of the analysis presented in the first volume: that the ability of adversaries in key regions to challenge U.S. force projection will increase over time.

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Summary

Duncan Long

This volume is a companion to *Smarter Power, Stronger Partners*, Volume I: *Exploiting U.S. Advantages to Prevent Aggression*.¹ That report assesses the nature of the challenge that anti-access and area-denial (A2AD) technologies and concepts of operations pose to U.S. force projection, including an assessment of cost and technology trends, and concludes that a new U.S. military strategy is warranted.² It then suggests an integrated strategy that leverages enduring U.S. advantages.

This volume uses scenarios to illustrate the effect of critical operational dynamics and trends in the context of important geographic regions. The principal purpose of these scenarios is to test the hypothesis that the A2AD threat to U.S. force projection is growing more severe in critical regions. The potential adversaries are those identified in the first volume: China, long recognized for its A2AD capabilities, as well as Russia and Iran. For each possible confrontation, we developed two separate scenarios, one set in the present (2015) and one set ten years hence (2025).³ Both the 2015 and 2025 scenarios describe fictional but plausible U.S. and adversary military actions based on common understanding of *current* operational capabilities and approaches. We

¹ Terrence K. Kelly, David C. Gompert, and Duncan Long, *Smarter Power, Stronger Partners*, Volume I: *Exploiting U.S. Advantages to Prevent Aggression*, Santa Monica, Calif.: RAND Corporation, RR-1359-A, 2016 (hereafter, Volume I).

² By *anti-access*, we mean opposition to getting force to and into a geographic space; by *area denial*, we mean opposition to the operation of such force within that space.

³ 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.

do not intend either version of the scenarios to capture the alternative U.S. strategic and operational approaches described in the first volume. Table S.1 shows the scenarios.

Summaries of the Scenarios

These scenarios are notional and not based on classified intelligence or actual plans. We developed them using only publicly available literature and the input of subject-matter experts, and they are not the result of modeling or war-gaming. We do not intend them to predict specific courses of events or encompass all aspects of a conflict. Although they do not amount to empirical validation, the specificity of the narratives makes the concepts more tractable, and their plausibility lends significant weight to the arguments presented in Volume I.

This section provides a brief summary of each scenario. A figure accompanies each. These figures aggregate all capability contests discussed in the full scenario descriptions in Chapters Two, Three, and

Table S.1
Scenarios

Combatants	Flash Point	Year
United States and China	Taiwan	2015
United States and China	Taiwan	2025
United States and China	SCS	2015
United States and China	SCS	2025
NATO and Russia	Estonia	2015
NATO and Russia	Estonia	2025
United States and Iran	Strait of Hormuz	2015
United States and a nonnuclear Iran	Strait of Hormuz	2025
United States and a nuclear-armed Iran	Strait of Hormuz	2025

NOTE: NATO = North Atlantic Treaty Organization. SCS = South China Sea.

Four into a single, straight “threat line.” There is one such line for 2015 and another for 2025. The aggregation is subjective and, given the specific dynamics of each scenario and complex interplay between the capabilities in question, necessarily imprecise. The lines are broad indications of how the threat to force protection changes over distance and over time—that is, as indicators of trends in relative capability between adversary A2AD and U.S. force projection. At the top of each figure, we include geographic points of interest in the scenario, at a distance from the adversary homeland. At the bottom of each figure, we show example adversary capabilities, at an approximate maximum effective range.

China

We have 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-claimed territory in the SCS.

China–Taiwan, 2015

In response to indications that Taiwan will try to solidify its autonomy, Beijing embarks on a blockade campaign to compel Taiwanese leaders to change their position. This campaign is not just a traditional naval blockade; it includes preemptive 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 so-called kill chain—the means by which China can target U.S. forces. These include command and control networks and intelligence, surveillance, and reconnaissance (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. airbases in Japan and against U.S. ships. The United States suffers significant losses, including mission kills of two carriers, but, ultimately, the continuing toll that U.S. nuclear attack submarines exact on Chinese surface ships forces China to lift the blockade and cease hostilities.

China–Taiwan, 2025

The 2025 scenario also addresses a Chinese blockade campaign answered by a U.S. response. China now has more, and more-accurate, short-range ballistic missiles (SRBMs) and intermediate-range ballistic missiles (IRBMs), which improved long-range ISR bolsters. These have a telling effect on U.S. airpower because Guam and bases closer in are now at significantly greater risk, and carriers can be found and targeted with both antiship ballistic missiles (ASBMs) and antiship cruise missiles (ASCMs). 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, although with some enhanced strike platforms: Strike Chinese command, control, communications, computers, intelligence, surveillance, and reconnaissance assets and networks and other mainland targets early and often. 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 U.S. ability to comprehensively attack Chinese assets.

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

China–Philippines, 2015

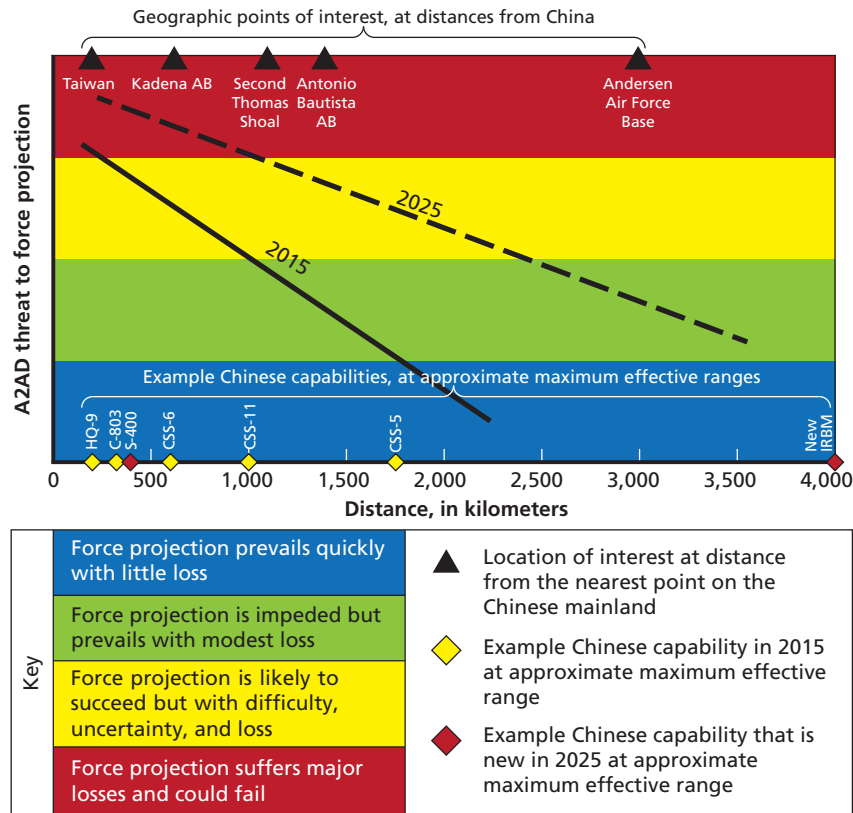
Conflict erupts over control of Second Thomas Shoal, a piece of territory that the Philippines currently controls. The United States comes to the Philippines' aid after China blockades Philippine outposts and shoots down a Philippine Air Force plane. The United States can overcome Chinese efforts principally by making the SCS uninhabitable for the People's Liberation Army Navy. Air superiority is comparatively easy to establish and maintain. Chinese forces cannot effectively target U.S. bases in the Philippines or Guam and are unwilling to expand the conflict by attacking bases in Japan. U.S. forces do not initially strike mainland China because military planners judge that the risk of esca-

lation would be great while the operational benefit would be limited. When China manages to hit a U.S. carrier with an ASBM, however, it launches attacks against Chinese over-the-horizon radar and facilities linked to antisatellite capabilities. As in China–Taiwan 2015, attrition of People’s Liberation Army Navy surface ships by U.S. nuclear attack submarines and aircraft convinces Beijing to negotiate a cease-fire.

China–Philippines, 2025

As in the 2015 scenario, China attempts to seize control of islands that the Philippines holds. China’s improved long-range strike and long-range ISR are the difference makers. China’s ability to find and target U.S. ships and to hit U.S. airbases makes the conflict significantly more challenging for the United States. The United States has some capital ships and has two aircraft carriers that ASBMs and air- and submarine-launched ASCMs sank or put out of action. Chinese success prompts U.S. escalation to mainland attacks, focused on command, control, communication, computer, intelligence, surveillance, and reconnaissance networks and assets. Ultimately, each side can deny the other control of the SCS. The United States can prevent China from maintaining control of disputed features with air and cruise-missile strikes, but China retains formidable A2AD capabilities it can use to prevent the Philippines and the United States from reclaiming control over the same features. 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. Figure S.1 shows our assessment of China’s A2AD threat to force projection for all the China scenarios.

Figure S.1
Chinese Anti-Access and Area-Denial Threat to U.S. Force Projection, 2015 and 2025



NOTE: The 2015 and 2025 threat lines aggregate all capability contests described in this section between China and Taiwan. The lines are broad indications of how the threat to force protection changes over distance and over time—that is, as indicators of trends in relative capability between adversary A2AD and U.S. force projection. CSS-5 is the NATO reporting name for the Dong-Feng 21 medium-range ballistic missile. AB = airbase.

Russia

Each of the 2015 and 2025 Russia scenarios describes a Russian invasion of northeastern Estonia that triggers a war with NATO.

Russia–Estonia, 2015

Russia invades Estonia to protect the rights of ethnic Russians. Russian forces overrun their objective—an enclave bordering Russia—before NATO can mount a credible defense. Russia is banking on the fact that a *fait accompli*, backed with significant A2AD capabilities, will lead NATO to accede to this attack and that the limited incursion will fracture the alliance. NATO political will, however, is sufficient to uphold Article 5,⁴ and it sets about pushing Russian units out of the Baltics. The chief Russian A2AD barriers to overcome are the modern air-defense network and SRBMs and cruise missiles launched from a variety of platforms. The Russian integrated air-defense system (IADS) based in Kaliningrad and around St. Petersburg provides a complete umbrella over the Baltics. The SRBMs and cruise missiles can target NATO airbases as far away as England and threaten potential routes of advance.

NATO is superior both in capability and in capacity. The crucial question is whether the threat of Russian nuclear retaliation will deter NATO from bringing its full power to bear. Russia might perceive a strategic threat if a NATO suppression-of-enemy-air-defenses campaign strikes defenses around St. Petersburg and elsewhere in western Russia. Russian nuclear doctrine also allows for first use, as well as the possibility that Russia could meet a significant conventional defeat on the ground in the Baltics with a nuclear response.

NATO makes the crucial decision not to afford sanctuary to any Russian military assets supporting Russia's forces in the Baltics and, despite the danger that such a campaign could lead to a Russian nuclear response, bombs extensively in Kaliningrad and strikes Russia proper. When IADSs are sufficiently suppressed, NATO airpower exacts a tremendous toll on Russian ground forces. Russia withdraws

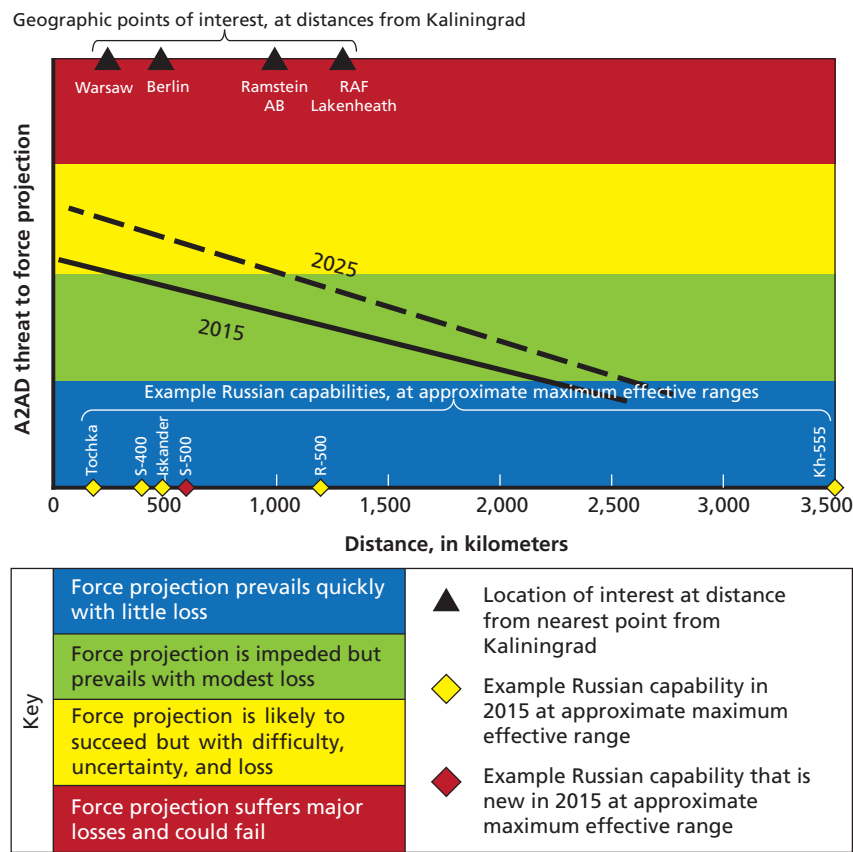
⁴ Article 5 of NATO's Washington Treaty (NATO, "The North Atlantic Treaty, Washington, D.C., April 4, 1949," last updated March 21, 2016) states that an attack on one alliance member is an attack on all.

before NATO ground forces, including a U.S. corps deploying from the continental United States, march on the Baltics.

Russia–Estonia, 2025

Like it did in the 2015 scenario, Russia invades Estonia to protect the rights of ethnic Russians. Russian military capabilities have improved by a modest degree. Air defenses and ground-launched missiles remain the most-threatening capabilities to the NATO relief of the Baltics. New and longer-range surface-to-air missiles bolster air defenses, and Russia has a deeper inventory of the ballistic and cruise missiles it used to good effect in 2015. The geography is, of course, constant and at least as thorny a problem as any piece of military hardware—Russia can quickly put large numbers of ground forces into Estonia and protect them from its own territory. NATO, however, retains the ability to eventually gain air superiority and begin to build up a ground force capable of evicting the Russian force. If political will is intact, and the alliance is willing to run the risk of nuclear war by attacking extensive targets in Russia, the Russian invasion is doomed. Like in 2015, Article 5 obligations are upheld, and Russian territory is targeted, and, like in 2015, NATO compels a Russian retreat before a combined arms campaign is required. Figure S.2 shows our assessment of Russia's A2AD threat to force projection for these scenarios.

Figure S.2
Russian Anti-Access and Area-Denial Threat to U.S. Force Projection, 2015 and 2025



NOTE: RAF = Royal Air Force.

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Iran

Two Iran scenarios, one set in 2015 and the other in 2025, describe conflicts in which the United States attempts to overcome Iranian efforts to close the Strait of Hormuz. In each of those instances, the war begins when the United States embarks on a bombing campaign to destroy Iran’s nuclear program. A third scenario briefly depicts a similar conflict, also set in 2025, in which Iran has a small number of

missile-deliverable nuclear weapons. In this case, Iran closes the strait in response to announced sanctions rather than a U.S. attack.

Nonnuclear Iran–United States, 2015

In the 2015 case, the United States can compel Iran to stand down in a matter of weeks with few losses. U.S. force projection—particularly U.S. airpower and the threat of ground invasion—simply overmatches Iran. The United States can operate short-range strike aircraft from basing locations close to the strait, a boon to its ability to target and suppress the ships and missiles that Iran requires to threaten shipping. Iran cannot threaten these sanctuaries in a significant fashion, although it has some success with irregular attacks and aims its inaccurate ballistic missiles at soft targets in an effort to intimidate America’s Persian Gulf–state 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. Road-mobile ballistic missiles, ASCMs, fast-attack craft, minelayers—all require persistent air patrols to suppress. Iranian air defenses have to be addressed to reduce the threat to patrolling aircraft. Importantly, in this scenario, demonstrated air dominance 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 sustain a threat to Strait of Hormuz shipping for a considerably longer period; even with air superiority, hunting for fleeting targets from the air is an extremely challenging task. Iran also has some irregular escalation options—such as sponsoring terror attacks against local U.S. allies—that it does not exercise.

Nonnuclear Iran–United States, 2025

The 2025 case shares an outcome with the 2015 case—the United States is able to compel Iran to stand down. This future campaign, however, is significantly more challenging. It takes twice as long and involves significantly greater air and naval losses, and the United States never fully defeats Iran’s A2AD capabilities. Ultimately, the United

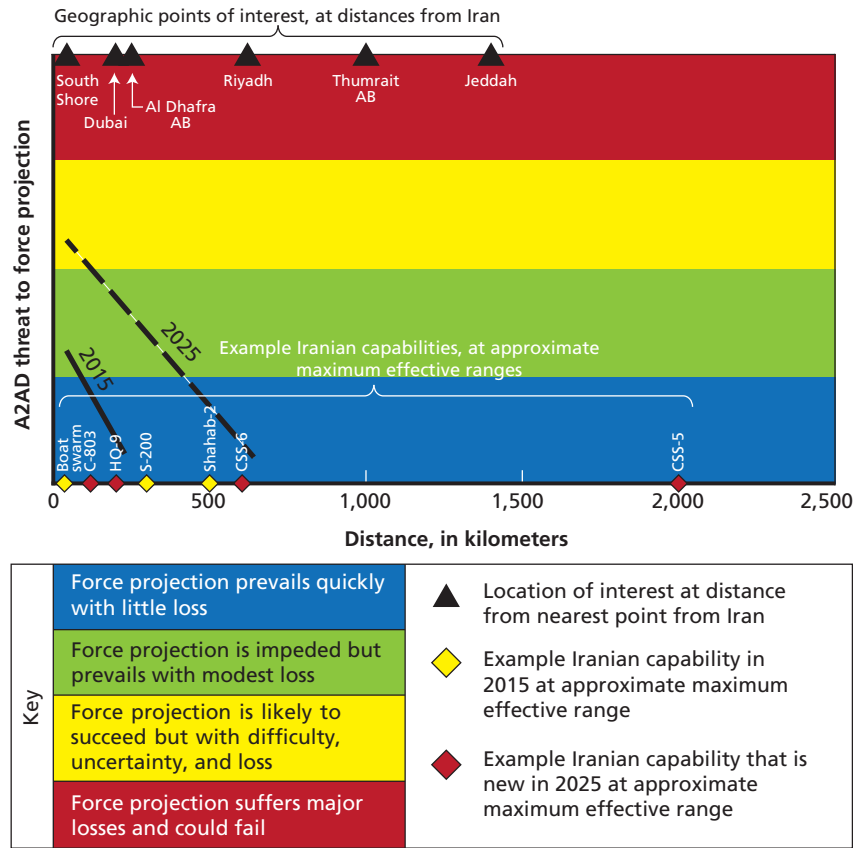
States is forced to prepare to escalate to regime change, a move that leads Tehran to cede the fight. The greatest change is the increase in Iran's missile capabilities and capacity, both ballistic and cruise, as well as modest increases in its IADS capabilities. Greater numbers of more-accurate short- and medium-range ballistic missiles enable Iran to pose a potent threat to fixed regional targets, forcing the United States to operate from airbases outside SRBM range and intimidating local U.S. partners. Iran's ISR is still comparatively weak, but its ASCMs are capable, and it is able to find and target U.S. ships with irregular means, exacting a significant toll on U.S. navy ships 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 shelter them.

United States–Nuclear-Armed Iran, 2025

Unsurprisingly, adding operational nuclear weapons to Iran's 2025 A2AD capabilities leads to a harder and riskier challenge for the United States. The United States enjoys escalation dominance over a nonnuclear Iran, a strategic advantage that is ultimately the key to unlocking the operational A2AD challenge at 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 would seem to threaten the Iranian 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. The two sides battle to a stalemate. In the other case, the United States embarks on a comparatively unconstrained effort very similar to the campaign in the nonnuclear 2025 case. The conflict spirals out of control and leads to a nuclear exchange. Figure S.3 shows our assessment of Iran's A2AD threat to force projection for all these scenarios.

Figure S.3
Iranian Anti-Access and Area-Denial Threat to U.S. Force Projection, 2015 and 2025



Major Common Elements

Three major common elements are evident in the scenarios:

1. The A2AD capabilities of important potential adversaries are likely to increase in significant ways over time, threatening U.S. strategic interests. The changes posited in these scenarios are well within the bounds of reasonable developments for these countries.
2. Adversaries' ability to conduct A2AD at distance is likely to increase, to the detriment of U.S. force projection.
3. The U.S. response under current strategy and operational approaches to defeating A2AD could lead to conflict escalation and, in some cases, increased risk of nuclear war. In Volume I, we discuss other approaches.

These major common elements do not exhaust the similarities among the scenarios. Nor do they trivialize the important strategic and operational differences in these contests. They do, however, seem uniquely significant.

The first speaks directly to this volume's central hypothesis: that the A2AD threat to U.S. force projection is growing more severe in critical regions. The second is closely related; it suggests that a change in strategic geography could attend a shift in the force projection/A2AD balance. The last illustrates a further reason that the United States' current military strategy is undesirable with respect to A2AD.

These scenarios suggest the need for a change in the United States' approach to A2AD, lest the advantages that the United States enjoys from its military superiority erode. They indicate a growing danger that adversaries will use A2AD as a shield behind which they can commit aggression. However unlikely war with China, Russia, or Iran might be, erosion of the United States' ability to bring forces to bear in their regions and against them could have deleterious geostrategic consequences. U.S. deterrence would be weakened. 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.

Together, Volume I and this report paint an unfavorable picture of the United States' ability to alter this trajectory with more of the same investments. Fortunately, as Volume I makes clear, the United States has the opportunity to pursue a viable alternative strategy, one that exploits U.S. advantages to prevent international aggression.

Acknowledgments

This volume received substantial contributions from RAND colleagues Peter A. Wilson, Jerry M. Sollinger, and Matthew Carroll, as well as Robert Nurick of the Atlantic Council. Stuart E. Johnson and Michael Johnson of RAND provided thoughtful and constructive reviews. We also wish to thank Timothy Muchmore of the Army Quadrennial Defense Review Office for his support of this work.

Abbreviations

A2AD	anti-access and area denial
AAA	anti-aircraft artillery
AAM	air-to-air missile
AAW	anti-air warfare
AB	airbase
AD	area denial
ADIZ	air-defense identification zone
AEW&C	airborne early warning and control
AFB	Air Force base
AIP	air-independent propulsion
ALCM	air-launched cruise missile
AO	area of operations
ASAT	antisatellite weapon
ASBM	antiship ballistic missile
ASCM	antiship cruise missile
ASuW	antisurface warfare
ASW	antisubmarine warfare

AWACS	Airborne Warning and Control System
BCT	brigade combat team
BDA	battle-damage assessment
BMD	ballistic-missile defense
BRP	Barko ng Republika ng Pilipinas (Ship of the Republic of the Philippines)
C2	command and control
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
CCP	Chinese Communist Party
CEP	circular error probable
CONOPS	concept of operations
CONUS	continental United States
CPGS	conventional prompt global strike
CSAR	combat search and rescue
CSG	carrier strike group
CVN	nuclear-powered aircraft carrier
DDG	guided-missile destroyer
DoD	U.S. Department of Defense
ECS	East China Sea
EEZ	exclusive economic zone
ESG	expeditionary strike group
EU	European Union
EW	electronic warfare

FFG	guided-missile frigate
GLCM	ground-launched cruise missile
G-RAMM	guided rockets, artillery, mortars, and missiles
HADR	humanitarian assistance and disaster relief
IAD	integrated air defense
IADS	integrated air-defense system
IBCT	infantry brigade combat team
ICBM	intercontinental ballistic missile
IISS	International Institute for Strategic Studies
INF	Intermediate-Range Nuclear Forces
IRBM	intermediate-range ballistic missile
IRGC	Iranian Revolutionary Guard Corps
IRGCN	Iranian Revolutionary Guard Corps Navy
ISR	intelligence, surveillance, and reconnaissance
km	kilometer
LACM	land-attack cruise missile
LCAC	landing craft, air cushion
LCS	littoral combat ship
LOS	line of sight
LPD	amphibious transport dock
LRASM	long-range antiship missile
MANPADS	man-portable air-defense system
MCM	mine countermeasure
MIRV	multiple independent reentry vehicle

MLE	maritime law enforcement
MRBM	medium-range ballistic missile
NAC	North Atlantic Council
NASIC	National Air and Space Intelligence Center
NATO	North Atlantic Treaty Organization
NFU	no first use
nm	nautical mile
NRF	North Atlantic Treaty Organization Response Force
OIF	Operation Iraqi Freedom
OTH	over the horizon
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
PLAN	People's Liberation Army Navy
PLANAF	People's Liberation Army Navy Air Force
PLASAF	People's Liberation Army Second Artillery Force
RAF	Royal Air Force
ROE	rule of engagement
SAG	surface-action group
SAM	surface-to-air missile
SCS	South China Sea
SEAD	suppression of enemy air defenses
SLBM	submarine-launched ballistic missile
SLCM	submarine-launched cruise missile
SLOC	sea line of communication

SPOD	seaport of debarkation
SRBM	short-range ballistic missile
SSBN	nuclear-powered ballistic-missile submarine
SSGN	nuclear-powered guided-missile submarine
SSN	nuclear attack submarine
THAAD	Terminal High Altitude Area Defense
TRA	Taiwan Relations Act
UAE	United Arab Emirates
UAS	unmanned aircraft system
UAV	unmanned aerial vehicle
UK	United Kingdom
UN	United Nations
UUV	unmanned underwater vehicle
WMD	weapons of mass destruction

Introduction

Duncan Long

This volume is a companion to *Smarter Power, Stronger Partners*, Volume I: *Exploiting U.S. Advantages to Prevent Aggression*.¹ That report assesses the nature of the challenge that anti-access and area-denial (A2AD) technologies and concepts of operations pose to U.S. force projection and concludes that a new U.S. military strategy is warranted.² In so doing, the report identifies potential adversaries that seem to pose a unique A2AD threat, either now or in the not-too-distant future. It also highlights dynamics that characterize the A2AD threat, perhaps most importantly the growing advantage of such capabilities over force projection. This volume uses scenarios to show the impact of that crucial trend: that, through use of A2AD capabilities, potential adversaries in critical regions seem likely to become more capable of challenging U.S. force projection. As such, these scenarios contribute to the broader discussion found in Volume I of how A2AD challenges U.S. force projection and informs ensuing discussion of alternative U.S. military strategies.

This chapter first summarizes Volume I. We then describe how and why we developed the scenarios described in the present volume.

¹ Terrence K. Kelly, David C. Gompert, and Duncan Long, *Smarter Power, Stronger Partners*, Volume I: *Exploiting U.S. Advantages to Prevent Aggression*, Santa Monica, Calif.: RAND Corporation, RR-1359-A, 2016 (hereafter referred to as Volume I).

² By *anti-access*, we mean opposition to getting force to and into a geographic space; by *area denial* (AD), we mean opposition to the operation of such force within that space.

Smarter Power, Stronger Partners

Volume I lays out a case for why the United States should rethink its military strategy. The United States has come to regard the capability to project force and wage war globally as essential to its national security and position in the world. Ample resources have been provided to maintain such a capability, and every U.S. president since Ronald Reagan has used it.³ *Force projection* has become virtually synonymous with *power projection* and thus with the ability to exert U.S. will and influence. It follows that any erosion in actual or perceived ability of the United States to project force could have huge adverse consequences.

Yet the U.S. ability to project force is being eroded by the advance and spread of militarily useful technologies. Many of these capabilities are focused on counter–force projection A2AD capabilities. Although they are still far superior to forces of any potential adversary, both U.S. forward-based and expeditionary forces are becoming increasingly exposed to advanced sensors locating and tracking them and to extended-range weapons striking them. This is especially so for U.S. military platforms—the surface ships and aircraft that carry strike weapons and troops. It is getting increasingly hard and expensive for the United States to preserve its singular concentration of military power, especially its capability to send forces into harm’s way.

The U.S. military is aware of the threat that A2AD poses and has focused on what amounts to counter–counter–force projection: capabilities and operational concepts that seek to defeat A2AD capabilities. But, as Volume I develops in detail, trends are generally unfavorable to countering A2AD with improved force projection. Moreover, U.S. efforts to overcome A2AD bring with them increasing strategic risk.

In brief, operational, geographic, technological, and economic factors influence and could determine the competition between A2AD and force projection, and, in each case, A2AD has critical advantages. There is reason to think that A2AD capabilities can improve

³ Starting with Panama, Presidents Reagan, George H. W. Bush (Iraq), Bill Clinton (Yugoslavia), and George W. Bush (Afghanistan and Iraq) have ordered large-scale U.S. force projection. President Barack Obama has ordered more-measured and surgical uses of force at distance.

more or less continuously and that the ability of important potential adversaries—not just China but also Iran and Russia—to threaten U.S. force projection will increase both over time and over distance. In the meantime, the United States either is stuck with legacy platforms—increasingly easy targets—or must embark on costly and slow change toward new, more-survivable, less-targetable means with which to project force. Because A2AD’s advantage over force projection in exploiting technology is improving steadily, its “relative operational return on investment”—as compared with force projection—is not only superior but growing. This portends a deteriorating future for U.S. force projection, unless technological breakthroughs alter these trajectories.

Of at least as much concern as the dynamics that advantage A2AD over force projection, improvements in A2AD are increasing pressures on the U.S. military to plan on destroying these capabilities by conducting early strikes against an adversary’s A2AD capabilities. Such a U.S. response to A2AD might help deter aggression or, failing that, reduce harm to U.S. forces. However, the pressure on U.S. (and adversary) forces to strike early could also create instability during crises, compress the time for diplomacy to avert conflict, and cause an enemy to preempt.

Moreover, U.S. attack on an adversary’s homeland, already an aspect of U.S. force projection, will become riskier as weapons of mass destruction (WMD) and other means to respond strategically proliferate. Whether to take out A2AD before it can be used against U.S. forces or to escalate if U.S. forces cannot overcome A2AD, the option of attacking the territory of a sophisticated and resolute enemy will be less and less attractive to U.S. leaders.

Although the United States *should* preserve options to strike first and to strike enemy homeland, it needs more-prudent options to prevent aggression and safeguard its interests—peacefully if possible, forcibly if necessary—despite enhanced A2AD. Volume I explores alternative approaches for meeting the U.S. need to project power, not just force, into critical regions where potential adversaries are.

It first posits that the main reason the United States should project force is to prevent international aggression. Treating the prevention of aggression as the primary U.S. military mission in the world does

not mean that it would be the only mission. A2AD is less problematic for scalpel-like U.S. forces, such as special operations, cruise-missile strikes, or use of drones for counterterrorism, and A2AD capabilities on a level that could be truly problematic for the United States will be difficult for any but the world's most capable countries to develop. Moreover, attacks on enemy territory, such as to destroy WMD capabilities or otherwise protect vital U.S. interests, might be justified and worth the risks in some circumstances despite enhanced A2AD, and should not be precluded. However, as the case of China already shows, the era in which the United States could project force and wage war with relative ease might be drawing to a close. Thus, although it might not be feasible or affordable for the United States to overcome the growing A2AD challenge that capable states pose frontally or linearly, the United States has other options. To be clear, no such option promises to restore U.S. ability to project force without risk into any region against any adversary for any purpose it chooses. But any affordable option that enables the United States to prevent international aggression, protect its interests and friends, and make war less likely—and less frequently—could be better than the current path and thus worth pursuing.

Although our assessment revealed no single, simple U.S. strategy to overcome the A2AD problem, it does suggest that the United States has ways of exploiting its enduring advantages to prevent aggression, even as its ability to use offensive force projection declines. The A2AD problem neither reflects nor portends a decline in U.S. power. Rather, it is the result of specific technological phenomena that happen to make traditional military platforms vulnerable to several potential adversaries. Far from declining, the United States possesses economic, technological, and political advantages. It occupies central positions in world finance, trade, technology, information technology, and, now, energy production, giving it potential leverage over foes and friends. Its blend of entrepreneurship, dynamic markets, capital access, and scale gives the United States an edge in creating and applying new technology, including in the military sphere. Finally, the United States retains strong political influence with a majority of the world's militarily able states, thanks to shared interests, formal security agreements, and lead-

ership in international institutions. As proof, compare the many capable allies of the United States with the very few and seriously flawed allies of China, Russia, and Iran.

These U.S. advantages are sustainable, and A2AD is making them more important than the projection of offensive force. The United States needs (and can have) a genuinely comprehensive strategy centered on using A2AD to prevent regional aggression, using power projection (not just force projection) wisely, and in which offensive force figures importantly but not predominantly.

In addition to its abundant power, the United States enjoys an advantageous geopolitical position. In East Asia, it is China that seeks to revise the status quo, and it is China's menacing behavior about which most regional states are increasingly concerned. In eastern Europe, most ex-Soviet nations are tilting decidedly toward Europe and the North Atlantic Treaty Organization (NATO), thanks to Russian president Vladimir Putin's aggressiveness (and the toll it is starting to take on Russia itself). Although it faces many current and mounting challenges, the United States has a stake in international order and stability. This is not to say that it is or should become a classical "status quo power"; rather, it should seek peaceful progress toward a more democratic, market-based, interconnected, moderate, and responsible international community, made possible by stemming regional aggression in concert with allies and partners.

Precisely because orderly and peaceful change supports its interests in contested regions, the United States can generally afford to assume a more defensive position than it has in the past decade or so, neither relying on nor permitting the use of offensive force to alter the status quo. By implication, trends in technology and costs favoring defense (i.e., A2AD) that now work against U.S. power can instead work for it. Under a new condition of mutual A2AD, even as adversaries raise the costs of U.S. force projection, adversaries will be unable to project force themselves—and, thus, will be unable to fully exploit their A2AD.

From this analysis of U.S. power and geopolitical position emerge three ideas that, together, suggest a new strategy of exploiting U.S. advantages to prevent aggression. First, because the main use of U.S.

military power should be to prevent regional aggression, the United States should adopt what we call *Blue A2AD* as the organizing principle for its forces. Blue A2AD is the collective A2AD capabilities of the United States and its regional allies. As it is, no state can match the U.S. ability to sense, target, and strike opposing forces, which is the sine qua non of A2AD. The United States excels in most of the technologies, systems, and skills that underpin effective A2AD: space-based and other extended-range sensors; target identification and tracking; precision guidance; integrated air defense (IAD); data networking, fusion, and processing; and integrated command and control (C2). Blue A2AD would imply a more defensive but still engaged and influential U.S. role in critical regions. Second, U.S. partners can and should take on more defense responsibility and, with U.S. help, contribute to Blue A2AD in their regions. Third, the United States should hone and use its nonmilitary coercive power to prevent intimidation and destabilizing behavior short of aggression. Implementing each idea will require U.S. initiative.

Scenarios: Illustrating the Nature and Significance of Trends in Anti-Access and Area Denial Versus Force Projection

The principal purpose of this volume is to test the hypothesis that the A2AD threat to U.S. force projection is growing more severe in critical regions. The potential adversaries are those identified in Volume I: China, long recognized for its A2AD capabilities, as well as Russia and Iran. For each possible confrontation, we developed two separate scenarios, one set in the present (2015) and one set ten years hence (2025).⁴ Both the 2015 and 2025 scenarios describe plausible U.S. and adversary military actions based on common understanding of current operational capabilities and approaches. Neither version of the scenar-

⁴ 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.

ios is intended to capture the alternative U.S. strategic and operational approaches described in Volume I. Table 1.1 lists each scenario’s combatants, geographic flash point, and year of occurrence.

These scenarios examine some of the most critical points made in Volume I about the contest between A2AD and force projection. The present and future versions expose whether and how this contest is becoming more or less favorable to the United States. By focusing on particular adversaries and particular regions, the importance of trends in A2AD versus force projection is appropriately fixed in specific geopolitical and geographic contexts. Indeed, the varied outcomes of the scenarios hold within them varied potential lessons for the United States. Although these scenarios do not amount to empirical validation, the specificity of the narratives makes the concepts more tractable, and their plausibility lends significant weight to the arguments presented in Volume I.

Table 1.1
Scenarios

Combatants	Flash Point	Year
United States and China	Taiwan	2015
United States and China	Taiwan	2025
United States and China	SCS	2015
United States and China	SCS	2025
NATO and Russia	Estonia	2015
NATO and Russia	Estonia	2025
United States and Iran	Strait of Hormuz	2015
United States and a nonnuclear Iran	Strait of Hormuz	2025
United States and a nuclear-armed Iran	Strait of Hormuz	2025

NOTE: SCS = South China Sea.

Scenario Development

These scenarios are narratives that describe the interplay between the combatants' strategic and operational objectives, concepts of operations (CONOPS), and military capabilities. The critical hypothesis we designed them to test—whether the A2AD advantage over U.S. force projection increases with time—shapes their focus. Thus, they postulate *military* conflicts only; A2AD developments will undoubtedly affect strategic contests even absent open warfare, but we do not explore those prospective impacts here. They focus on particular aspects of the proposed campaigns and do not describe all, or even all important, operational details. Of particular note is the fact that we give more attention to adversary capabilities and capacity than to U.S. capabilities and capacity.

We developed the scenarios using only publicly available literature and the input of subject-matter experts, and they are not the result of modeling or war-gaming. We do not intend these scenarios to predict these specific conflicts, nor do we contend that these specific narratives are the single most likely way in which the contests would unfold. The scenarios are only vehicles to test likely trends in relative capabilities.

The current (2015) and future (2025) versions of the scenarios use a common flash point 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, while we used literature and subject-matter experts' input, combined with authors' judgments, 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 technical breakthroughs or dramatic changes to force structure.

The geopolitical terrain has shifted in notable ways since we began this project in the fall of 2013. Of most recent note is the fact that negotiations with Iran over its nuclear program culminated with a tentative agreement in the summer of 2015, with the goal of reducing the likelihood of a future conflict. Perhaps most significantly, however, relations with Russia worsened dramatically. We began drafting the scenarios before the Russian invasion of Crimea and before violent

separatist action in eastern Ukraine. For the United States to engage in a war with Russia strained credulity at the time, although we felt that the case warranted some exploration. The possibility is now not quite so far-fetched. The dynamic circumstances, however, present a challenge to developing a credible Russia scenario. At present, there is huge and weighty uncertainty about how events will resolve themselves: The future integrity of the Ukrainian state, the degree to which Moscow will openly engage in and support hostilities, and the NATO response to all of this are very much up in the air. The Russia scenarios use what seems to us now to be a credible status quo ante bellum, but there is a distinct danger that facts on the ground could overtake the postulated circumstances before this report is published.

Scenario Format

Although each scenario was written by authors who approached the material somewhat differently from one another, each scenario follows a common format:

- A background section briefly describes the parties' strategic objectives.
- A "Path to War" section provides both a flash point and an explanation of operational objectives.
- A "Conduct of the War" section describes the outcomes of contests between select A2AD and force-projection capabilities.
- A "Net Assessment" section aggregates the assessment of each contest between A2AD and force-projection capability, offers an assessment of strategic risk, and highlights critical factors that could lead to a different outcome.

In the 2025 scenarios, we repeat some material from the 2015 scenarios, but we do assume that the reader has read the latter before reading the former. We have written the two China scenarios to stand alone, and we repeat significant material from China–Taiwan (Chapter Two) in China–Philippines (Chapter Three).

Dividing the core of the scenarios—the "Conduct of the War" sections—into independent capability contests serves to highlight

some of the most-critical ways in which A2AD confronts force projection. These contests typically concern capabilities that were quite explicitly developed to contend with each other, and it is useful to consider them in that context. This approach, however, is somewhat artificial. It disturbs the linearity of narrative developments and can disguise connections between them. These capabilities, on both sides, are mutually supporting and are applied as part of a joint campaign. Moreover, by focusing on some capability contests, others recede into the background. We hope that the reader will bear these things in mind and will tolerate their consequences when reviewing the scenarios.

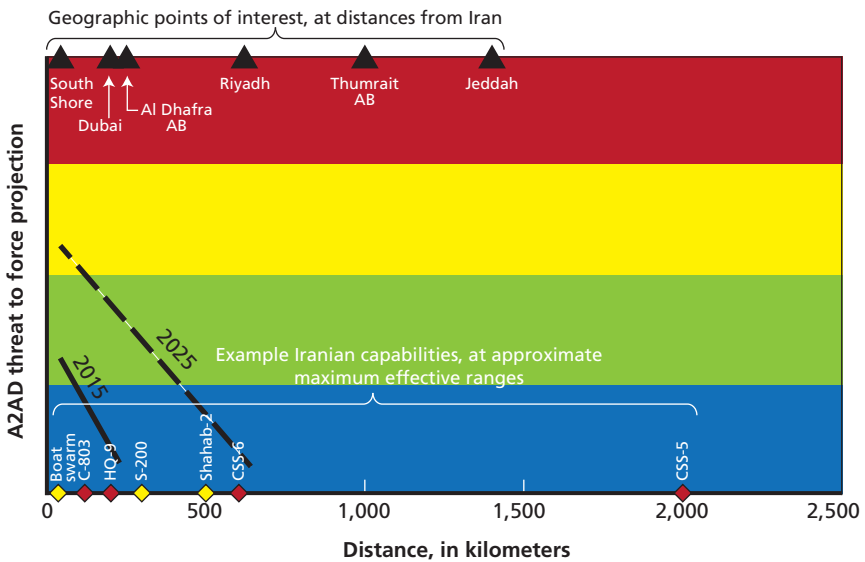
Each scenario concludes with a net assessment that attempts to aggregate all capability contests discussed into a single, straight “threat line” for display in a figure, as in the example (Figure 1.1). The 2025 scenarios show the line for 2015 as well. The assessments are particular to the scenarios in question. The aggregation is subjective and, given the specific dynamics of each scenario and complex interplay between the capabilities in question, necessarily imprecise. The threat lines are broad indicators of how the threat to force protection changes over distance and over time—that is, indicators of trends in relative capability between adversary A2AD and U.S. force projection. At the top of each figure, we include geographic points of interest in the scenario, at a distance from the adversary homeland. At the bottom, we show example adversary capabilities, at an approximate maximum effective range.

Collective Assessment

This volume concludes with an assessment of all nine scenarios, focused on drawing out the common elements running through the scenarios. Three key common themes stand out:

1. The A2AD capabilities of important potential adversaries are likely to increase in significant ways over time more than U.S. force projection, threatening U.S. strategic interests. The changes posited in these scenarios are well within the bounds of reasonable developments for these countries.
2. Adversaries’ ability to conduct A2AD at distance is likely to increase, to the detriment of U.S. force projection.

Figure 1.1
Example Net Assessment: Iranian Anti-Access and Area-Denial Threat to U.S. Force Projection



Key	Force projection prevails quickly with little loss	▲ Location of interest at distance from nearest point from Iran
	Force projection is impeded but prevails with modest loss	◆ Example Iranian capability in 2015 at approximate maximum effective range
	Force projection is likely to succeed but with difficulty, uncertainty, and loss	◆ Example Iranian capability that is new in 2025 at approximate maximum effective range
	Force projection suffers major losses and could fail	

NOTE: AB = airbase.

3. The U.S. response under current strategy and operational approaches to defeating A2AD could lead to conflict escalation and, in some cases, increased risk of nuclear war. In Volume I, we discuss other approaches.

China–Taiwan

Michael S. Chase and Jeffrey Engstrom

China–Taiwan, 2015

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

Background

The United States is rebalancing to Asia as the region becomes increasingly central to U.S. economic, diplomatic, and military interests and U.S. involvement in the wars in Iraq and Afghanistan has wound down.¹ Washington's rebalance to Asia involves not only shifting military capabilities to the region and rotational deployments but also greater diplomatic involvement in regional issues; high-level participation in regional diplomatic and economic meetings; and economic and trade initiatives, such as the Trans-Pacific Partnership.² U.S. objectives in the region also include maintaining a stable relationship with China while deterring China from using force or the threat of force to resolve maritime territorial disputes. Furthermore, the United States attaches

¹ See, for example, Hillary Clinton, "America's Pacific Century," *Foreign Policy*, October 11, 2011, and U.S. Department of Defense (DoD), *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, Washington, D.C., January 2012.

² On U.S. policy toward China and Asia more generally, see Jeffrey A. Bader, *Obama and China's Rise: An Insider's Account of America's Asia Strategy*, Washington, D.C.: Brookings Institution, March 8, 2012.

a high priority to forging relationships with new security partners and assuring longstanding U.S. allies and security partners that the United States has the capability and the will to make the rebalance substantive and sustainable despite budgetary constraints and a contentious political environment at home. In addition, the United States seeks to ensure the security of sea lines of communication (SLOCs), prevent proliferation of WMD, and promote protection of human rights in the region.

Beijing's most-important objectives are perpetuating Chinese Communist Party (CCP) rule, sustaining economic growth and development, maintaining domestic social and political stability, defending Chinese sovereignty and territorial integrity, and securing China's status as a major power.³ Many Chinese observers view U.S. rebalancing as aimed at containing China and ensuring that its reemergence as a major power does not threaten U.S. interests.⁴ They see the United States as bent on maintaining its dominance and believe that U.S. power and U.S. determination to prevent China's rise from undermining its position make the United States the greatest potential threat to China's security. Nonetheless, they seek a stable relationship with the United States, one that is conducive to China's achievement of its broader domestic and international objectives. Chinese leaders frequently discuss establishing a "new pattern of major-country interaction" with the United States, one that avoids a major confrontation of the type that has often resulted between status quo and rising great powers and results in U.S. accommodation of China's most-important interests.⁵

Taiwan seems an unlikely flash point owing to the relatively stable relationship the island has enjoyed with China in the past few years,

³ Information Office of the State Council of the People's Republic of China, *The Diversified Employment of China's Armed Forces*, Beijing, April 16, 2013.

⁴ See, for example, Andrew J. Nathan and Andrew Scobell, "How China Views America: The Sum of Beijing's Fears," *Foreign Affairs*, September–October 2012, and Kenneth G. Lieberthal and Wang Jisi, *Addressing U.S.–China Strategic Distrust*, Washington, D.C.: Brookings Institution, March 30, 2012.

⁵ Yang Jiechi, "Innovations in China's Diplomatic Theory and Practice Under New Conditions," *China Daily*, updated August 16, 2013.

although the future remains far from certain.⁶ Taiwan's objectives include maintaining its de facto autonomy as its rapprochement with China progresses, increasing its international space through involvement in relevant international organizations, and reducing its dependence on China by strengthening its economic relations with other countries in the region. As Sino–Japanese tension over the disputed Senkaku/Diaoyu Islands increases, Japan is shifting the focus of its security policy toward China and placing greater emphasis on defense. Japan continues to rely heavily on the United States to guarantee its security. For many other countries in the region, however, the calculus is less straightforward. They are wary of the instability that would likely result from greater friction between the United States and China. Moreover, even as the importance of their economic ties with China is increasing, they also value the role the United States plays in maintaining regional security and stability. As a result, they seek to maintain good relations with Beijing and Washington, and they want to avoid being put in a position that would require them to choose between China and the United States.⁷

Path to War

Although a conflict over Taiwan seems like a remote possibility at the beginning of 2015, the cross-strait relationship takes an unexpected and dramatic turn for the worse later in the year, plunging the region into the most serious crisis since China's 1995–1996 military exercises and missile tests. The crisis begins when a document reportedly outlining Chinese plans to pressure Taiwan into agreeing to a first-ever cross-strait summit meeting on Chinese terms is leaked to media outlets in Taiwan. In Taiwan, an official spokesperson states that no such meeting will take place unless it can be arranged under circumstances that protect Taiwan's interests and the dignity of the people of Taiwan.

⁶ Richard C. Bush III, *Uncharted Strait: The Future of China–Taiwan Relations*, Washington, D.C.: Brookings Institution, January 29, 2013.

⁷ Evan S. Medeiros, Keith Crane, Eric Heginbotham, Norman D. Levin, Julia F. Lowell, Angel Rabasa, and Somi Seong, *Pacific Currents: The Responses of U.S. Allies and Security Partners in East Asia to China's Rise*, Santa Monica, Calif.: RAND Corporation, MG-736-AF, 2008.

Nonetheless, the media reports spark large-scale demonstrations in several cities in Taiwan. Protest leaders charge that any such meeting would risk compromising Taiwan's sovereignty and put it on a path toward unification on unacceptable terms. Politicians from both major parties in Taiwan react to the public outcry by calling for stronger action to protect Taiwan's autonomy and enhance the island's international profile.

China responds by stating that discussions about achieving national reunification cannot wait indefinitely. Chinese leaders call for immediate talks on political issues, but Taipei rejects Beijing's demands. Chinese leaders then decide to conduct large-scale military exercises to underscore their resolve and coerce Taiwan into participating in political talks, but Taiwan again refuses to agree to participate in political negotiations. Facing slowing economic growth and rising domestic unrest at home, Chinese leaders conclude that they cannot afford to appear weak on Taiwan.

The People's Liberation Army (PLA) has improved dramatically since the 1995–1996 Taiwan Strait crisis, giving Beijing options it previously lacked. Amphibious lift capability, however, remains relatively limited and is insufficient for the PLA to invade Taiwan.⁸ Lacking the ability to successfully conduct an amphibious invasion and hoping that a more limited application of military force will be sufficient to achieve their policy objectives, Chinese leaders order the PLA to prepare to conduct a blockade of Taiwan. The United States detects the preparations and threatens to intervene on Taiwan's behalf, but U.S. statements and movements of forces do not deter Beijing. When Taiwan refuses a final ultimatum to negotiate on China's terms, China begins conducting a joint blockade campaign against Taiwan on D+0.⁹

For China, a joint blockade campaign is much more than a traditional naval blockade: Chinese military planners believe that the PLA

⁸ According to DoD, "The PLA Navy currently lacks the massive amphibious lift capability that a large-scale invasion of Taiwan would require." See Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2013*, Washington, D.C., c. 2013, pp. 57–58.

⁹ That is, on D-Day, the very first day of the conflict. D+1 is the second day of the conflict, D+2 is the third day, and so on.

must cripple the target country's ability to counter the blockade and gain information, air, and sea dominance. Accordingly, China's initial activities include joint firepower strikes designed to destroy Taiwan counterblockade and defense forces. Targets include ports and naval bases; shore-based missiles; airfields; air defenses; early warning; and command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) capabilities. China also launches computer network attacks against Taiwan military and government computer systems. In addition, the PLA is prepared to conduct strategic defense of the mainland, including strategic air defense, in case deterrence fails and the United States intervenes by launching air and cruise-missile strikes against China.

China issues a public statement declaring that the conflict is strictly an internal matter and that it will not tolerate any external interference in China's domestic affairs. Taiwan's leaders urgently appeal for humanitarian aid and call for U.S. military intervention in accordance with the Taiwan Relations Act (TRA).¹⁰

Along with its appeals for international support, Taiwan also undertakes some military actions to counter the Chinese blockade. Although China's initial wave of ballistic- and cruise-missile attacks seriously degrades Taiwan's air and naval capabilities, Taiwan still manages to respond by sinking two Chinese frigates with mobile anti-ship cruise missiles (ASCMs). Taiwan also launches a computer network attack against PLA C2 and air-defense systems. In the early days of the conflict, Taiwan refrains from striking mainland targets with its relatively small arsenal of land-attack cruise missiles (LACMs). But there are indications that Taiwan's military is preparing to hit mainland targets, and political leaders in Taiwan state publicly that such strikes would be justified in response to Chinese ballistic- and cruise-missile attacks against Taiwan.

In Beijing, Chinese leaders expect U.S. intervention, but they calculate that it might still be possible to limit conflict with the United States by refraining from kinetic actions against U.S. forces and sending carefully calibrated deterrent signals. Accordingly, China does not

¹⁰ Public Law 96-8, Taiwan Relations Act, April 10, 1979.

launch any kinetic strikes against U.S. forces in the region when it begins attacking Taiwan on D+0. At the same time that it starts carrying out the joint blockade campaign, however, China launches cyberattacks against U.S. military targets. Specifically, Beijing conducts computer network attacks against U.S. military logistics systems to try to delay the U.S. response to the crisis. In addition, China publicizes deterrent actions, such as the deployment of conventional medium-range ballistic missiles (MRBMs) and Dong-Feng 21 (DF-21D, also known by their NATO reporting name, CSS-5) antiship ballistic missiles (ASBMs) to field sites, which appear to be intended as warnings to the United States.

Despite Chinese attempts to deter U.S. military intervention, on D+1, the president of the United States declares that, unless China lifts the blockade within 24 hours, the United States will intervene militarily to break the blockade, in accordance with the TRA. The next day, on D+2, the United States makes good on this threat when U.S. nuclear attack submarines (SSNs) operating in the area sink two Chinese frigates and a Chinese Luyang II destroyer (also known as a Type 052C destroyer) that were enforcing the blockade. As soon as this news begins spreading on the Internet in China, tens of thousands of Chinese people take to the streets in Beijing, Shanghai, and other major cities to protest against U.S. military intervention. Within hours, China responds by attacking U.S. surface ships operating in the Philippine Sea with submarine-launched ASCMs. Some of the ASCMs miss because of U.S. countermeasures, but others find their targets, sinking one U.S. guided-missile destroyer (DDG) and heavily damaging two others. By the end of D+2, both sides have suffered serious losses at sea—as one U.S. commentator observes in a widely quoted interview on CNN, “After only two days, this is already the most serious naval conflict since the end of World War II in the Pacific, and it is only going to get worse.”

The next day, on D+3, as the conflict seems to be on the verge of further escalation, Chinese analysts note movements of U.S. B-52 and B-1B bombers to Guam, which they interpret as an implicit nuclear threat. Shortly thereafter, China responds by visibly increasing the readiness of its theater and strategic nuclear forces. Senior Chinese mil-

itary officers state publicly and privately that China continues to adhere to its policy of no first use (NFU) of nuclear weapons, but they warn that China is fully prepared “to counter any nuclear threats or coercion by the United States.”¹¹

The United States’ Conflict Objectives

The United States seeks to break the Chinese blockade of Taiwan. U.S. leaders have stated that the United States continues to hold that the resolution of the China–Taiwan dispute must be peaceful and that it intends to ensure that the people of Taiwan are not coerced into unification by force. U.S. leaders have stated that their intent is to protect Taiwan’s people and to ensure their security, prosperity, and democracy. Furthermore, Washington has stated that its fundamental policy toward China and Taiwan has not changed and that any long-term solution is acceptable so long as it is arrived at peacefully and with the consent of the people of Taiwan. The United States also aims to restore security and stability to the region as quickly as possible; it wishes to avoid a large-scale conflict with China and to limit escalation. In addition, the United States aims to preserve its alliance relationships and maintain its influence in Asia.

China’s Conflict Objectives

Beijing’s objective is to coerce Taiwan into participating in unification talks on Chinese terms. Chinese leaders have stated that Taiwan must agree to participate in such talks immediately and that the negotiations must take place on the basis of the One China principle. China has indicated that the specific format of unification is an appropriate subject for cross-strait negotiations and that it is willing to offer what it describes as “flexible terms” to Taiwan once it has agreed to participate in the talks. China wishes to avoid a major conflict with the

¹¹ With a land-based nuclear force that includes more survivable road-mobile intercontinental ballistic missiles (ICBMs) and a nascent sea-based nuclear deterrent, China appears to many observers as well on the way to realizing its longstanding desire for an assured retaliation capability. See Jeffrey Lewis, “China’s Nuclear Modernization: Surprise, Restraint, and Uncertainty,” in Ashley J. Tellis, Abraham M. Denmark, and Travis Tanner, eds., *Strategic Asia 2013–14: Asia in the Second Nuclear Age*, Seattle, Wash.: National Bureau of Asian Research, October 2013, pp. 67–96.

United States if possible but accepts that its blockade of Taiwan risks triggering war with the United States and possibly with other U.S. allies. China plans to use diplomatic and economic pressure along with military threats to influence U.S. allies and partners so that they will refuse to support the United States, or at least limit the support they are willing to offer to Washington. In addition, China seeks to increase its overall influence in the region as a result of its successful unification with Taiwan.

Taiwan's Conflict Objectives

Taiwan's objective is to restore something that resembles the status quo that prevailed prior to the Chinese implementation of the blockade. Leaders in Taiwan have indicated that their paramount objective is to guarantee Taiwan's security, freedom, and prosperity. Leaders in Taiwan have stated clearly that they will not negotiate with China under military pressure. At the same time, however, they have indicated that they remain open to rebuilding the cross-strait relationship once China has ceased all hostilities against Taiwan.

Other Parties' Conflict Objectives

As for many other countries in the region, their leaders have stated publicly and privately that they do not wish to be drawn directly into the conflict. Some countries have indicated their willingness to support the United States, such as by permitting basing of noncombat aircraft on their territory, but others have told Washington they are unwilling to put their countries at risk of Chinese attack or even to be put in a position that could result in a dramatic worsening of their economic relationships with China.

Conduct of the War

China's Anti-Access and Area-Denial Concept of Operations

The PLA military text *The Science of Campaigns* 《战役学》 describes in general detail various aspects of the joint blockade campaign of the sort on which China has now embarked.¹² The PLA anticipates this cam-

¹² Zhāng Yùliáng, ed., 《战役学》 [The Science of Campaigns], 2nd ed., Beijing: 国防大学出版社 [National Defense University Press], 2006, pp. 297–309.

paign to be both large-scale and long-duration and one that involves all of the PLA's services (Army, Navy, and Air Force), as well as the Second Artillery Corps, China's conventional and nuclear-missile force.

The PLA envisions the blockade as consisting of four distinct phases. In the first phase, the PLA deploys its intelligence, surveillance, and reconnaissance (ISR) assets and prepares the battlefield while trying not to provide any advance warning to Taiwan or the United States.¹³ The next phase is blockade establishment.¹⁴ Far from being a relatively benign action in which Taiwanese ships are turned back to port, activity in this phase would be tremendous amounts of PLA kinetic strikes against key targets on the island in an attempt to destroy Taiwan's military capability to resist so as to achieve both sea and air superiority. The third phase, sustaining the blockade, seeks to destroy Taiwan's will to resist largely through the long duration of the blockade itself while maintaining sea and air superiority.¹⁵ After objectives have been reached, the fourth-phase conclusion is when participating PLA forces transition from a conflict footing back to a peacetime footing.¹⁶

If the U.S. military becomes involved in the conflict, China would also wage an anti-air raid campaign designed to repel any U.S. air strikes against forces participating in the main campaign or against important mainland military, political, or economic targets. *The Science of Campaigns* generally describes how this campaign would be conducted.¹⁷ Using primarily PLA Air Force (PLAAF) and PLA Navy (PLAN) Air Force (PLANAF) air and ground assets, this campaign prescribes the development of a system that consists of three zones for air interdiction of U.S. strike aircraft. The first zone is the furthest intercept area and is patrolled by fighter aircraft and long-range surface-to-air missiles (SAMs) that are both ground- and ship-based.¹⁸

¹³ Yùliáng, 2006, p. 297.

¹⁴ Yùliáng, 2006, pp. 298–303.

¹⁵ Yùliáng, 2006, pp. 304–308.

¹⁶ Yùliáng, 2006, p. 310.

¹⁷ Yùliáng, 2006, pp. 331–348.

¹⁸ Yùliáng, 2006, p. 343.

The second zone, or the air–land attack area is the middle zone and consists of fighters, as well as SAM and anti-aircraft artillery (AAA) batteries.¹⁹ Last, the third zone, or the deep anti-annihilation area, is nearest to the strategic target China seeks to protect and is guarded by fighters, SAM, AAA, and possibly aerial obstacles.²⁰ Integrated C4ISR networks, as well as active information operations, such as electronic warfare, support all of these activities.²¹

Although it was Beijing's intent that these operational concepts and the capabilities developed to support them would deter the United States from military involvement in the blockade, it must now hope that it can impose such cost on responding U.S. forces that Washington opts for some settlement. The coming days and weeks will reveal just how steep a price the United States must pay. If events seem to run against the PLA, Beijing can contemplate its options to escalate the fight.

U.S. Force-Projection Concept of Operations

The United States will execute elements of the air–sea battle concept in order to deny China the ability to continue to prosecute its blockade and restore air lines of communication and SLOCs to the island. The intent is that, once China realizes that the campaign against Taiwan cannot succeed and that the United States is prepared and able to destroy the PLA's ability to project military force, it will abandon hostilities.

The U.S. CONOPS will focus on early, aggressive elimination of China's ability to target U.S. (and remaining Taiwanese) forces. Key targets are those assets that enable China to find and target U.S. naval forces—the radars and communication networks in particular—and the defenses that protect them. Chinese ships and aircraft currently executing the blockade are also high-priority targets.

The targets are numerous and the defenses robust. The campaign requires flowing substantial air (fighters, strike, and mission-support aircraft) and naval forces (carrier strike groups [CSGs], surface-action

¹⁹ Yùliáng, 2006, p. 343.

²⁰ Yùliáng, 2006, p. 343.

²¹ Yùliáng, 2006, pp. 339–340.

groups [SAGs], submarines, and at-sea replenishment) to the region.²² Because the United States expects stiff resistance from Chinese A2AD at U.S. bases and facilities close to Taiwan, it plans to operate from more-distant bases, such as U.S. Fleet Activities Yokosuka, Yokota AB, and Andersen Air Force Base (AFB), as well as from multiple aircraft carriers.

Assessment of Chinese Anti-Access and Area Denial Versus U.S. Force Projection

Chinese Anti-Access and Area Denial Versus U.S. Strike Aircraft: Setup

The role of U.S. strike aircraft is to destroy Chinese military targets that are directly engaged in enforcing a blockade of Taiwan and those seeking to prevent U.S. forces from effective operation in the area in the waters of the Taiwan Strait, the East China Sea (ECS), and parts of the western Pacific. U.S. rules of engagement (ROE) in the posited scenario permit limited strikes against mainland targets, including the following:

- the airfields from which PLAAF and PLANAF fighters, attack, bomber, and mission-support aircraft fly
- ports that directly support PLAN operations
- conventional ballistic-missile and ground-launched cruise-missile (GLCM) units that threaten U.S. fixed assets and surface ships
- SAM sites that threaten U.S. strike, air superiority, and special-mission aircraft
- assets supporting the PLA's ability to target U.S. satellites with its offensive space-control capabilities
- PLAN surface ships
- C4ISR assets, such as C2 networks and radars, that support China's ability to target U.S. forces and execute the blockade.

The U.S. Air Force and Navy muster a significant number of strike aircraft. Some are in theater by D+3, but the force flow is not

²² Mission-support aircraft include PLAAF and PLANAF airborne early-warning and control (AEW&C), tanker, reconnaissance, and electronic-warfare (EW) aircraft.

complete for weeks. These aircraft are stationed at U.S. bases in Guam and Japan and afloat on U.S. aircraft carriers.

China's ability to hold U.S. strike aircraft and assisting mission-support aircraft at risk emanates from two main sources: (1) kinetic attack through SAMs and (2) kinetic attack from air-to-air missiles (AAMs).²³ (The threat to U.S. aircraft while at their bases is covered in the discussion of fixed assets.) The first of these kinetic threats originates either from SAM batteries located on the mainland or from PLAN surface ships likely operating in and around Taiwan.²⁴

The PLA's most-capable land-based SAM is the HQ-9, with a range of 200 kilometers (km). The HQ-9 is based on the S-300 (NATO designation SA-10 Grumble/SA-20 Gargoyle). These are supported by S-300 systems imported from Russia. Afloat, the PLAN's four Luyang II-class (Type 052C) destroyers carry 48 HHQ-9 SAMs (the naval variant of the aforementioned HQ-9) in vertical-launch tubes.²⁵ This represents the most potent ship-to-air threat in China's arsenal. Also of note are the service's two Luzhou-class (Type 051C) destroyers that carry 36 SA-N-20 SAMs each and have a range of 75 km.²⁶

PLAAF and PLANAF fighters pose a significant challenge to the United States' ability to operate over or near Taiwan or the mainland. Indeed, a recent DoD report states that China possesses 490 combat aircraft (or roughly 16 air regiments) within unrefueled range of Taiwan.²⁷ Given the number of deployment airfields adjacent to Taiwan in China's Nanjing Military Region, this number could easily jump to approximately 800 combat aircraft and 26 air regiments during a conflict, such as this blockade scenario. Although Taiwan's own air defenses attrite some of these aircraft, China's ability to bring additional reserves forward means that Taiwan does not dent the overall

²³ The anti-air raid campaign also recognizes EW's role in countering incoming air strikes, although we do not further consider this in this section.

²⁴ This section assumes that PLAN surface ships are not unlikely to operate beyond mainland-generated sorties of PLAAF or PLANAF air cover.

²⁵ "Luyang-II (Type 052C) Class," *Jane's Fighting Ships*, February 7, 2014.

²⁶ "Luzhou Class (Type 051C)," *Jane's Fighting Ships*, December 9, 2013.

²⁷ Office of the Secretary of Defense, 2013, p. 76.

number of sorties China can generate. U.S. strike aircraft face a significant threat from AAMs launched from PLAAF and PLANAF fourth- and 4.5-generation fighters seeking to maintain air superiority over the Taiwan Strait and likely Taiwan as well.²⁸ The most-lethal PLA AAMs are the Russian-developed R-77 and the Chinese-developed PL-12, with ranges of 110 km and 70 km, respectively.²⁹ AEW&C aircraft, such as the KJ-2000 and KJ-200, will aid the PLA fighters launching these missiles, and those AEW&C aircraft might, in turn, be integrated into China's larger C4ISR picture, which would include various surface radars, including an over-the-horizon (OTH) radar that potentially ranges to 3,000 km (covering a substantial portion of the Philippine Sea), and space-based assets.³⁰

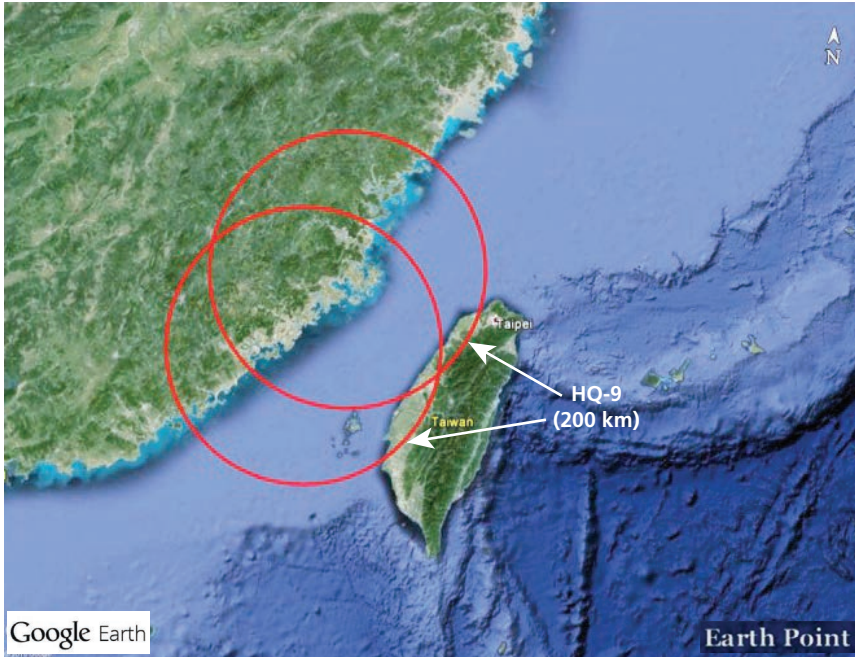
In sum, China's IAD and proximity to Taiwan make for a formidable threat to U.S. strike aircraft flying close to the strait or unable to operate from standoff ranges. Figure 2.1 shows the ranges of the HQ-9 SAM relative to the Taiwan Strait in this scenario.

²⁸ This includes the indigenously built J-10 and J-11, as well as Russian-built Su-27 and Su-30 fighter aircraft.

²⁹ "R-77, RVV-AE (AA_12 'Adder')," *Jane's Air-Launched Weapons*, January 12, 2009; "PL-12 (SD-10, SD-10A)," *Jane's Air-Launched Weapons*, August 19, 2013.

³⁰ The Project 2049 report (Mark Stokes, *China's Evolving Conventional Strategic Strike Capability*, Project 2049 Institute, September 14, 2009, p. 18) mentioned in Taiwan Matters to America, "The PLA Air Force over the Horizon Radar Brigade," *The Taiwan Link: Perspectives on Taiwan from America's Capital*, December 24, 2009.

Figure 2.1
Ranges of HQ-9 Surface-to-Air Missiles Relative to the Taiwan Strait, 2015



SOURCE: Google Earth.

NOTE: Missile-launcher locations are illustrative.

RAND RR1359/1-2.1

Chinese Anti-Access and Area Denial Versus U.S. Strike Aircraft: Outcome

U.S. B-1B, B-2, and B-52 bombers begin to launch standoff attacks against key Chinese targets, such as strategic ISR assets and C2 nodes, as well as those airfields and ports that are directly prosecuting operations against Taiwan. (U.S. Navy ships and submarines attack similar targets, as covered further in the discussion of surface ships.) The 1,000- to 1,100-km ranges of U.S. air-launched cruise missiles (ALCMs), the AGM-158 (launched from the B-1B) and the AGM-86 (launched from the B-52), are long enough to reach Chinese airbases and ports adjacent to the Taiwan Strait from the relative safety of launch points over the Philippine Sea. These strikes are intended first and foremost to degrade

China's situational awareness and capacity to target U.S. forces, and secondly to impede China's ability to maintain air and sea superiority in and adjacent to the Taiwan Strait.

Simultaneously with these efforts, U.S. Navy carrier-based strike aircraft and U.S. Air Force B-52s firing Harpoon antiship missiles first focus on attacking PLAN surface ships that pose a significant air-defense threat.³¹ Once this immediate threat has been tolerably abated, secondary targets for U.S. naval strike aircraft then, in conjunction with U.S. surface and subsurface assets, coalesce around sinking remaining PLAN surface ships that are preventing sea access to Taiwan's ports.

The United States has generally good success against fixed targets, including China's coastal OTH radar arrays and those tracking radars and control facilities that sustained preconflict intelligence preparation have helped to target. Chinese air defenses defeat some inbound cruise missiles, but coordinated, multi-aspect attacks overcome most obstacles. U.S. suppression-of-enemy-air-defenses (SEAD) efforts are only partially successful, however, because China hides elements of its air-defense system, moving batteries and activating radars only intermittently.

However, these activities are costly and resource intensive because mainland targets are numerous. Strike missions against all airbases or facilities supporting China's war efforts cannot be prosecuted from standoff ranges. U.S. strike aircraft have to launch ordnance from points as close as the Taiwan Strait, putting them well within range of any surviving land-based and seaborne air defenses or PLA air superiority aircraft.³² Strike operations continue to require low-observable aircraft operating with extensive EW support. Even so, a dozen aircraft are lost in the first week of the fight to Chinese defenses, and inventories of standoff precision weapons run low. Further losses are sustained from the PLA's anti-air raid operations.

³¹ "AGM-84 Harpoon," *Jane's Air-Launched Weapons*, August 23, 2013.

³² Sean O'Connor, *IMINT and Analysis*, undated.

Chinese Anti-Access and Area Denial Versus U.S. Fixed Assets: Setup
China's ability to maintain its blockade of Taiwan and potentially achieve its strategic objective of reunification is dramatically enhanced by effectively denying U.S. air and naval assets the ability to operate from forward locations in Okinawa, Japan, as well as somewhat more-distant basing locations on Japan proper and Guam. Indeed, without these bases, U.S. strike aircraft would have to rely on multiple aerial refuelings to reach their targets and return. This curbs, potentially severely, total strike sortie throughput and significantly hinders any mission that requires sustained time on station. Because China can generate necessary air superiority sorties from mainland bases, the fewer U.S. strike aircraft and air superiority aircraft that can operate nearby, the easier it is for China to maintain its blockade over the duration of the campaign, and the greater the PLA's ability to respond to any attempted U.S. air strikes.

Although it imposes real challenges, the effect of Chinese strikes on U.S. naval bases is somewhat less severe for U.S. naval assets because various at-sea replenishment ships allow numerous naval SAGs the ability to operate for extended periods at distance. Furthermore, U.S. nuclear-powered vessels—specifically, attack submarines and aircraft carriers—allow the U.S. Navy to be somewhat less tethered to its ports (although submarines must return to port to rearm). As a result, the PLA's campaign to degrade or destroy U.S. regional airbases is an extremely high priority; strikes against U.S. regional naval bases are also important but not as high of a priority.

Beyond U.S. airfields and ports, numerous supporting facilities, such as logistics hubs and C2 centers, are forward located in the region. These also provide tempting targets for Chinese strikes. China's ability to strike U.S. regional airbases, ports, and other support facilities in the western Pacific derives from its large and growing fleet of land-based MRBMs, medium-range cruise missiles, intermediate-range ballistic missiles (IRBMs), and intermediate-range cruise missiles, as well as its ALCMs. U.S. bases in Japan—specifically, on Okinawa (Kadena, Futenma, and others), Kyushu, southern Honshu (U.S. Fleet Activities Sasebo and Marine Corps Air Station Iwakuni, respectively), as well as northern Honshu (Misawa AB)—are susceptible to strikes from some

of the PLA arsenal of short-range ballistic missiles (SRBMs), short-range cruise missiles, MRBMs, and medium-range cruise missiles.³³ Many of these bases are also well within range of PLAAF strike aircraft, such as the H-6, JH-7A, J-11, and Su-30, which can deliver air-to-surface missiles, such as the AS-17 Krypton and the AS-18 Kazoo. U.S. bases located in and near Tokyo are slightly out of range of the DF-16 MRBM (CSS-11) and the CJ-10/DH-10 LACM, although the DF-21 MRBM, YJ-63 ALCM, or air-launched version of the CJ-10/DH-10 cruise missile could conceivably reach them. If the higher estimate for range is used for the CJ-10/DH-10 (i.e., 2,000 km), Guam is within reach of an H-6K bomber with a CJ-10/DH-10 ALCM.³⁴ However, to launch their standoff payload, these bomber aircraft would still have to successfully fly to a spot over the Philippine Sea roughly 1,500 to 2,000 km from Guam and, in doing so, would become highly susceptible to U.S. air superiority aircraft. Although the most recent DoD report to Congress shows the U.S. territory within range of a generic LACM, it does not provide details.³⁵

Both the United States and Japan have invested in considerable missile defenses in the region. Aegis-equipped ships in both fleets are available to counter the Chinese missile threat, and critical facilities have point defense from, among other assets, Patriot and Terminal High Altitude Area Defense (THAAD) missile batteries. Table 2.1 lists the ballistic and cruise missiles that pose a threat to U.S. bases, and Figure 2.2 shows ranges of some PLA ballistic missiles relative to the Taiwan Strait for this scenario.

³³ For the DF-16 MRBM to target U.S. bases in northern Honshu (Misawa AB), the missile would have to be fired from locations in Manchuria.

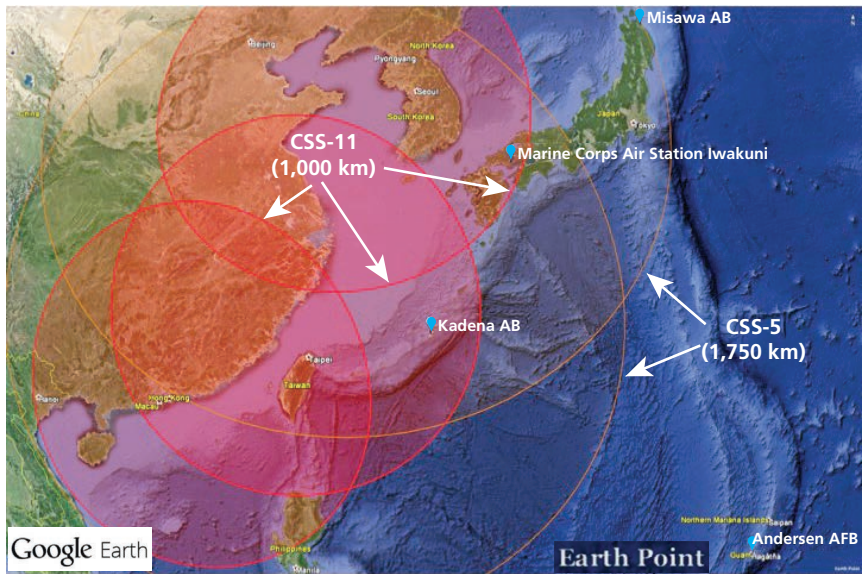
³⁴ Although the aged DF-3 (CSS-2) liquid-fueled ballistic missile is capable of reaching Guam, its low accuracy and nuclear mission prevent it from being considered to pose a serious conventional threat to U.S. bases on the island, such as Andersen AFB or Naval Base Guam.

³⁵ After reading a mention in an earlier section of the DoD report, one might easily speculate that it is the CJ-20 alleged to enter service sometime in 2014 according to the International Institute for Strategic Studies (IISS).

Table 2.1
The Chinese Ballistic- and Cruise-Missile Threat to U.S. Bases in and Near the Taiwan Strait, 2015

Chinese Name	NATO Designation	Type of Missile	Total Range, in Kilometers	Missiles	Launchers
DF-16	CSS-11	MRBM	1,000	~25	12
DF-21	CSS-5	MRBM	1,750	~75	36
YJ-63	—	ALCM	200	Unknown	20 (H-6H)
CJ-10/DH-10	—	LACM	1,500–2,000	200–500	54
		ALCM	3,300–3,800	Unknown	36 (H-6K)

Figure 2.2
Ranges of Select Chinese Ballistic Missiles Relative to the Taiwan Strait, 2015



SOURCE: Google Earth.
NOTE: Missile-launcher locations are illustrative.

Chinese Anti-Access and Area Denial Versus U.S. Fixed Assets: Outcome

Relatively shortly after U.S. submarines sink PLAN surface ships on D+2, China begins a joint firepower strike to destroy or degrade the ability of U.S. bases to generate sorties or launch and rearm surface ships. Because sustaining air superiority is a necessary condition of successfully executing the blockade of Taiwan, suppressing U.S. airbases' sortie generation is one of the PLA's highest campaign priorities. Of these airbases, U.S. facilities on Okinawa (Kadena AB and Marine Corps Air Station Futenma) are China's main targets: They are home to substantial U.S. assets and provide by far the easiest access to the strait of all U.S. operating bases. Bringing air operations at Kadena AB to a dead stop would require a substantial barrage of accurate strikes, and keeping the airbase closed would then require follow-on attacks as sections are repaired and undetonated ordnance is removed.

Despite having a limited inventory of missiles that can reach these targets, China adopts a comparatively conservative approach to airbase attack: Hit runways regularly, with the intent to entirely suppress operations. This choice is driven, in part, by operational limitations: China does not have the survivable ISR to support regular battle-damage assessments (BDAs) of the runways that actually need reattack or to positively identify times at which U.S. aircraft are in the open. Further, high-volume attacks on specific bases increase the probability of defeating missile defenses. It is also strategic: China could conserve its limited number of missiles and hold the bases at risk for a longer period but wants to bloody the United States as early and as often as possible and force Washington to reassess its involvement. Through the missile barrage, the PLA is able to largely halt air sortie generation on Okinawa until D+7. Sixteen U.S. aircraft forward deployed at these airfields are destroyed. After D+7, China can keep up some harassing attacks with air-to-surface missiles that PLAAF multirole fighters launch and a small number of conserved MRBMs. This degrades flight operations somewhat, but U.S. sortie generation increases steadily after the initial barrage.

Other major U.S. installations in Japan—Iwakuni, U.S. Fleet Activities Sasebo, Misawa, and Yokosuka—receive very little Chi-

nese attention because missiles are focused on Okinawa. Guam is not touched. The threat the PLA poses to Guam is almost insignificant because it is limited to DH-10 cruise missiles launched from H-6K bombers at standoff ranges. For such strikes to be successful, the H-6K (a derivative of the Soviet Tu-16 bomber) would need to successfully evade U.S. aircraft and air defenses to find its way to launch its payload approximately 700 km east of Taiwan.³⁶ Although this is possible, it is unlikely that an unstealthy, slow bomber would be capable of such a feat in the face of U.S. counterair operations.

Chinese Anti-Access and Area Denial Versus U.S. Surface Ships: Setup

For the United States to achieve its conflict objectives, it must break the Chinese blockade of Taiwan. For China to achieve its goals, the PLA must maintain the blockade. Beijing aims to cut Taiwan off from the outside world for an amount of time sufficient to generate enough bargaining leverage for it to compel Taipei to accept its demands. China's military must be prepared to counter expected U.S. military intervention, and this requires it to employ A2AD capabilities against U.S. surface ships that will be involved in U.S. attempts to disrupt the blockade or carry out other military actions against China. Improvements in PLAN capabilities in the past 15 years have made it a much more formidable antisurface-warfare (ASuW) force, and its capabilities are complemented by those of other services (most notably, the PLA Second Artillery Force's [PLASAF's] DF-21D ASBM) and enhanced PLA C4ISR systems.³⁷

³⁶ This assumes that the DH-10 ALCM has a range of 2,000 km.

³⁷ According to the Office of Naval Intelligence's senior intelligence officer for China, Jesse L. Karotkin,

At the dawn of the 21st Century, the People's Liberation Army Navy (PLA[N]) remained largely a littoral force. Though China's maritime interests were rapidly changing, the vast majority of its naval platforms offered very limited capability and endurance, particularly in blue water. Over the past 15 years the PLA(N) has carried out an ambitious modernization effort, resulting in a more technologically advanced and flexible force. This transformation is evident not only [in] the PLA(N)'s Gulf of Aden counter-piracy presence, which is now in its sixth year, but also in the navy's more advanced regional operations and exercises. In contrast to its narrow focus [just a] decade ago, the PLA(N) is evolving to meet a wide range of missions including conflict with Taiwan, enforce-

The ASuW capabilities China can bring to bear against U.S. surface ships include PLAN surface ships and submarines, PLANAF aircraft capable of launching long-range ASCMs, and PLASAF land-based ASBMs.³⁸ China also is developing unmanned underwater vehicles (UUVs) and has considerable mine-warfare capabilities. The UUVs' capabilities are thought to be limited by range and C2 challenges in 2015, but mines could pose a threat in an A2AD role.³⁹ In addition, the PLAN has been enhancing its logistics capabilities and improving in other areas, such as C4ISR systems, education, training, and exercises. Antisubmarine warfare (ASW) remains an important area of weakness for the PLAN. Nonetheless, the PLAN poses an increasingly serious threat to Taiwan, and it is an important element of China's ability to deter U.S. military intervention or, if deterrence fails, to counter U.S. military intervention by delaying the arrival of U.S. forces and reducing the effectiveness of their operations.⁴⁰ According to one observer,

China's emerging maritime A2AD force can be viewed as broadly analogous to the sea-denial force that the Soviet Union developed during the Cold War to deny U.S. use of the sea or counter U.S. forces participating in a NATO–Warsaw Pact conflict. One

ment of maritime claims, protection of economic interests, as well as counter-piracy and humanitarian missions.

See Jesse L. Karotkin, "Trends in China's Naval Modernization," testimony before the U.S. China Economic and Security Review Commission, January 30, 2014.

³⁸ Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, Washington, D.C.: Congressional Research Service, RL33153, September 30, 2013.

³⁹ On UUVs, see Lyle Goldstein and Shannon Knight, "Coming Without Shadows, Leaving Without Footprints," *Proceedings Magazine*, Vol. 136/4/1, 286, April 2010, pp. 30–35. On mines, see Scott C. Truver, "Taking Mines Seriously: Mine Warfare in China's Near Seas," *Naval War College Review*, Vol. 65, No. 2, Spring 2012, pp. 30–66.

⁴⁰ The PLAN is expected to contribute to other missions, including enforcing China's territorial claims in the ECS and SCS; challenging foreign military activities in its exclusive economic zone (EEZ); protecting Chinese SLOCs; participating in noncombatant evacuation, antipiracy, and humanitarian-assistance and disaster-relief (HADR) operations; promoting China's regional security interests; and bolstering China's status as an emerging world power more generally. See O'Rourke, 2013.

potential difference between the Soviet sea-denial force and China's emerging maritime A2AD force is that China's force includes ASBMs capable of hitting moving ships at sea.⁴¹

The PLAN's surface ships have improved dramatically since the 1990s, when China began acquiring modern destroyers from Russia. In recent years, China has shed its reliance on imported surface ships and produced some classes of modern surface combatants, including frigates and destroyers with greatly improved ASuW and anti-air warfare (AAW) capabilities. China is also building new Jiangdao-class (Type 056) corvettes and Houbei-class (Type 022) ASCM-armed fast-attack craft that feature a catamaran hull design.

The four *Sovremennyy*-class destroyers China imported from Russia are equipped with the highly capable Russian-made SS-N-22 Sunburn ASCM. China's indigenously produced destroyers feature more-modern hull designs, propulsion systems, sensors, weapons, and electronics. China's domestically produced destroyers are also armed with ASCMs, and the Luyang II (Type 052C) and Luyang III (Type 052D) destroyers feature phased-array radar systems. According to DoD, China launched the lead ship in the Luyang III class in 2013, and it will likely enter service in 2015. Furthermore, according to DoD,

The Luyang III incorporates the PLA Navy's first multipurpose vertical launch system, likely capable of launching ASCM, LACM, SAM and anti-submarine rockets. China is projected to build more than a dozen of these ships to replace its aging LUDA class destroyers⁴²

Since the 1990s, China has also developed four new classes of indigenously built frigates: the Jiangwei I, Jiangwei II, Jiangkai I (Type 054), and Jiangkai II (Type 054A). As one analyst observes, "Compared to China's remaining older Jianghu (Type 053) class frigates, which entered service between the mid-1970s and 1989, the four

⁴¹ O'Rourke, 2013, p. 5.

⁴² Office of the Secretary of Defense, 2013, p. 7.

new frigate classes feature improved hull designs and systems, including improved AAW capabilities.”⁴³

In addition, China commissioned its first aircraft carrier, *Liaoning*, in September 2012. It is a refurbished aircraft carrier that China acquired from Ukraine in the late 1990s. It is conventionally powered and has a “ski-ramp” configuration that limits the range and payload of its fixed-wing aircraft. It can accommodate roughly 30 aircraft, including fixed-wing aircraft and helicopters, but it is not expected to embark an operational air wing until at least 2015. In the future, China is expected to deploy an unknown number of indigenously developed aircraft carriers.⁴⁴

Along with its improving surface fleet, the PLAN has a growing number of modern submarines. The modernization of China’s submarine force has focused on qualitative improvements, resulting in a more modern and capable submarine force. The PLAN’s submarines include Kilo-class diesel submarines imported from Russia and several classes of indigenously produced submarines, such as the Song- and Yuan-class attack submarines. These are, in general terms, quieter and longer-ranged than the boats they replace. The Yuan-class submarine is believed to incorporate an air-independent propulsion (AIP) system. China also has two Type 093 SSNs and is building four more improved versions of the Type 093 to replace its older Han-class Type 091 SSNs (the Type 095 nuclear-powered guided-missile submarine [SSGN] will eventually succeed the Type 093). In addition, three Type 094 nuclear-powered ballistic-missile submarines (SSBNs) are now operational with the PLAN. Each Type 094 can carry 12 JL-2 nuclear-armed submarine-launched ballistic missile (SLBMs). China could deploy up to five Type 094s before it proceeds to its next generation Type 096 SSBN some time in the next decade.⁴⁵ In addition, the PLAN also

⁴³ Ronald O’Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, Washington, D.C.: Congressional Research Service, RL33153, February 28, 2014, p. 25.

⁴⁴ On Chinese carriers and carrier-based aircraft developments, see O’Rourke, 2014, pp. 15–21.

⁴⁵ Office of the Secretary of Defense, 2013, pp. 6–7.

still has some older, less capable submarines that could nonetheless be useful in certain roles in a Taiwan conflict or possibly in the event of a clash in the SCS.

Chinese land-based aircraft also represent a potent A2AD threat against U.S. surface ships. The first fourth-generation fighter fielded with the PLANAF is the Su-30MK2, which is capable of targeting enemy surface ships. China's land-based naval aircraft inventory also includes ASCM-armed JH-7 fighter-bombers and older but potentially threatening ASCM-armed H-6 bombers.⁴⁶

Deployed on surface ships, submarines, and strike aircraft, Chinese ASCMs pose an especially serious threat to U.S. surface ships. China's inventory of ASCMs includes the Russian-made SS-N-22, carried by the PLAN's *Sovremennyy* DDGs, and SS-N-27 ASCMs, carried by eight of the PLAN's Kilo-class submarines.⁴⁷ It also has potent indigenously designed ASCMs, such as the YJ-8A (NATO designation C-801) and the YJ-62 (C-602), and the YJ-83 (C-803). These weapons all have OTH range—as much as 500 km. China has made investments in maritime reconnaissance and communication networks that allow it to take advantage of this capability to successfully target ships at distance.⁴⁸

Furthermore, the PLASAF fields a relatively small but growing number of DF-21D ASBMs capable of targeting U.S. aircraft carriers. The DF-21D is an MRBM with a maneuvering reentry vehicle and a range of more than 1,500 km.⁴⁹

⁴⁶ Karotkin, 2014; O'Rourke, 2014, p. 32.

⁴⁷ According to DoD, China

has, or is acquiring, nearly a dozen ASCM variants, ranging from the 1950s-era CSS-N-2 to the modern Russian-made SS-N-22 and SS-N-27B. China is working to develop a domestically-built supersonic cruise missile capability. The pace of ASCM research, development, and production has accelerated over the past decade.

See Office of the Secretary of Defense, 2013, p. 42.

⁴⁸ Karotkin, 2014.

⁴⁹ See Andrew S. Erickson, "Ballistic Trajectory: China Develops New Anti-Ship Missile," *Jane's Intelligence Review*, Vol. 22, January 4, 2010, pp. 2–4; Office of the Secretary of Defense, 2013, p. 5; and National Air and Space Intelligence Center (NASIC), *Ballistic and Cruise Missile Threat*, Wright-Patterson Air Force Base, NASIC-1031-0985-13, 2013.

In addition, China has a wide range of mine-warfare capabilities, including moored, bottom, drifting, rocket-propelled, and intelligent mines.⁵⁰ Table 2.2 lists China's types of naval capabilities and the number it has of each type.

To deal with these A2AD threats, the U.S. Navy surges forward nearly the entire Pacific fleet, including 37 destroyers and cruisers, 20 SSNs, and two SSGNs. Three nuclear-powered aircraft carriers (CVNs) are in theater by D+10 and four by D+20.

Chinese Anti-Access and Area Denial Versus U.S. Surface Ships: Outcome

As mentioned above, on D+2, the United States makes good on its threat to start trying to break the blockade when U.S. SSNs sink two Chinese frigates and a Chinese Luyang II DDG. China responds by sinking a U.S. DDG and heavily damaging two others with long-range submarine-launched ASCMs. The United States is convinced that it must attack the Chinese kill chain as quickly as possible, so the United

Table 2.2
Selected Chinese Naval Capabilities, 2015

Type	Number
Destroyer	27 (including 17 modern)
Frigate	48 (including 31 modern)
Corvette	10
Missile-armed fast-attack craft	85
Amphibious ship	56
Mine-warfare ship	42
Major auxiliary ship	More than 50
Minor auxiliary ship and service and support craft	More than 400

SOURCE: Karotkin, 2014.

⁵⁰ Andrew S. Erickson, Lyle J. Goldstein, and William S. Murray, *Chinese Mine Warfare: A PLA Navy "Assassin's Mace" Capability*, Newport, R.I.: China Maritime Studies Institute, U.S. Naval War College, China Maritime Study 3, June 2009; Karotkin, 2014.

States also begins unleashing a series of cyberattacks and conventional strikes against Chinese mainland targets, including space- and C4ISR-related facilities, some of which are deep in Chinese territory. In the discussion of strike aircraft, we have already covered the contributions of strike aircraft (including carrier-based aircraft) to these attacks, but the U.S. ships and submarines are essential to the effort. Indeed, cruise missiles launched from ships and submarines provide the majority of the U.S. standoff strike capacity and are especially critical in the days before Chinese air defenses have been attrited.

For the next several days, U.S. SSNs continue to exact a heavy toll on Chinese surface ships, sinking PLAN frigates and destroyers. In addition, on D+5, U.S. carrier-based and land-based aircraft engage PLAAF and PLANAF fighters and bombers in the air over Taiwan. The United States loses a small number of aircraft to Chinese AAMs but inflicts heavy losses on the Chinese side.

U.S. efforts to limit the threat from Chinese ASBMs are ultimately successful. Early strikes against Chinese C4ISR frustrate the PLA's ability to locate major U.S. combatants and target them effectively. However, China's long-range ASCMs prove to be even more dangerous. On D+7 and D+8, Chinese submarines and bombers launch coordinated ASCM attacks against two U.S. aircraft carriers. One is so heavily damaged that it is effectively removed from action for the remainder of the conflict and must be withdrawn from the area, but the other U.S. carrier targeted in this attack escapes without suffering any serious damage. The next day, Chinese DDGs, submarines, and naval aviation launch long-range ASCM attacks against several U.S. surface ships. Some of the missiles fail to hit their targets, but others are successful, sinking two DDGs and damaging several other ships.

Although China inflicts serious losses on the U.S. surface fleet with its A2AD capabilities, Beijing ultimately cannot maintain the blockade. The main reason is China's inability to prevent U.S. SSNs from sinking a large number of PLAN surface ships and attack submarines. By D+21, PLAN surface-ship losses are so severe that China has no choice but to seek a face-saving way out of the conflict while attempting to salvage the best political outcome it can hope to achieve under the circumstances.

Chinese Space, Information Warfare, and C4ISR Versus U.S. Counter-C4ISR: Setup

Chinese military authors argue that space is essential for numerous military missions, such as ISR, military communications, navigation and positioning, and strategic early warning. According to a treatise by one former senior PLA officer,

Space will become an important battleground of confrontation between opposing forces . . . the development of manned space vehicles and new types of space weapons will enable space strength to make continuous progress, and this will make space the principal arena in future wars.⁵¹

Overall, Chinese military writings on space emphasize its importance in gaining and maintaining information superiority, which, in turn, is seen as key to seizing the initiative in a conflict with a technologically advanced adversary, such as the United States.⁵² Space is therefore seen as a potentially decisive arena in this 2015 Taiwan conflict scenario, and China seeks to ensure its ability to operate freely in space while denying the same ability to the United States.⁵³ However, because of Taiwan's proximity to the mainland and the distances from which U.S. forces must operate, the PLA is much less dependent on space in this scenario than the United States is. China can rely on land-based communications, unmanned aerial vehicles (UAVs), and other such capabilities to a much greater extent than the United States can, and this asymmetry in the level of dependence on space systems gives China a strong incentive to degrade or deny U.S. space systems even at the expense of U.S.

⁵¹ Zhao Xijun, ed., *Intimidation Warfare: A Comprehensive Discussion on Missile Deterrence*, National Defense University, May 2005.

⁵² Kevin Pollpeter, "PLA Space Doctrine," in Andrew S. Erickson and Lyle J. Goldstein, eds., *Chinese Aerospace Power: Evolving Maritime Roles*, Naval Institute Press, 2011, pp. 50–68.

⁵³ Kevin Pollpeter, "Controlling the Information Domain: Space, Cyber, and Electronic Warfare," in Ashley J. Tellis and Travis Tanner, eds., *Strategic Asia 2012–13: China's Military Challenge*, National Bureau of Asian Research, October 2012, pp. 162–194; Dean Cheng, "China's Military Role in Space," *Strategic Studies Quarterly*, Spring 2012, pp. 55–77.

retaliation in kind against Chinese satellites.⁵⁴ PLA strategists calculate that China is better off if both sides essentially negate each other's space capabilities than if it allows the United States to continue using its space systems. China does not believe that it has much hope of encouraging U.S. restraint, nor does it believe that it would benefit equally if the two sides reached an implicit or explicit agreement to avoid attacks against space capabilities.

Nonetheless, PLA strategists discuss the potential advantages of some limits on conflict in space, such as refraining from attacks that generate large amounts of debris, which could damage other countries' satellites and potentially bring them into the conflict when they might otherwise choose to remain on the sidelines. But, at the outset of the conflict, it is unclear whether PLA strategists view certain U.S. space systems, such as U.S. early-warning satellites, as off limits because of the potential escalation risks or as potentially legitimate targets because they play tactical, as well as strategic, roles in supporting U.S. military operations.

As for space capabilities, China has on orbit a range of satellites to support its military operations, and China is expanding its space-based capabilities in such areas as ISR, communications, and navigation and positioning.⁵⁵ China also has OTH radars that it can use along with its ISR satellites to target surface ships.

China is also developing multidimensional counterspace capabilities and has at its disposal a variety of systems that it could employ against U.S. assets.⁵⁶ These include so-called soft-kill capabilities, such as jammers. They also include the antisatellite-weapon (ASAT) interceptor China tested in January 2007 should Chinese leaders authorize

⁵⁴ 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 Press, 2011, pp. 95–152.

⁵⁵ Andrew S. Erickson, "Satellites Support Growing PLA Maritime Monitoring and Targeting Capabilities," *China Brief*, Vol. 11, No. 3, February 10, 2011, pp. 13–19.

⁵⁶ Ashley J. Tellis, "China's Military Space Strategy," *Survival*, Vol. 49, No. 3, September 1, 2007, pp. 41–72; Michael Krepon, Eric Hagt, Shen Dingli, Bao Shixiu, Michael Pillsbury, and Ashley Tellis, "The Bush Years and Beyond: China's Military Space Strategy—An Exchange," *Survival*, Vol. 50, No. 1, 2008, pp. 157–198.

the PLA to employ so-called hard-kill capabilities. China's goals appear to include strategic deterrence and space control—preserving its own ability to use space while limiting or denying the adversary's ability to use space-based assets in crisis or conflict with China.⁵⁷

The Chinese military's doctrinal writings also emphasize the importance of maintaining China's own C4ISR capabilities while denying the same to the adversary. This involves measures, such as camouflage, concealment, denial, and deception, to protect PLA forces from detection and targeting by U.S. precision-strike capabilities.

Chinese Space, Information Warfare, and C4ISR Versus U.S. Counter-C4ISR: Outcome

China does not launch any preemptive kinetic strikes against U.S. forces at the outset of the conflict, but it begins conducting computer network attacks against U.S. military logistics systems on D+0. As soon as Beijing judges that the United States is preparing to intervene on behalf of Taiwan, China also begins conducting reversible counter-space operations (jamming communication links and dazzling optical sensors with low-power lasers) against U.S. space systems. China calculates that it is necessary to begin conducting these nonkinetic attacks as soon as it concludes that Washington is determined to become involved in the conflict, but it attempts to tailor its actions to avoid precipitating further escalation by the United States. When the United States begins launching cyberattacks against China on D+2, it also begins conducting reversible offensive space control operations against a variety of Chinese space systems. U.S. jamming and cyberattacks degrade Chinese C4ISR and diminish China's ability to use its space systems for force-enhancement missions, but China manages to at least partially compensate for these losses because of its ability to use other communication systems and land-based ISR platforms, such as UAVs.

Throughout the first two weeks of the conflict, China and the United States both refrain from debris-generating counterspace actions, calculating that destruction of the other side's satellites would pose a threat to its own space systems and would likely damage those of other

⁵⁷ Bao Shixiu, "Deterrence Revisited: Outer Space," *China Security*, Winter 2007, pp. 2–11.

countries not involved in the conflict, potentially undermining their diplomatic relationships with third parties.

On D+18, however, with U.S. military action seriously threatening the success of the blockade, China threatens to begin destroying U.S. space systems unless the United States immediately halts all military operations against China. When the United States continues to conduct operations to break the blockade, China carries out its threat by launching a single, direct-ascent ASAT attack against a U.S. spacecraft in low earth orbit. The United States responds with further air and cruise-missile attacks against Chinese mainland targets, including space-tracking and space-launch facilities and military command centers. Additionally, within a few days, the large amount of debris that the Chinese ASAT attack generates results in damage to other satellites, including those belonging to several countries that are not involved in the conflict. These countries condemn China diplomatically, and the incident severely undermines China's broader strategic communication efforts, which China had designed to portray it as handling an internal dispute in a way that did not pose a threat to the interests of any other country.

Conclusion of the War

The war ends on D+21, when China concludes that it cannot successfully sustain the blockade because of the heavy losses it has suffered as a result of U.S. intervention in the conflict, especially the sinking of a large number of PLAN surface ships by U.S. submarines.

Although Beijing fails to achieve its key objective of compelling Taiwan to negotiate unification on China's terms, Chinese leaders portray the military action as a strategic success, arguing that it left China better off than it would have been if it had exercised restraint. In a major speech broadcast on official television, China's top leader states,

The PLA's military action prevented Taiwan from drifting further toward independence and inflicted heavy damage against U.S. forces. The heroic sacrifices of the PLA protected China's sovereignty and territorial integrity—and they taught the United States a serious lesson about the costs of intervening in China's

internal affairs. The historical trend is clear, and unification is inevitable.

At the end of the conflict, all parties have suffered heavy losses. More broadly, the U.S.–China relationship appears to have been irreparably damaged. Moreover, the regional and global economic effects are expected to be extremely serious. Finally, because Taiwan's status remains unresolved, many observers fear that the Taiwan Strait could once again become a flash point as soon as Beijing calculates that it is in a better position to settle the dispute on its terms.

Net Assessment

In 2015, China is a formidable adversary. It inflicted significant losses on very expensive U.S. force-projection platforms, and the conflict threatened to spiral into even costlier escalation.

Keeping the fighting in its own backyard greatly helped China, while U.S. forces depended heavily on a small number of bases and aircraft carriers to project strike power in the fight. The United States ultimately succeeded because of two important Chinese limitations. First, Chinese success depended on some degree of sea control, but China could not protect its surface ships from U.S. attack submarines and thus could not sustain a blockade of Taiwan. Second, China could impede, but not halt, U.S. air operations. It did not have sufficient numbers of missiles that could reach major U.S. airbases in Japanese territory. The United States was able to contest air superiority in and around Taiwan and conduct strikes on both the mainland (in particular, on C4ISR) and deployed forces.

Considered from a different angle, those same limitations point to U.S. strengths. Highly capable, forward-deployed submarines accorded U.S. forces a tremendous advantage. U.S. regional bases, surface ships, and aircraft carriers put forward a combination of precision strike and ISR that was able to overcome modern counterair and countersurface defenses designed specifically to stop them.

It is important to note that this conflict could unfold in ways even more challenging and costly for the United States. China did not open the war with a dramatic, comprehensive surprise attack against

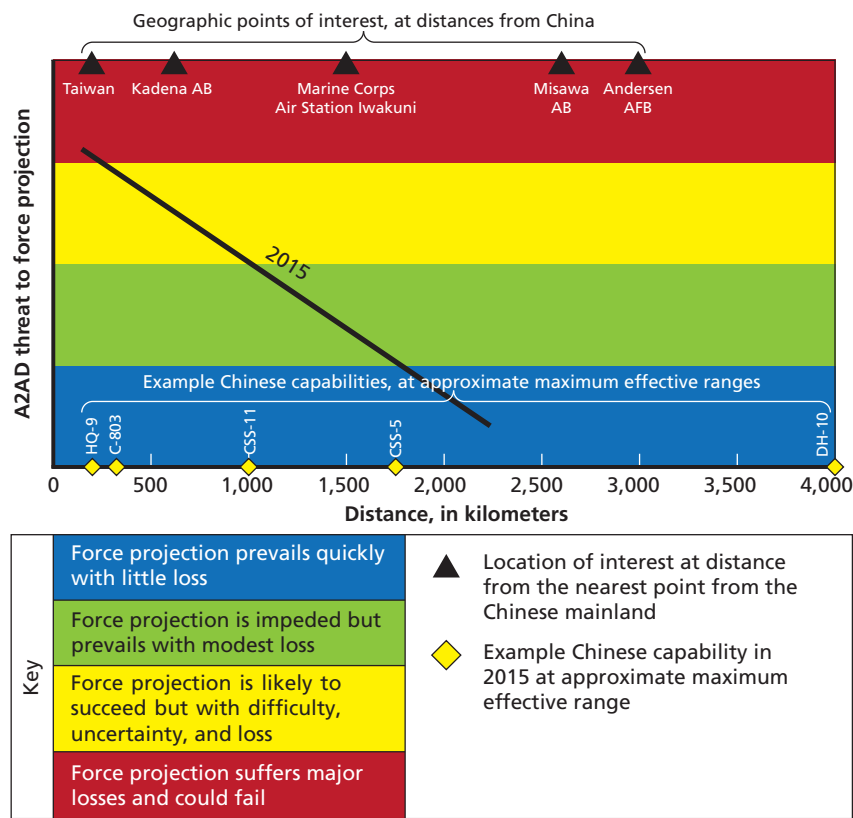
U.S. forces in the region, something that it might plausibly conclude is wise. Nor did the escalatory path unfold to include large-scale counter-space warfare or the use of nuclear weapons. And the war ended when China still retained significant capability to sustain a threat to Taiwanese shipping, something it could conceivably draw out for a long period. Figure 2.3 summarizes our net assessment for this scenario, and Figure 2.4 depicts the Chinese A2AD threat to force projection for this scenario.

Figure 2.3
China–Taiwan Net Assessment, 2015

Assessment	Color
The United States prevails in the capability contest quickly with little loss.	Blue
The United States prevails with some time and loss.	Green
The United States can succeed but with difficulty, uncertainty, and loss.	Yellow
The United States suffers major losses and could fail.	Red

A2AD threat to	By	Result
Surface ships	Submarines	Yellow
	Cruise missiles	Green
	Ballistic missiles	Yellow with red diagonal stripes
	Aircraft	Yellow
Strike aircraft	Air defense	Yellow with red diagonal stripes
	Aircraft	Green
		Green
Bases	Ballistic missiles	Yellow
	Cruise missiles	Green
C4ISR		Yellow
	Cyber	Yellow
	ASAT	Yellow
Strategic risk	EW	Green
		Yellow
Overall		Yellow

Figure 2.4
Chinese Anti-Access and Area-Denial Threat to U.S. Force Projection, 2015



NOTE: Effective range of an air-launched version of the DH-10 cruise missile includes the range of the bomber launching the missile.

China–Taiwan, 2025

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

Background

The United States continues to implement its policy of rebalancing to Asia, which has become increasingly central to U.S. economic, diplomatic, and military interests. The military component of Washington's rebalance to Asia involves not only shifting military capabilities to the region and increasing the frequency of rotational deployments but also the diversification of its regional basing arrangements and the development of new capabilities intended to defeat A2AD threats. Beyond the defense-related aspects of the policy, Washington continues to pursue greater diplomatic involvement in regional issues, high-level participation in regional diplomatic and economic meetings, and economic and trade initiatives. U.S. objectives in the region still include maintaining a stable relationship with China while deterring China from using force or the threat of force to resolve maritime territorial disputes, forging relationships with new security partners, and assuring longstanding U.S. allies and security partners that the United States has the capability and the will to make the rebalance substantive and sustainable despite a tighter budget environment and challenges that periodically demand its attention in the Middle East and other parts of the world. Additional U.S. objectives include ensuring the security of SLOCs, preventing proliferation of WMD, and promoting protection of human rights in the region.

Beijing's most-important objectives have not changed much in the past decade. China's leaders remain fixated on perpetuating CCP rule, sustaining economic growth and development, maintaining domestic social and political stability, defending Chinese sovereignty and territorial integrity, and securing China's status as a major power. Many Chinese observers view U.S. rebalancing as aimed at containing China and ensuring that China's reemergence as a major power does not threaten

U.S. interests. They see the United States as bent on maintaining its dominance and believe that U.S. power and determination to prevent China's rise from undermining its position make the United States the greatest potential threat to China's security. Nonetheless, they continue to seek a stable relationship with the United States, one that is conducive to China's achievement of its broader domestic and international objectives. Chinese leaders continue to discuss establishing a "new pattern of major-country interaction" with the United States,⁵⁸ and the two countries have managed to maintain cooperation on some issues and avoid stumbling into conflict in the past decade, but competition for influence in the region increasingly dominates the U.S.–China relationship.

Taiwan seemed like an unlikely flash point for many years, owing to the relatively stable relationship the island enjoyed with China under President Ma Ying-jeou, but the cross-strait rapprochement stagnated under his successor because China could not persuade Taiwan to move toward unification. By 2025, the cross-strait relationship has become increasingly icy, and a conflict seems like a much less remote possibility. China was extremely suspicious of the winner of Taiwan's 2025 presidential election. Beijing viewed Taiwan's new leadership as determined to stall further progress in the cross-strait relationship. Under these much less favorable circumstances, Taiwan's objectives included maintaining its *de facto* autonomy in the face of growing Chinese pressure to participate in talks on political issues, maintaining some level of international participation even as China tries to limit its profile, and reducing its economic dependence on China by continuing to diversify its trade relations with other countries in the region.

China and Japan have continued to struggle over the disputed Senkaku/Diaoyu Islands for more than a decade. China–Japan relations continued to deteriorate, and, as a result of domestic political pressures in both countries, a mutually acceptable resolution appeared increasingly unlikely. Japan continued to shift the focus of its security policy toward China and devoting greater attention to the defense of disputed territories. Over the years, the Senkaku/Diaoyu Islands dis-

⁵⁸ Jiechi, 2013.

pute evolved into a broader and deeper regional security rivalry between Japan and China. Japan continues to rely heavily on the United States to guarantee its security, but it has also deployed conventional ballistic and cruise missiles as a deterrent, a move that has had some unintended consequences, most notably by contributing to further tension in Japan's already strained diplomatic and security relationship with South Korea.

Other countries in the region remain wary of the instability that would likely result from greater friction between the United States and China. The importance of their economic ties with China is impossible to ignore, but the countries continue to value the role the United States plays in maintaining regional security and stability, especially given China's growing military power and its increasingly assertive actions in defense of its maritime territorial claims. Consequently, leaders in these countries continue to prioritize maintaining good relations with Beijing and Washington, and they want to avoid being put in a position that would force them to choose between China and the United States, although many recognize that this is becoming an increasingly difficult balancing act because of growing competition between the two countries.

Path to War

Although a conflict over Taiwan seemed like a remote possibility given the warming of cross-strait ties under President Ma Ying-jeou's leadership from 2008 to 2016, the cross-strait relationship deteriorated under his successor. As Taiwan's 2025 presidential election approaches, the relationship takes a dramatic turn for the worse, plunging the region into the most serious crisis since China's 1995–1996 military exercises and missile tests.

The crisis begins when China issues a blunt warning to voters in Taiwan that they should “not choose a candidate who opposes the reunification of China, lest they make a choice they will soon regret.” China's bullying statement leads to massive demonstrations in Taipei and several other cities in Taiwan. The candidate Beijing strongly opposes ultimately wins the closely contested election and, in his victory speech, states that he would never do anything that would under-

mine Taiwan's sovereignty or put it on a path toward unification on Beijing's terms. He promises stronger action to protect Taiwan's de facto autonomy and enhance the island's international profile.

China responds by stating that Taiwan's new leader should understand that discussions about achieving national reunification must not wait indefinitely. Chinese leaders call for immediate talks on political issues, but the newly elected president of Taiwan rejects Beijing's demands.

Chinese leaders decide to conduct large-scale military exercises to underscore their resolve and coerce Taiwan into participating in political talks, but Taiwan's new leadership again refuses to agree to participate in political negotiations.

Facing slowing economic growth and rising domestic unrest at home, Chinese leaders conclude that they cannot afford to appear weak on Taiwan. Because they still doubt the PLA's ability to successfully conduct an amphibious invasion, and because they calculate that a more limited application of military force will be sufficient to achieve their policy objectives without causing long-term damage to China's broader economic and diplomatic interests, Chinese leaders order the PLA to prepare to conduct a blockade of Taiwan. The United States detects the preparations and threatens to intervene on Taiwan's behalf, but U.S. statements and movements of forces fail to deter Beijing. When Taiwan refuses a final ultimatum to negotiate on China's terms, China begins conducting a joint blockade campaign against Taiwan on D+0. For China, a joint blockade campaign is much more than a traditional naval blockade. It also involves kinetic and nonkinetic strikes against a wide range of targets. These attacks, which include air strikes and ballistic- and cruise-missile strikes, cyberattacks, and EW, are intended to rapidly destroy the ability of Taiwan's military to counter the Chinese blockade.

Chinese military planners believe that the PLA must gain information, air, and sea dominance to successfully execute the blockade campaign. Accordingly, China's initial activities include joint fire-power strikes against Taiwan. Targets include C2 centers, communication facilities, ports and naval bases, shore-based missiles, airfields, air defense, early warning, and C4ISR capabilities. Beijing seeks to destroy

Taiwan counterblockade and defense forces so that it can successfully establish and maintain the blockade. China also launches computer network attacks against Taiwan's military and government computer systems. In addition, the PLA is prepared to conduct strategic defense of the mainland, including strategic air defense, in case deterrence fails and the United States intervenes by launching air and cruise-missile strikes against China.

Taiwan's leaders urgently appeal for humanitarian aid and call for U.S. military intervention in accordance with the TRA. Moreover, although China's initial wave of ballistic- and cruise-missile attacks seriously degrade Taiwan's air and naval capabilities, Taiwan still manages to respond by sinking several Chinese surface ships with mobile ASCMs and launching a computer network attack against PLA C2 and air-defense systems. Taiwan also launches conventional precision strikes against mainland air and naval bases with its relatively small arsenal of LACMs. Immediately following the strikes, Taiwan's new president states publicly that they are a justified response to Chinese ballistic- and cruise-missile attacks against Taiwan. He states that the cruise-missile strikes demonstrated to Chinese leaders that the island would "fight to the end and that Taiwan's people will never give up their freedom and democracy." Political commentators in Taiwan indicate that the attacks were probably also intended to bolster morale in Taiwan and to show the United States that Taiwan remains in the fight and will not easily buckle under the pressure of Chinese military action.

For their part, Chinese leaders expect U.S. intervention, but they calculate that limiting a direct military conflict with the United States might still be possible by refraining from kinetic actions against U.S. forces and sending carefully calibrated deterrent signals. Accordingly, China does not launch any kinetic strikes against U.S. forces in the region when China starts attacking Taiwan on D+0. At the same time that it begins carrying out the joint blockade campaign, however, China launches cyberattacks against U.S. military targets. Specifically, Beijing conducts computer network attacks against U.S. military logistics systems to try to delay the U.S. response to the crisis. In addition, China publicizes some deterrent actions, such as the deployment of

conventional MRBMs and DF-21D ASBMs to field sites, which seem to be intended as warnings to the United States.

Despite Chinese attempts to deter U.S. military intervention, on D+1, the president of the United States declares that the United States will intervene militarily to break the blockade. The United States begins organizing convoys to bring supplies to Taiwan. When China attacks the first convoy as it approaches Taiwan on D+2, U.S. SSNs respond by sinking two Chinese guided-missile frigates (FFGs) and a Chinese DDG. As soon as news of the escalating confrontation starts spreading on the Internet, tens of thousands of Chinese people take to the streets in Beijing, Shanghai, and other major cities to protest against U.S. military intervention. Within hours, China responds by sinking two U.S. DDGs with submarine-launched ASCMs.

Also on D+2, China releases a video of a reporter interviewing a senior PLA officer discussing China's long-range conventional strike capabilities. The senior officer states,

Unlike in the past, we now have the capability to respond in kind if the United States continues to strike us with conventional air raids and missile attacks. Today, the PLA has mobile launchers, bombers, submarines, and surface ships all armed with land-attack cruise missiles, and we have numerous conventional ballistic missiles. We can reach targets as far as Guam with large numbers of conventional weapons, and we even have the ability to strike targets as far away as Hawaii and Alaska with ease. We are also developing hypersonic glide vehicles to improve our nuclear deterrent and our long-range conventional strike capability, and even though they have not yet entered service formally, we could still use them operationally in an emergency.

Undeterred, and convinced that it must attack the Chinese kill chain as quickly as possible, the United States begins unleashing a series of conventional strikes against Chinese mainland targets, including space- and C4ISR-related facilities, some of which are deep in Chinese territory.

The following day (D+3), in a move that China portrays as a direct response to the U.S. strikes against Chinese territory, China

strikes U.S. facilities in Okinawa and Andersen AFB on Guam. China strikes Okinawa with conventional ballistic and cruise missiles and air attacks, while it targets Guam with cruise missiles launched by PLAAF bombers, PLASAF conventional IRBMs, and LACMs launched by Chinese Luyang III destroyers and Type 095 SSGNs.⁵⁹

By D+4, the conflict seems to be on the verge of further escalation. Some observers perceive continuing large-scale deep strikes by the United States as increasing the danger of nuclear escalation because of the threat those strikes pose to strategic targets in China. Later that day, Chinese analysts detect what they believe to be elevated readiness of U.S. conventional prompt global strike (CPGS) capabilities. They interpret this as an implicit threat to strike Chinese nuclear forces, potentially leaving China vulnerable to U.S. “nuclear blackmail,” as one Chinese analyst puts it in comments widely quoted in international media. At a Ministry of National Defense press conference later that day, when a Chinese reporter asks whether China’s NFU policy is still in effect, the ministry spokesperson replies, “China continues to support the policy of NFU, but no one should think that this means that China will stand by idly if the United States attacks Chinese nuclear forces with its conventional long-range strike capabilities.”

The United States’ Conflict Objectives

The United States seeks to break the Chinese blockade of Taiwan. U.S. leaders have stated that the United States continues to hold that the resolution of the China-Taiwan dispute must be peaceful and that it intends to ensure that the people of Taiwan will not be coerced into unification by force. U.S. leaders have stated that their intent is to protect Taiwan’s people and to ensure their security, prosperity, and democracy. Furthermore, Washington has stated that its fundamental policy toward China and Taiwan has not changed and that any long-term solution is acceptable so long as it is arrived at peacefully and with the consent of the people of Taiwan. The United States also aims to restore security and stability to the region as quickly as possible; it

⁵⁹ The PLAN’s ability to launch long-range conventional strikes against land targets is one of several changes that distinguish this scenario from the 2015 conflict scenario described above.

wishes to avoid a large-scale conflict with China and to limit escalation. In addition, the United States aims to preserve its alliance relationships and maintain its influence in Asia.

China's Conflict Objectives

Beijing's objective is to coerce Taiwan into participating in unification talks on Chinese terms. Chinese leaders have stated that Taiwan must agree to participate in such talks immediately and that the negotiations must take place on the basis of the One China principle. China has indicated that the specific format of unification is an appropriate subject for cross-strait negotiations and that it is willing to offer what it describes as "flexible terms" to Taiwan once it has agreed to participate in the talks. China wishes to avoid a major conflict with the United States if possible but accepts that its blockade of Taiwan risks triggering war with the United States and possibly with other U.S. allies. China plans to use diplomatic and economic pressure along with military threats to influence U.S. allies and partners so that they will refuse to support the United States, or at least limit the support they are willing to offer to Washington. In addition, China seeks to increase its overall influence in the region as a result of its successful unification with Taiwan.

Taiwan's objective is to restore something that resembles the status quo that prevailed prior to the Chinese implementation of the blockade. Leaders in Taiwan have indicated that their paramount objective is to guarantee Taiwan's security, freedom, and prosperity. Leaders in Taiwan have stated clearly that they will not negotiate with China under military pressure. At the same time, however, they have indicated that they remain open to rebuilding the cross-strait relationship once China has ceased all hostilities against Taiwan.

Other Parties' Conflict Objectives

As for many other countries in the region, their leaders have stated publicly and privately that they do not wish to be drawn directly into the conflict. Some countries have indicated their willingness to support the United States, such as by permitting basing of noncombat aircraft on their territory, but others have told Washington that they are unwilling to put their countries at risk of Chinese attack or even to

be put in a position that could result in a dramatic worsening of their economic relationships with China.

Conduct of the War

This section describes the conduct of the war in the 2025 Taiwan blockade scenario.

Changes Since 2015

This section briefly outlines changes in Chinese and U.S. military capabilities that distinguish the 2025 scenario that follows from the 2015 scenario that was presented above. It covers qualitative and quantitative improvements in Red and Blue capabilities, as well as any posited decreases in capability over the intervening period of time (due to budget constraints, for example).

The most-notable improvements in Chinese capabilities include the addition of conventional IRBMs, increased inventories of SRBMs and MRBMs, operational carrier aviation capabilities, fifth-generation stealth fighters, S-400 SAMs (NATO designation SA-21 Growler), and improvements in C4ISR systems. China has also upgraded its space capabilities to give them farther-ranging and more-robust ISR and communication coverage in the western Pacific and deployed some counterspace systems. In addition, Beijing has further strengthened the credibility of its nuclear deterrent with the deployment of DF-41 road-mobile ICBMs capable of carrying multiple independent reentry vehicles (MIRVs), and it is believed to be close to fielding an ICBM-launched hypersonic glide vehicle that could be used as a nuclear delivery system or in a CPGS role.

The United States has faced budget challenges, but it has not been standing still. Key improvements in U.S. military capabilities include enhanced offensive cyberwarfare capabilities and the long-range anti-ship missile (LRASM), which has improved U.S. ASuW capabilities. The F-35 has been fielded. Carriers now embark limited numbers of unmanned combat aircraft, and small numbers of land-based stealth long-range unmanned aircraft systems (UASs) are available for strike and ISR. In addition, the United States has started to deploy CPGS capabilities in limited numbers.

China's Anti-Access and Area-Denial Concept of Operations

China's CONOPS are relatively unchanged from 2015. Its joint blockade campaign against Taiwan includes a tremendous number of kinetic strikes against key targets on the island in an attempt to destroy Taiwan's military capability to resist. Its central answer to U.S. military intervention is an anti-air raid campaign designed to repel any U.S. air strikes against forces participating in the main campaign or against important mainland military, political, or economic targets.

The United States' Force-Projection Concept of Operations

The U.S. CONOPS is also unchanged from 2015. It will focus on early, aggressive elimination of China's ability to target U.S. (and remaining Taiwanese) forces. Key targets are those assets that enable China to find and target U.S. naval forces—the radars and communication networks in particular—and the defenses that protect them. Chinese ships and aircraft currently executing the blockade are also high priorities. The intent is that, once China realizes that the campaign against Taiwan cannot succeed and that the United States is poised to do ongoing damage to its military, it will abandon hostilities.

Chinese Assessment of Anti-Access and Area Denial Versus U.S. Force Projection

Chinese Anti-Access and Area Denial Versus U.S. Strike Aircraft:
Setup

Just like in 2015, the role of U.S. strike aircraft is to destroy Chinese military targets that are directly engaged in enforcing a blockade of Taiwan and those seeking to prevent U.S. forces from effective operation in the waters of the Taiwan Strait, the ECS, and parts of the western Pacific. U.S. ROE in the posited scenario permit strikes against Mainland targets, including the following:

- the airfields from which PLAAF and PLANAF operate
- ports that directly support PLAN operations
- conventional ballistic-missile and GLCM units that threaten U.S. fixed assets and surface ships
- SAMs that threaten U.S. strike, air superiority, and special-mission aircraft

- assets supporting the PLA's ability to target U.S. satellites with its offensive space control capabilities
- PLAN surface ships
- C4ISR assets, such as C2 networks and radar, that support the Chinese ability to target U.S. forces and execute the blockade.

The United States has some strike assets available to it that were not available in 2015: All variants of the F-35 are in field, and it has limited numbers of long-range stealthy UASs. Although the United States has some forward-positioned forces, significant numbers of aircraft must be brought to theater after the start of hostilities.

In 2025, the PLA's most capable land-based SAM is a variant of the S-400. China began to purchase this advanced system from Russia in 2015. It has a range of 400 km, allowing China to cover all of Taiwan. China's IAD system (IADS) also features a modified version of the HQ-9 with an extended range of 250 km. Integration of supporting radars has tightened and become more robust against attack, especially in the area around Taiwan. The larger number of radars with greater range and fidelity has eroded, though not removed, the advantage that low-observable characteristics accord to U.S. aircraft, such as F-35, F-22, and B-2. Afloat, the PLAN has 20 Luyang II-class and Luyang III-class destroyers that carry 48 HHQ-9 SAMs (the naval variant of the aforementioned HQ-9) in vertical-launch tubes, as well as 40 or so frigates that carry 36 of the missiles each.⁶⁰ This represents the most potent ship-to-air threat in China's arsenal. Also of note are the service's two Luzhou-class destroyers that carry 36 SA-N-20 SAMs each and have a range of 75 km.⁶¹

Like in 2015, U.S. strike aircraft in 2025 face a heightened threat from AAMs launched from PLAAF and PLAN fighters. However, in 2025, a substantial number of the frontline fighters seeking to maintain air superiority over Taiwan are stealthy fifth-generation J-20 and J-31 fighters. Since 2015, new deployment airfields have been built adjacent to Taiwan in China's Nanjing Military Region, and China

⁶⁰ "Luyang-II," 2014.

⁶¹ "Luzhou Class," 2013.

could muster 1,000 combat aircraft and 30 air regiments during a conflict, such as this blockade scenario. These aircraft are further bolstered by many dozens of aerial refueling aircraft, which extend both range and loiter time for China's fighters.

The most lethal PLA AAM is the China-developed PL-21 with ranges of more than 100 km.⁶² The PLA fighters launching these missiles will be aided by AEW&C aircraft, such as the KJ-2000 and KJ-200, which, in turn, could be integrated into China's larger C4ISR picture. That C4ISR picture draws on an OTH radar that potentially ranges to 3,000 km, covering a substantial portion of the Philippine Sea; other surface radars; and space-based assets.⁶³

In sum, China's IADs and proximity to Taiwan in 2025 make it extremely difficult for U.S. strike aircraft to fly over or near Taiwan and the mainland. Figure 2.5 illustrates the ranges of some PLA SAMs relative to the Taiwan Strait for this scenario.

Chinese Anti-Access and Area Denial Versus U.S. Strike Aircraft: Outcome

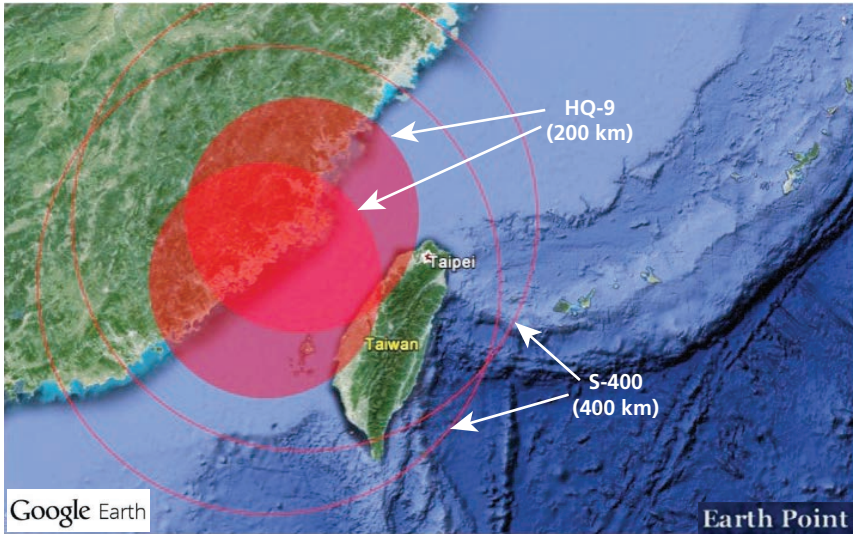
U.S. long-range strike aircraft, such as the B-1B, B-2, and B-52, begin to launch standoff attacks against key Chinese targets, such as ISR, airfields, ports, and C2 nodes nearest to Taiwan. The 1,000- to 1,100-km ranges of U.S. ALCMs, the AGM-158 (launched from the B-1B and B-2), and the AGM-86 (launched from the B-52), are long enough to reach Chinese airbases and ports adjacent to the Taiwan Strait from the relative safety of launch points over the Philippine Sea. These strikes are intended first and foremost to degrade China's situational awareness and capacity to target U.S. forces, and then secondly to impede China's ability to maintain air and sea superiority in and adjacent to the Taiwan Strait.

Simultaneously with U.S. efforts to destroy PLA strategic ISR assets and infrastructure prosecuting the blockade, U.S. Navy carrier-based F-35C fighters and Air Force B-52 bombers firing AGM-84 or AGM-158 maritime interdiction variants (also known as LRASMs)

⁶² "PL-12," 2013.

⁶³ Project 2049 report (Stokes, 2009, p. 18) mentioned in *Taiwan Matters to America*, 2009.

Figure 2.5
Ranges of Select Chinese Surface-to-Air Missiles Relative to the Taiwan Strait, 2025



SOURCE: Google Earth.

NOTE: Missile-launcher locations are illustrative.

RAND RR1359/1-2.5

first focus on attacking PLAN surface ships that pose a significant air-defense threat.⁶⁴ In 2025, this takes significant time; as noted earlier, the PLAN's SAM threat has grown substantially with further modern surface ships added to its fleet. Once this immediate threat has been tolerably abated, secondary targets for U.S. naval strike aircraft then coalesce around sinking remaining PLAN surface ships that are preventing sea access to Taiwan's ports.

Like in 2015, the United States generally succeeds against high-priority fixed targets and can substantially reduce China's long-range ISR. In other areas, however, progress is slower and more dearly won. Even more so than in 2015, aircraft survivability is at a premium for U.S. forces. The United States' capability and capacity to conduct

⁶⁴ "AGM-84 Harpoon," 2013; "AGM-158 JASSM," *Jane's Strategic Weapons Systems*, March 27, 2014.

standoff strikes have not greatly improved, so some penetration of Chinese air defenses is required. Mostly because of increased integration and the addition of the S-400, Chinese air-defense capabilities since 2015 have significantly improved capabilities and ranges, including against stealthy aircraft. Limited numbers of survivable aircraft and supporting EW assets must shoulder the load both of penetration and of creating pockets of air superiority from which to fire ALCMs. In effect, targets have increased, but the numbers of platforms that can attack many of those targets have decreased and are reduced in number still further because of Chinese attacks on U.S. airbases and carriers (covered in the discussions of fixed and surface assets). U.S. air-war planners must move more deliberately through the target list, focusing on C2 and ISR (and supporting air defenses), while other targets (such as air and naval bases) are left largely alone. Three B-2s are downed, and F-22s and F-35s suffer losses both to IADS and to Chinese aircraft, which outnumber them significantly. In addition, five B-1B and nine B-52 bombers are also lost while prosecuting such attacks.

Chinese Anti-Access and Area Denial Versus U.S. Fixed Assets: Setup

The fixed assets that support U.S. power projection are unchanged in type and role from 2015. The United States needs regional airbases to achieve its campaign objectives. If China can deny use of forward locations in Okinawa, Japan, as well as somewhat more-distant basing locations on Japan proper and Guam, its prospects for victory are hugely improved. The further removed from the Taiwan Strait U.S. aircraft must operate, the fewer strike sorties they can generate and the less able the U.S. force will be to create and sustain air superiority.

Although it imposes real challenges, the effect of Chinese strikes on U.S. naval bases is somewhat less severe for U.S. naval assets because various at-sea replenishment ships allow numerous naval SAGs the ability to operate for extended periods at distance. Furthermore, U.S. nuclear-powered vessels—specifically, attack submarines and aircraft carriers—allow the U.S. Navy to be somewhat less tethered to its ports (although submarines must return to port to rearm). As a result, the PLA's campaign to degrade or destroy U.S. regional airbases is an

extremely high priority; strikes against U.S. regional naval bases are also important but less so.

Beyond U.S. airfields and ports, numerous supporting facilities, such as logistics hubs and C2 centers, are forward located in the region. These also provide tempting targets for Chinese strikes. China's chief threat to U.S. regional airbases, ports, and other support facilities in the western Pacific derives from its large and growing fleet of land-based ballistic and cruise missiles, as well as its ALCMs. Significant increases in the inventories of these missiles since 2015 heighten the risks to U.S. bases within their respective ranges. Inventories have more than kept pace with increased missile-defense capacity. Capabilities have also improved: In 2025, Guam is now vulnerable to strikes from sea-based and land-based systems. From the sea, China's newest SSGN, the Type 095 class, can use its complement of submarine-launched cruise missiles (SLCMs) to attack targets on the island.⁶⁵ From the mainland, the PLASAF has fielded a conventional IRBM that can cover the roughly 3,000-km distance to strike targets on U.S. territory with precision.⁶⁶ Both of these capabilities significantly extend China's A2AD perimeter.

U.S. and Japanese missile-defense capacity has increased somewhat. Because, in large part, of continued Japanese investment, more Aegis ships in the region are capable of ballistic-missile defense (BMD). THAAD provides protection at Guam, but other bases continue to rely on Patriot. Table 2.3 lists missiles and launchers considered in this scenario and their respective ranges, and Figure 2.6 depicts their ranges relative to the Taiwan Strait.

Chinese Anti-Access and Area Denial Versus U.S. Fixed Assets: Outcome

Relatively shortly after U.S. submarines sink PLAN surface ships and the United States begins striking mainland targets, China begins a joint firepower strike to destroy or degrade the ability of U.S. bases to generate sorties or support surface ships. Because sustaining air superi-

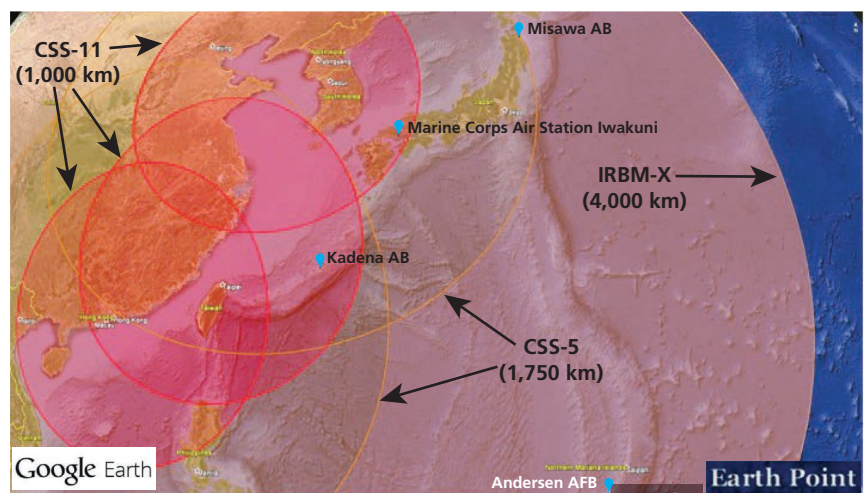
⁶⁵ O'Rourke, 2014.

⁶⁶ Office of the Secretary of Defense, 2013.

Table 2.3
The Chinese Ballistic- and Cruise-Missile Threat to U.S. Bases, 2025

Chinese Name	NATO Designation	Type of Missile	Total Range, in Kilometers	Missiles	Launchers
DF-16	CSS-11	MRBM	1,000	~125	60
DF-21	CSS-5	MRBM	1,750	~225	90
YJ-63	—	ALCM	200	Unknown	20 (H-6H)
CJ-10/DH-10	—	LACM	1,500–2,000	400–600	54
		ALCM	3,300–3,800	Unknown	36 (H-6K)
U/I	—	IRBM	4,000	75	25
		SLCM	2,000	~36	3 (SSGN)

Figure 2.6
Ranges of Select Chinese Ballistic Missiles Relative to the Taiwan Strait, 2025



SOURCE: Google Earth.
NOTE: Missile-launcher locations are illustrative.
RAND RR1359/1-2.6

ority is a necessary condition of successfully executing the blockade of Taiwan, suppressing U.S. airbases’ sortie generation is one of the PLA’s

highest campaign priorities. Unlike in 2015, when, largely because of inventory constraints, China focused solely on U.S. airbases on Okinawa (Kadena AB and Marine Corps Air Station Futenma), it now expands to attack other bases in Japan, including Marine Corps Air Station Iwakuni, U.S. Fleet Activities Sasebo, and U.S. Fleet Activities Yokosuka. China's new conventional IRBMs also attack the U.S. territory of Guam.

China is also more effective with its inventory than it was in 2015. This is partly due to improved ISR.

Even though China's ISR is somewhat degraded by early strikes against its OTH, space-based assets, as well as networked tactical assets, can provide useful situational awareness throughout the conflict. China is, for the most part, able to target airbase strikes only at those runways and other facilities that it knows need to be reattacked. Chinese missile attacks are also more-sophisticated, highly coordinated efforts designed to overwhelm missile defenses. China can shut down air operations from the bases mentioned earlier on Okinawa and the Japanese home islands for a period of 13 days. Sporadic attacks continue after that point.

In 2025, PLA IRBMs and SLCMs also threaten Guam. Air operations at Andersen AFB are severely degraded through D+5, and lingering effects are felt in the ensuing three weeks.

Chinese Anti-Access and Area Denial Versus U.S. Surface Ships: Setup
Like in 2015, for the United States to achieve its conflict objectives, it must break the Chinese blockade of Taiwan. For China to achieve its goals, the PLA must maintain the blockade. Beijing needs to cut off Taiwan's connections with the outside world for an amount of time sufficient to generate enough bargaining leverage for it to compel Taipei to accept its demands. China's military must be prepared to counter expected U.S. military intervention, and this requires it to employ A2AD capabilities against U.S. surface ships that will be involved in U.S. attempts to disrupt the blockade or carry out other military actions against China. By 2025, China has significantly strengthened

the PLAN's counterintervention capabilities, enabling China to hold U.S. assets at risk further into the Philippine Sea and SCS.⁶⁷

The ASuW capabilities China can bring to bear against U.S. surface ships include PLAN surface ships and submarines, PLANAF aircraft capable of launching ASCMs, and PLASAF land-based ASBMs.⁶⁸ Semi-autonomous UUVs can now perform an ISR role hundreds of nautical miles from the Chinese coast and even lay mines.⁶⁹ In addition, the PLAN has been continuing to enhance its logistics capabilities, and it has made important strides in other areas, such as C4ISR systems, education, training, and exercises. Even by 2025, ASW remains an important area of weakness for the PLAN. Nonetheless, the PLAN poses an increasingly serious threat to Taiwan, and it has emerged as a major element of China's ability to deter U.S. military intervention or, if deterrence fails, to counter U.S. military intervention by delaying the arrival of U.S. forces and reducing the effectiveness of their operations.⁷⁰

The PLAN has continued to improve since 2015, fielding increasing numbers of its most-sophisticated ships. As mentioned above, it now has 20 domestically produced Luyang II and Luyang III DDGs, which feature phased-array radar systems and can launch ASCMs and LACMs.

In addition, China commissioned its first aircraft carrier, *Liaoning*, in September 2012. It is a refurbished aircraft carrier that China acquired from Ukraine in the late 1990s. It is conventionally powered and has a ski-ramp configuration that limits the range and payload of its fixed-wing aircraft. It is capable of accommodating roughly 30 aircraft, including fixed-wing aircraft and helicopters. It embarked

⁶⁷ Karotkin, 2014.

⁶⁸ O'Rourke, 2013.

⁶⁹ On UUVs, see Goldstein and Knight, 2010, pp. 30–35. On mines, see Truver, 2012.

⁷⁰ The PLAN is expected to contribute to other missions, including enforcing China's territorial claims in the ECS and SCS; challenging foreign military activities in its EEZ; protecting Chinese SLOCs; participating in noncombatant evacuation, antipiracy, and HADR operations; promoting China's regional security interests; and bolstering China's status as an emerging world power more generally. See O'Rourke, 2013.

an operational air wing in 2016.⁷¹ By 2025, China has deployed two more-capable indigenously developed aircraft carriers, and at least two more are reportedly under construction. China's carrier aviation capabilities are much less sophisticated than those of the United States in many respects, but they are more than enough to intimidate many of China's neighbors in the region.

In 2015, the PLAN lacked the amphibious capability required to invade Taiwan.⁷² By 2025, China's amphibious capabilities have improved, but an invasion of Taiwan would still be a very risky proposition, and a failed invasion attempt could be catastrophic politically.

China also has a growing number of modern submarines. By 2025, these more-modern submarines have replaced China's older, less capable submarines. The modernization of China's submarine force has continued to focus on qualitative improvements. The fleet is capable of longer SCS patrols and thus of greater presence in the contested waters. It is also harder to detect, and there is a greater profusion of cruise missile–launching capability.

In addition, in 2025, five Type 094 SSBNs are now operational with the PLAN. They have been conducting deterrence patrols since 2015. Each Type 094 can carry 12 JL-2 nuclear-armed SLBMs. The anticipated next-generation Type 096 SSBN has not yet entered service.⁷³

The land-based aircraft of the PLAAF and PLANAF also represent a potent A2AD threat against U.S. surface ships. Modern aircraft in China's inventory include Russian-made Su-27s and Su-30s; indigenously produced J-10s and J-11s; and stealthy, fifth-generation J-20s and J-31s. At least some of China's strike fighters are armed with modern ASCMs. China's land-based naval aircraft inventory also includes ASCM-armed JH-7 fighter-bombers and older, but potentially threatening, ASCM-armed land-based bombers.⁷⁴

⁷¹ On Chinese carriers and carrier-based aircraft developments, see O'Rourke, 2014, pp. 15–21.

⁷² Office of the Secretary of Defense, 2013, pp. 57–58.

⁷³ Office of the Secretary of Defense, 2013, pp. 6–7.

⁷⁴ O'Rourke, 2014, p. 32.

The ASCMs themselves are also more lethal, with greater range and precision. The YJ-12 supersonic missile has been fielded in large numbers.⁷⁵ It has a range of approximately 400 km. In addition, China has a wide range of mine-warfare capabilities. By 2025, these include not only a variety of moored, bottom-drifting, rocket-propelled, and intelligent mines but also advanced capabilities, such as extended-range propelled-warhead mines, antihelicopter mines, and bottom-influence mines equipped to counter minesweeping efforts.⁷⁶

By 2025, the PLAN also has a substantial land-attack capability, with three aircraft carriers (the refurbished carrier that entered service more than a decade earlier and two indigenously produced carriers that entered service more recently) and some destroyers and submarines capable of launching LACMs.

Furthermore, the PLASAF fields DF-21 ASBMs capable of targeting U.S. aircraft carriers. China's inventory of ASBMs has increased since 2015, when only a relatively small number were deployed to PLASAF units. Approximately 90 launchers can carry DF-21 variants, triple the 2015 total. The 2025 variants of the DF-21 have a range of about 2,500 km.⁷⁷ Table 2.4 lists the capabilities explored in this scenario and the percentage of each capability that is of modern design.

As in 2015, the U.S. Navy brings the great majority of the Pacific fleet to bear. Flow of assets based elsewhere begins on D-day. About 40 destroyers and cruisers are in and around the western Pacific by D+10, along with 20 SSNs. Three CVNs are in theater by D+10 and four by D+20.

Chinese Anti-Access and Area Denial Versus U.S. Surface Ships: Outcome

As noted above, on D+2, the United States begins trying to break the blockade, with U.S. SSNs sinking several PLAN surface ships after

⁷⁵ Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2014*, Washington, D.C., c. 2014, p. 40.

⁷⁶ Erickson, Goldstein, and Murray, 2009.

⁷⁷ See Erickson, 2010; Office of the Secretary of Defense, 2013, p. 5; and NASIC, 2013.

Table 2.4
Selected Chinese Naval Capabilities, 2025

Type	Number	Percentage That Are of Modern Design
Aircraft carrier	3 (including 2 domestically produced)	—
Destroyer	34	85 (<i>modern</i> defined as multimission or extensively upgraded)
Frigate	58	85 (<i>modern</i> defined as multimission or extensively upgraded)
Corvette	30	—
Amphibious ship	55	—
Missile-armed coastal patrol craft	85	—
Diesel submarine	64	75 (<i>modern</i> defined as capable of firing ASCMs)
SSN and SSGN	9	100 (<i>modern</i> defined as capable of firing ASCMs)
Nuclear-powered SSBN	5	—

SOURCE: Estimates based in part on 2020 estimates contained in O'Rourke, 2013, p. 45.

China attacks a U.S.-organized convoy. Later on D+2, China responds with long-range ASCM strikes that sink two U.S. DDGs.

Chinese ASCMs pose a tremendous challenge, particularly those launched by aircraft and submarines. China's preferred CONOPS from the air is to employ a massed attack of a dozen or more strike aircraft approaching U.S. SAGs and CSGs from multiple angles. The ASCMs can be launched from beyond the ships' ability to engage the incoming aircraft. This threat is, in part, enabled by Chinese success against U.S. airbases: This has limited the aircraft available to the United States to contest air superiority and has diverted some carrier-based aircraft away from ship defense.

The PLAN's long-range ASCMs inflict a heavy toll on U.S. surface ships, sinking two additional DDGs and three FFGs between D+6 and D+8. Drawn closer to the mainland by the need to generate strike sorties, a CSG suffers a massed air-launched ASCM attack on D+9. The carrier is put out of action, with a large number of casualties.

U.S. attacks on Chinese C4ISR somewhat mitigate China's ASBM threat, but, on D+10, China still manages to locate a U.S. aircraft carrier and heavily damages it with an ASBM.

The United States has some important successes. On D+3, the United States sinks several Chinese surface ships with LRASMs launched by U.S. Air Force bombers. For the next several days, even though the United States faces serious challenges in the form of Chinese ASuW capabilities, the undersea environment is one in which U.S. submarines can operate with devastating effect against Chinese surface ships. U.S. SSNs continue to sink Chinese surface ships at a rate that alarms Chinese military leaders.

On D+11, Chinese ASCMs even more severely damage another U.S. aircraft carrier, causing a large number of casualties. The attacks against the carriers lead to widespread outrage in the United States. One op-ed by a U.S. congressional representative in a major U.S. newspaper even compares the strikes against the carriers to the Japanese attack on Pearl Harbor and demands that the president threaten to retaliate with nuclear weapons if China attacks another U.S. aircraft carrier. On D+12, China observes movements of U.S. bombers to Guam. Beijing links the deployment to the op-ed and misinterprets the action as an implicit threat of nuclear escalation. This incident is one of several that highlight the risks that the overlap between nuclear and conventional capabilities on both sides poses.

Although PLAN ASW capabilities have improved at least somewhat since 2015, U.S. SSNs still exact a heavy toll on Chinese surface ships. By the end of the conflict, the PLAN has lost a large number of its most-modern DDGs and FFGs to U.S. submarines. Combined with the PLAN's losses to air-launched ASCMs, this severely degrades the capabilities of the PLAN's surface fleet by the end of the campaign. Consequently, China cannot successfully execute its joint blockade campaign, and CCP leaders must seek a way out of the conflict that

allows them to preserve their domestic political position even though they have failed to compel Taiwan to accept unification on China's terms.

Chinese Space, Information Warfare, and C4ISR Versus U.S. Counter-C4ISR: Setup

Chinese military writings on space emphasize its importance in gaining and maintaining information superiority, which, in turn, is seen as key to seizing the initiative in a conflict with a technologically advanced adversary, such as the United States. Space is therefore seen as a potentially decisive arena in this conflict scenario, and China seeks to ensure its ability to operate freely in space while denying the same ability to the United States.⁷⁸ However, like in 2015, because of Taiwan's proximity to the mainland and the distances from which U.S. forces must operate, the PLA is much less dependent on space than the United States is in this scenario, even though China's own space-based capabilities have improved considerably in the past decade. In this scenario, China can still rely on land-based communications, UAVs, and other such capabilities to a much greater extent than the United States can, and this asymmetry in the level of dependence on space systems gives China a strong incentive to degrade or deny U.S. space systems even at the expense of U.S. retaliation in kind against Chinese satellites.⁷⁹ Even in 2025, PLA strategists calculate that China is better off if both sides essentially negate each other's space capabilities than if China allows the United States to continue using its space systems in hopes of encouraging U.S. restraint.

Nonetheless, PLA strategists discuss the potential advantages of some limits on conflict in space, such as refraining from attacks that generate large amounts of debris, which could damage other countries' satellites and potentially bring them into the conflict when they might otherwise choose to remain on the sidelines.

PLA strategists debate whether certain U.S. space systems, such as U.S. early-warning satellites, are essentially off limits because of the

⁷⁸ Pollpeter, 2012; Cheng, 2012.

⁷⁹ Gompert and Saunders, 2011.

potential escalation risks or whether they are potentially legitimate targets because they play tactical, as well as strategic, roles in supporting U.S. military operations. By 2025, however, China has launched its own missile early-warning satellites. This makes it possible for the two countries to reach an informal understanding that, in the event of a conflict, they should avoid attacks against space-based early-warning capabilities so as not to increase the risk of nuclear escalation. Yet it is unclear whether they will adhere to this understanding throughout the 2025 conflict over Taiwan.

The Chinese military's doctrinal writings also emphasize the importance of maintaining China's own C4ISR capabilities while denying the same to the adversary. Part of this involves such measures as camouflage, concealment, denial, and deception to protect PLA forces from detection and targeting by U.S. precision strike capabilities.

As for capabilities, China's space and counterspace capabilities have improved considerably since 2015. China has on orbit a range of satellites to support its military operations, including ISR, navigation and positioning, and communication satellites. China also has at its disposal a variety of counterspace capabilities. These include a wide range of soft-kill and hard-kill counterspace capabilities, such as kinetic-energy weapons (e.g., missiles), directed-energy weapons (e.g., laser, microwave), and systems capable of capturing, damaging, or destroying enemy equipment in space. Although Chinese officials are circumspect about discussing these capabilities in public, Chinese scholars and scientists have stated in unofficial settings that China has developed a wide range of capabilities, including direct-ascent and co-orbital ASATs.

Chinese Space, Information Warfare, and C4ISR Versus U.S. Counter-C4ISR: Outcome

Both countries refrain from attacks against space-based early-warning capabilities to avoid increasing the risk of nuclear escalation throughout the 2025 conflict over Taiwan. China and the United States also refrain from debris-generating counterspace actions, calculating that destruction of the other side's satellites would constitute a major escalation of the conflict and that resultant debris would pose a threat to

their own space systems, as well as those of other countries not involved in the conflict. Space control actions throughout the early phases of the conflict are limited to reversible measures, such as jamming. For example, the United States employs reversible means to degrade Chinese space-based ISR capabilities. However, on D+17, China escalates in space by employing a space robotic-arm capability to permanently disable a U.S. ISR satellite.⁸⁰ China conducts the attack without generating debris that could present a hazard to other space systems, but the United States nonetheless views the action as a major escalation because of its permanent effects against an important U.S. space capability.

The United States responds by launching additional air and cruise-missile strikes against Chinese ground-based space surveillance facilities and space launch facilities in China. The United States also escalates in space, shifting from employing only reversible effects to using offensive space control capabilities to create permanent effects against several Chinese ISR satellites. On D+18, China attempts to reconstitute some of the lost space-based ISR capability by using solid-fuel launchers designed for a rapid-response capability to place new satellites into orbit.⁸¹ Beijing also threatens to escalate to direct-ascent ASAT attacks if the United States takes any further actions against Chinese satellites or launches any further strikes against Chinese ground stations.

Conclusion of the War

By D+18, the war appears to rapidly escalating, not only because of the ASAT attacks but also as a result of targeting errors and miscommunication that create a growing sense of nuclear risks. What is seemingly the most dangerous incident takes place a few hours later, when U.S. long-range bomber and CPGS weapon strikes intended to degrade the

⁸⁰ Kevin Pollpeter, "China's Space Robotic Arm Programs," *Study of Innovation and Technology in China Bulletin Analysis*, University of California Institute on Global Conflict and Cooperation, October 2013.

⁸¹ "China's First Solid-Fuel Rocket to Debut Before 2016: Official," *SINA English*, March 2, 2013. According to Liang Xiaohong, deputy head of the China Academy of Launch Vehicle Technology, the Long March-11 rocket will be capable of launch on short notice. "The development of the Long March-11 will greatly improve China's capabilities to rapidly enter the space and meet the emergency launching demand in case of disasters and emergencies," Liang said.

ability of China's conventional missile force to continue striking U.S. airbases and surface ships inadvertently destroy a small number of China's nuclear-armed road-mobile MRBMs and IRBMs. This incident dramatically underscores the nuclear escalation risks that arise from the overlap between strategic and campaign-level capabilities. Indeed, China has been concerned about U.S. CPGS capabilities and possible conventional attacks against its nuclear forces since the first days of the conflict, and, in this case, it misinterprets the U.S. strikes as an initial attempt to degrade China's nuclear retaliatory capability. Consequently, China responds by placing the rest of its theater and strategic road-mobile nuclear missiles and SSBNs on what it publicly states is the "highest level of alert."

In addition to further enhancing the survivability of its nuclear deterrent by increasing the readiness of its land-based and sea-based nuclear forces, China uses official media to convey a series of warnings to the United States. Chinese television broadcasts a video of the PLASAF commander inspecting a missile brigade outfitted with DF-41 road-mobile ICBMs. The narrator describes the DF-41 as China's most advanced mobile nuclear ICBM and confirms that it is capable of carrying MIRVs. Additionally, in the video, the PLASAF commander states that the brigade has raised its alert level. He warns that China is "fully prepared to counter any attempts by the United States to coerce China with nuclear threats, and to retaliate rapidly and resolutely if ordered to do so by the Supreme Command."

Also in response to the U.S. conventional air and missile strikes, on D+20, PLAN Type 095 SSGNs and PLAAF long-range stealth bombers launch conventional LACM attacks against U.S. missile-defense radar sites in Alaska.⁸² A few hours later, a vice chair of China's Central Military Commission releases the following public statement:

China's increased nuclear alert levels and the PLA's conventional strikes against missile defense radars in Alaska are a direct response to U.S. attacks against our nuclear deterrent forces; our

⁸² For a reference to potential Chinese interest in developing such capabilities for the PLAAF, see Zhang Ming-ai, "China to Develop Long-Range Stealth Bombers," *China.org.cn*, October 24, 2013.

actions are intended to send a powerful warning to the United States.

In addition, he warns that the U.S. strikes have resulted in what he describes as “an adjustment to China’s no-first-use nuclear policy” and that any further conventional attacks against China’s nuclear-missile force will lead to “extremely serious consequences.” Another factor that makes the threat of escalation seem more credible is the difficulty China faces in sustaining the blockade because of the heavy losses its surface fleet has suffered at the hands of U.S. SSNs.

On D+21, with both sides increasingly concerned that the conflict might escalate to the nuclear level, leaders in Beijing and Washington agree to a cease-fire. China lifts what remains of its blockade, portraying the conflict as a victory domestically and highlighting its successful military operations against the United States. Following the announcement of the cease-fire, China’s top leader appears on official television and states,

The PLA’s heroic actions prevented what otherwise would have been a major Taiwan independence incident, and the sacrifices we made have laid the groundwork for the inevitable reunification of China. Moreover, by standing up to U.S. bullying, China has proven its status as a world power, second to none.

At the end of the conflict, all parties involved have suffered heavy losses, with a level of destruction of surface ships not seen since World War II in the Pacific, and Taiwan’s status remains unresolved. The U.S.–China relationship appears to have been gravely damaged, and many observers fear that the Taiwan Strait might again become a flash point as soon as Beijing calculates that its chances of compelling a resolution of the impasse on its terms have become more favorable.

Net Assessment

Although it was a formidable opponent in 2015, China is more capable in 2025. The fundamental character of the challenge it poses is the same: The conflict takes place within reach of its homeland-based A2AD umbrella. The elements that constitute that umbrella, however,

have improved. In particular, it has a deeper inventory of more-capable ballistic and cruise missiles and improved C4ISR to target those systems. Together, these things allow it to pose a greater, more sustained threat to U.S. airbases and capital surface ships.

China is also better able to control conflict escalation because it enhanced its ability to threaten the United States strategically (in space and through long-range conventional strike) without using nuclear weapons.

The United States can still exploit Chinese weakness in ASW and weather Chinese attacks on its airbases. Both of those factors combine to create unsustainable risk for Chinese surface forces, dooming the blockade. The resiliency of U.S. air forces also makes it possible, along with Navy cruise missiles, to strike targets critical to the Chinese campaign. Foremost among those are the C4ISR that allow it to find and target U.S. ships.

Like in 2015, it is important to note that this conflict could unfold in ways even more challenging and costly for the United States. China did not open the war with a dramatic, comprehensive surprise attack against U.S. forces in the region, something that it might plausibly conclude is wise. Nor did the escalatory path unfold to include large-scale counterspace warfare or the use of nuclear weapons. And the war ended when China still retained significant capability to sustain a threat to Taiwanese shipping, something it could conceivably draw out for a long period.

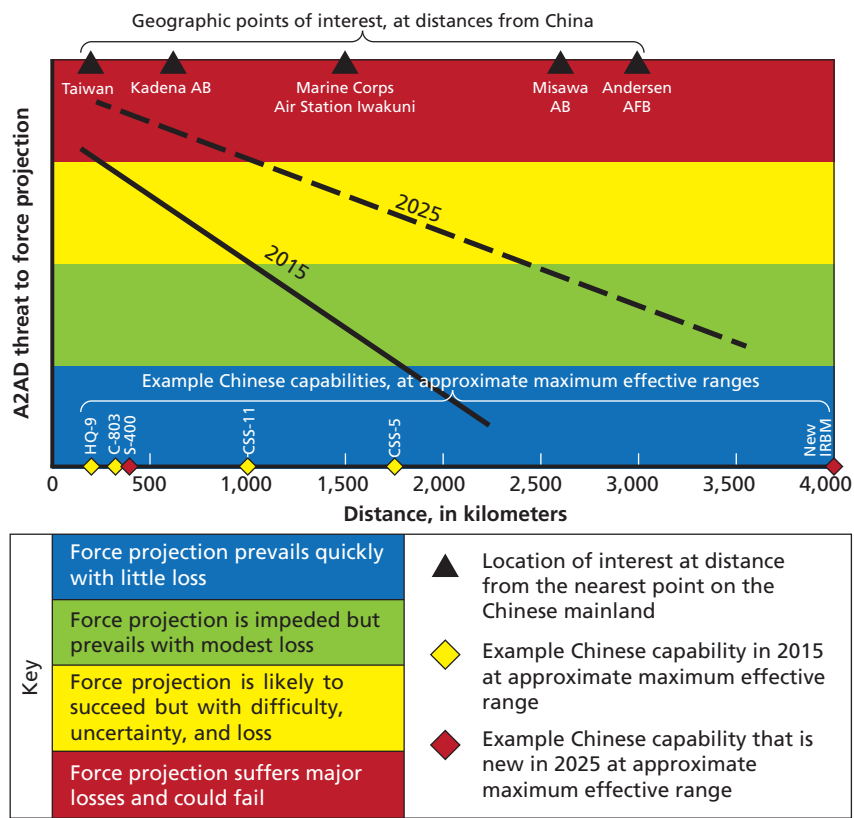
Figure 2.7 summarizes our net assessment for the 2015 and 2025 scenarios, and Figure 2.8 depicts our assessment of the A2AD threat to force projection for the 2015 and 2025 scenarios.

Figure 2.7
China–Taiwan Net Assessment, 2025

Assessment			Color
The United States prevails in the capability contest quickly with little loss.			
The United States prevails with some time and loss.			
The United States can succeed but with difficulty, uncertainty, and loss.			
The United States suffers major losses and could fail.			

A2AD threat to	By	Result, 2015	Result, 2025
Surface ships	Submarines		
Strike aircraft	Cruise missiles		
Bases	Ballistic missiles		
C4ISR	Aircraft		
Strategic risk	Air defense		
Overall	Aircraft		

Figure 2.8
Chinese Anti-Access and Area-Denial Threat to U.S. Force Projection, 2025



China–Philippines

Michael S. Chase and Jeffrey Engstrom

China–Philippines, 2015

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

Background

The United States is rebalancing to Asia as the region becomes increasingly central to U.S. economic, diplomatic, and military interests and U.S. involvement in the wars in Iraq and Afghanistan winds down.¹ Washington's rebalance to Asia involves not only shifting military capabilities to the region and rotational deployments but also greater diplomatic involvement in regional issues, high-level participation in regional diplomatic and economic meetings, and economic and trade initiatives, such as the Trans-Pacific Partnership.² U.S. objectives in the region also include maintaining a stable relationship with China while deterring China from using force or the threat of force to resolve maritime territorial disputes. Furthermore, the United States attaches a high priority to forging relationships with new security partners and assuring longstanding U.S. allies and security partners that the United States has the capability and the will to make the rebalance substantive and sustainable despite budgetary constraints and a contentious politi-

¹ See, for example, Clinton, 2011, and DoD, 2012.

² On U.S. policy toward China and Asia more generally, see Bader, 2012.

cal environment at home. In addition, the United States seeks to ensure the security of SLOCs, prevent proliferation of WMD, and promote protection of human rights in the region.

Within this context, the SCS, which encompasses hundreds of small islands and reefs within an area of roughly 1.4 million square miles, appears to be emerging as a potential flash point and is thus assuming greater importance to the overall U.S. strategy. The United States does not take a position on the sovereignty issues that divide the rival claimants, including China, Taiwan, Vietnam, Malaysia, Brunei, and the Philippines. In 2014, however, for the first time, Washington explicitly rejected China's claim as contrary to international law, a claim that encompasses almost all of the SCS and is often referred to as *the nine-dash line claim* for the nine dashes depicted on Chinese maps of the area.³ In testimony before the House Committee on Foreign Affairs on February 5, 2014, assistant secretary of the Bureau of East Asian and Pacific Affairs, Daniel R. Russel, stated,

Under international law, maritime claims in the South China Sea must be derived from land features. Any use of the “nine-dash line” by China to claim maritime rights not based on claimed land features would be inconsistent with international law. The international community would welcome China to clarify or adjust its nine-dash line claim to bring it in accordance with the international law of the sea.⁴

Beijing's most-important objectives are perpetuating CCP rule, sustaining economic growth and development, maintaining domestic social and political stability, defending Chinese sovereignty and territorial integrity, and securing China's status as a major power.⁵ Many Chinese observers view U.S. rebalancing as aimed at containing China

³ Jeffrey A. Bader, “The U.S. and China's Nine-Dash Line: Ending the Ambiguity,” Washington, D.C.: Brookings Institution, February 6, 2014.

⁴ Daniel R. Russel, assistant secretary of the Bureau of East Asian and Pacific Affairs, U.S. Department of State, “Maritime Disputes in East Asia,” testimony before the House Committee on Foreign Affairs Subcommittee on Asia and the Pacific, February 5, 2014.

⁵ Information Office of the State Council of the People's Republic of China, 2013.

and ensuring that its reemergence as a major power does not threaten U.S. interests.⁶ They see the United States as bent on maintaining its dominance and believe that U.S. power and determination to prevent China's rise from undermining its position make the United States the greatest potential threat to China's security. Nonetheless, they seek a stable relationship with the United States, one that is conducive to China's achievement of its broader domestic and international objectives. Chinese leaders frequently discuss establishing a "new pattern of major country relations" with the United States, one that avoids a major confrontation of the type that has often resulted between status quo and rising great powers and results in U.S. accommodation of China's most-important interests.

China is increasingly concerned about what it sees as challenges to its sovereignty claims in the SCS, and Beijing has been more forceful in asserting its claims in recent years—most notably, by gaining control over Scarborough Shoal after a standoff with the Philippines in 2012. Beijing states that it still aims to resolve the disputes peacefully but appears to be emphasizing that it expects rival claimants to accommodate its interests as it becomes more powerful. As China's foreign minister put it in March 2015 remarks about the maritime territorial disputes in the SCS, "we will never bully smaller countries, yet we will never accept unreasonable demands from smaller countries."⁷ Many of the "smaller countries" clearly feel as though they are being bullied. To minimize this perception internationally, China prefers to rely on its formidable and growing maritime law enforcement (MLE) capabilities to pursue its claims, but it has also demonstrated its improving naval capabilities with PLAN deployments to the SCS.

Importantly, however, China's ability to conduct military operations in the more-distant parts of the SCS remains limited in 2015, making this an even more challenging scenario for the PLA than the

⁶ See, for example, Nathan and Scobell, 2012, and Lieberthal and Jisi, 2012.

⁷ Edward Wong, "China's Hard Line: 'No Room for Compromise,'" *New York Times*, March 8, 2014.

joint blockade campaign against Taiwan. As one senior U.S. Air Force analyst recently observed,

A South China Sea conflict, particularly one at far reaches such as the Spratly Islands, will stress the ability of the PLAAF to project airpower in a sustained fashion. Limited aerial refueling capabilities, as well as a limited number of other “high demand–low density” assets such as [C4ISR] and support aircraft, greatly limits the PLAAF’s capability to maintain presence over the expanse of the South China Sea.⁸

China’s rival claimants welcome greater U.S. involvement as a counterweight to China in the region. Vietnam and the Philippines aim to strengthen their capabilities vis-à-vis China. For example, both have sought assistance from Japan to help them improve the abilities of their own coast guards. Still, both countries have important economic ties to China. For many other countries in the region, the calculus is at least equally complex. They are wary of the instability that would likely result from greater friction between the United States and China. Moreover, even as the importance of their economic ties with China is increasing, they also value the role the United States plays in maintaining regional security and stability. As a result, they seek to maintain good relations with Beijing and Washington, and they want to avoid being put in a position that would require them to choose between China and the United States.⁹

Path to War

The path to war begins with China’s June 2015 announcement that it is establishing an air-defense identification zone (ADIZ) covering much of the SCS, including islands claimed by Vietnam and the Philippines. Following China’s controversial establishment of an ADIZ over

⁸ Lee Fuell, technical director for force modernization and employment, National Air and Space Intelligence Center, “Broad Trends in Chinese Air Force and Missile Modernization,” Department of the Air Force presentation to the U.S.–China Economic and Security Review Commission, January 30, 2014.

⁹ Medeiros et al., 2008.

the ECS in 2013, the United States had urged Beijing to refrain from making any similar moves in the SCS, especially without first consulting with other countries whose interests would be affected. Nevertheless, China concludes that establishment of an SCS ADIZ is required as part of a strategy that aims to more assertively protect and advance its sovereignty claims. Some Chinese commentators suggest that the move is largely defensive, casting it as a response to Washington's rejection of China's nine-dash line claim as inconsistent with the United Nations (UN) Convention on the Law of the Sea—which the United States supports but to which it is not a party—and to legal action the Philippines has taken to try to push back against China's more-assertive enforcement of its claims. The United States and most of the rival claimants reject the Chinese ADIZ, and Washington responds almost immediately by flying B-52s through the claimed ADIZ without prior notification to China.

Tension over the newly announced SCS ADIZ gradually subsides by the end of the summer, with China doing relatively little to enforce it other than stating that it is “continuously monitoring the area” and periodically sending fighters to intercept aircraft passing through the declared ADIZ boundaries. In September 2015, however, politicians from the Philippines make a highly publicized visit to several of the disputed features. During the tour, one prominent politician states, “these islands belong to the Philippines, no matter how much China bullies us, and we will never give up a single inch of our territory.”

China responds to what it calls “an unacceptable affront to Chinese sovereignty” by stepping up its MLE activity around the disputed islands and sending a PLAN SAG to the SCS for what it describes as a “routine training exercise.” Beijing also uses economic pressure to try to coerce the Philippines—specifically, by restricting imports of bananas like it did at the time of the 2012 incident involving Scarborough Shoal.

Many observers suspect that Beijing is looking for an excuse to intensify its pressure on the Philippines and might be preparing to seize what it sees as an opportunity to wrest control of some of the disputed areas in a manner similar to its handling of the Scarborough Shoal incident. But this time, the result is a much more serious crisis, one that

unfolds so quickly the United States has little time to respond until the situation has already escalated to a much higher level.

On September 3, 2015, a large number of Chinese MLE vessels appear in the vicinity of Second Thomas Shoal (known as Ayungin Shoal in the Philippines and Ren'ai Reef in China), which lies about 105 nautical miles (nm) from Palawan Island and is lightly defended by troops from the Philippines.¹⁰ Both countries issue public statements declaring their sovereignty over Second Thomas Shoal and warn that the other side has no legitimate reason to be there.

In Manila, leaders fear that Beijing plans to take control of Second Thomas Shoal. They warn the United States that Beijing's strategy is to surround Second Thomas Shoal with MLE ships and fishing vessels in order to prevent the Philippines from delivering supplies to the small number of marines it has stationed on the *Barko ng Republika ng Pilipinas* (Ship of the Republic of the Philippines) (BRP) *Sierra Madre*, a World War II-era landing transport ship it ran aground on the shoal in the late 1990s to establish its presence in the area.¹¹

Their concerns are proven correct later that day when Chinese ships begin blocking Philippine attempts to resupply the marines. The crisis deepens further a few hours later, when a PLAN officer tells official media that, unless Manila agrees to withdraw the marines, China will tow the *Sierra Madre* out of the area. Manila ignores the warning and sends a naval vessel to the area to attempt to stop China from towing the *Sierra Madre*.

The ensuing confrontation leads to a collision between a Chinese MLE vessel and the Philippine Navy ship. This incident results in injuries on both sides and the death of one crew member from the Chinese vessel. The next day, with tensions running high, a video of the ship collision incident appears on the Internet, sparking angry protests in Beijing and other major Chinese cities.

¹⁰ For an assessment that identifies Second Thomas Shoal as a potential flash point, see Bonnie S. Glaser and Alison Szalwinski, "Second Thomas Shoal Likely the Next Flashpoint in the South China Sea," *China Brief*, Vol. 13, No. 13, June 21, 2013.

¹¹ On the BRP *Sierra Madre*, see Jeff Himmelman, "A Game of Shark and Minnow," *New York Times*, October 27, 2013.

Beijing issues a statement blaming the Philippines for instigating the incident that led to the ship collision by “illegally occupying Chinese territory.” Beijing also states that the Philippines “will be held accountable” for the death of the Chinese sailor. Manila responds by charging that the collision was the result of a dangerous maneuver by the Chinese MLE vessel. Other countries in the region urge calm, and the United States, for its part, issues a public statement indicating that it does not take sides in the territorial dispute but expects China to exercise restraint and pursue its claims in a manner consistent with international norms and laws.

China does not attempt to tow the *Sierra Madre* at this time, but Chinese MLE ships continue to surround it, apparently to prevent it from being resupplied. Within a few days, the marines on board the ship are out of supplies. China allows a fishing vessel from the Philippines to remove the marines from the ship. The fishing vessel takes them back to Palawan Island, where they receive a welcome from the president of the Philippines, who praises them for doing the best they could to protect Second Thomas Shoal facing impossible odds. With their departure, however, China is effectively in control of the area.

Meanwhile, a Chinese PLAN SAG that had been conducting an exercise elsewhere in the SCS begins moving toward Thitu Island, which is currently occupied by the Philippines.¹² Thitu Island—the second-largest island in the Spratly Islands after Taiwan-held Itu Aba—features a roughly 1,400-m-long airstrip, and approximately 50 army troops from the Philippines defend it.¹³ The PLAN SAG is composed of a destroyer, two frigates, and a Type 071 amphibious ship equipped with helicopters and landing craft, air cushion (LCAC)-type landing craft. Beijing again states that it is carrying out routine training, but a Chinese military officer quoted in one newspaper report adds somewhat ominously that the PLAN SAG is “fully capable of

¹² Thitu Island is also known as Zhongye Dao in Chinese and Pag-asa in Tagalog. For more, see Carl Thayer, “What If China Did Invade Pag-asa Island?” *Diplomat*, January 16, 2014.

¹³ In addition, Thitu Island has a population of about 200 civilians, and it is administered under the Philippine municipality of Kalayaan.

defending Chinese sovereignty if enemies continue to illegally occupy our territory.”

The president of the Philippines releases the following statement: “Might does not make right, and these unprovoked acts of aggression must not be allowed to stand. We must ensure that the rights of all countries are respected, not only the largest and most powerful countries.” Fearing that China is about to further escalate the conflict, possibly by seizing Thitu Island, Manila urgently appeals for support from the United States and other countries.

These events draw the United States directly into the midst of what appears to be a rapidly escalating crisis in the SCS. Senior U.S. officials state that Washington is determined to prevent China from bullying the Philippines and to preserve freedom of navigation in the area. They state that all options are under consideration, including military intervention if necessary. Media commentators in the United States, Japan, Singapore, and other countries in the region speculate that any Chinese action against Thitu Island would likely trigger a U.S. military response. By September 6, 2015, both China and the United States are flowing additional forces into the area, and the stage appears to be set for a U.S.–China showdown in the SCS. It comes the following day, when China demands that the Philippines remove all forces “illegally occupying” Thitu Island. Manila refuses and attempts to reinforce the island by sending a transport aircraft to bring supplies to the troops. China shoots down the transport plane. The president of the Philippines declares that China’s actions constitute an act of war, and Manila requests U.S. military assistance.

The United States’ Conflict Objectives

U.S. objectives include ensuring freedom of navigation in the SCS, preventing China from using force to resolve claims to disputed territory or maritime rights, ensuring that such issues are resolved in accordance with international norms and law instead of by coercion, and defending the Philippines from further Chinese bullying or use of force. The United States also aims to restore security and stability to the region as quickly as possible, and Washington wishes to avoid a large-scale conflict with China and to limit escalation. In addition, the United States

aims to preserve its alliance relationships and maintain its influence in Asia.

China’s Conflict Objectives

Beijing aims to gain and maintain control over Second Thomas Shoal, Thitu Island, and other features claimed by the Philippines. China also hopes that its forceful stance will give it greater bargaining leverage vis-à-vis other rival claimants—most notably, Vietnam—enabling it to resolve the rest of the disputes in the SCS in its favor through bilateral negotiations. China seeks to deter U.S. military intervention, if possible, or, if deterrence fails, to ensure that U.S. military intervention does not prevent China from achieving its strategic objectives. In addition, Beijing calculates that its actions will undermine the credibility of U.S. security assurances and limit the ability of the United States to challenge China’s regional security interests.

Rival Claimants’ and Other Countries’ Conflict Objectives

Manila seeks to prevent China from seizing control of Second Thomas Shoal or other disputed islands it currently occupies. In addition, Manila seeks to strengthen its relationship with the United States and gain stronger backing from other countries in the region to deter any future Chinese attempts at coercion.

As for many other countries in the region, their leaders have stated publicly and privately that they do not wish to be drawn directly into the impending conflict between China and the United States. Most notably, although Japan has publicly supported the United States and the Philippines, it has indicated that it does not want the United States to draw it into a wider war. The United States agrees to minimize direct use of Japanese facilities for operations in the Philippines. Both countries, however, take measures to prepare should the fighting spread.

Conduct of the War

China’s Anti-Access and Area-Denial Concept of Operations

China’s national objectives of achieving control over parts of the Spratly Islands would be realized through the PLA’s “coral island offensive campaign” concept. Primarily a naval campaign carried out by PLAN surface ships and marines, *The Science of Campaigns* generally describes

this campaign's main activities.¹⁴ First, the PLA will seek to develop and maintain air and naval superiority through the destruction of nearby enemy military assets.¹⁵ Once that is achieved, the logistics and communication connections between the island or reef must be severed. The second phase is the actual assault and occupation supported by naval and air firepower.¹⁶ The last and final phase is to transition to defending the newly acquired outposts.¹⁷

If the U.S. military becomes involved in the conflict, China would also wage an “anti-air raid campaign” designed to repel any U.S. air strikes against forces participating in the main campaign or against important mainland military, political, or economic targets. *The Science of Campaigns* generally describes how this campaign would be conducted.¹⁸ Using primarily PLAAF and PLANAF air and ground assets, this campaign prescribes the development of a system that consists of three zones for air interdiction of U.S. strike aircraft. The first zone is the “furthest intercept area” and is patrolled by fighter aircraft and long-range SAMs that are both ground and ship based.¹⁹ The second zone, or the “air-land attack area” is the middle zone and consists of fighters, as well as SAM and AAA batteries.²⁰ Lastly, the third zone, or the “deep anti-annihilation area” is nearest to the strategic target China seeks to protect and is guarded by fighters, SAMs, AAAs, and possibly aerial obstacles.²¹ Integrated C4ISR networks, as well as active information operations, such as EW, support all of these activities.²²

Although it was Beijing's intent that these operational concepts and the capabilities developed to support them would deter the United

¹⁴ Yùliáng, 2006, pp. 535–538.

¹⁵ Yùliáng, 2006, p. 537.

¹⁶ Yùliáng, 2006, p. 538.

¹⁷ Yùliáng, 2006, p. 538.

¹⁸ Yùliáng, 2006, pp. 331–348.

¹⁹ Yùliáng, 2006, p. 343.

²⁰ Yùliáng, 2006, p. 343.

²¹ Yùliáng, 2006, p. 343.

²² Yùliáng, 2006, pp. 339–340.

States from military involvement in the blockade, it must now hope it can impose such cost on responding U.S. forces that Washington opts for some settlement. The coming days and weeks will reveal just how steep a price the United States must pay. If events seem to run against the PLA, Beijing can contemplate its options to escalate the fight.

The United States' Force-Projection Concept of Operations

The United States believes that it can achieve its immediate conflict objectives—halt PLAN advances against Philippine possessions and restore their possession to Manila—while preventing the conflict from escalating. The CONOPS calls for rapid attrition of those Chinese forces in and around Second Thomas Shoal while avoiding any attacks on mainland China. Because the Spratly Islands are at a considerable distance from the mainland, forcing the PLA to operate at extended ranges, the United States is expecting only moderate resistance. Because U.S. presence in and near the SCS is very limited, U.S. air and naval forces will flow into theater. In addition to U.S. bases in Guam, the Philippine government has allowed the U.S. aircraft to operate from Clark AB, Antonio Bautista AB, and Edwin Andrews AB. Port facilities are also available at Subic Bay for the U.S. Navy.

Assessment of Chinese Anti-Access and Area Denial Versus U.S. Force Projection

Chinese Anti-Access and Area Denial Versus U.S. Strike Aircraft: Setup

The most immediate role of U.S. strike aircraft is to destroy Chinese military targets that are directly engaged in prosecuting the seizure of Philippine-held SCS islands and features. This specifically includes PLAN destroyers, frigates, and amphibious ships and possibly various Chinese state maritime enforcement vessels. Because U.S. ROE do not permit strikes against mainland targets, U.S. strike aircraft are prohibited from striking the airfields, ports, conventional ballistic-missile and GLCM units, and other facilities. However, strikes against PLA facilities on the islands and atolls that China controls in the SCS, such as on Woody Island, are permitted.

Numerous U.S. Air Force and Navy strike aircraft of multiple types can be brought to bear on PLA military forces. When in theater,

these aircraft will be stationed either afloat on U.S. aircraft carriers, on U.S. bases on Guam, or from airfields that the Philippines allows for U.S. use during the conflict (Clark AB, Antonio Bautista AB, and Edwin Andrews AB).

China's ability to hold U.S. strike aircraft and assisting mission-support aircraft at risk emanates from two main sources: (1) kinetic attack through SAMs and (2) kinetic attack from AAMs.²³ (The threat to U.S. aircraft while at their bases is discussed below.) The first of these kinetic threats originates either from SAM batteries located on the mainland or from PLAN surface ships likely operating in the SCS. The HQ-9, the most advanced SAM China possesses, has a maximum range of about 200 km. Second Thomas Shoal is more than 1,000 km from the southern tip of Hainan Island, so the threat to U.S. vessels from PLA land-based SAMs is almost negligible so long as the conflict is confined.

In this scenario, the likeliest threat to U.S. strike aircraft are air-to-air missiles launched from PLAAF and PLAN 4.5-generation fighters seeking to maintain a modicum of air cover for PLAN SAGs or seeking to prevent mainland strikes.²⁴ Although Chinese air-superiority fighters, such as the J-11 or Su-27, have a maximum operational radius of 1,500 km, they cannot stay on station for substantial periods of time to intercept U.S. strike aircraft because they cannot be aerially refueled with the PLAAF's and PLAN's fleet of converted H-6 bombers.²⁵ For the time that they are in the area, the most-lethal PLA AAMs are the Russian-developed R-77 and the China-developed PL-12 with ranges of 110 km and 70 km, respectively.²⁶ AEW&C aircraft, such as the KJ-2000 and KJ-200, which could be integrated into China's larger C4ISR picture, will aid the PLA fighters launching these missiles. That picture includes space-based assets and an OTH radar that ranges to

²³ The anti-air raid campaign also recognizes EW's role in countering incoming air strikes, although we do not consider this further in this section.

²⁴ This includes the indigenously built J-11, as well as Russian-built Su-27 and Su-30 fighter aircraft.

²⁵ "XAC H-6," *Jane's All the Worlds Aircraft*, July 8, 2014.

²⁶ "R-77," 2009; "PL-12," 2013.

as much as 3,000 km, covering a substantial portion of the Philippine Sea.²⁷

Another potential threat to U.S. strike aircraft are the PLAN's four Luyang II-class (Type 052C) destroyers, which carry 48 HHQ-9 SAMs (the naval variant of the aforementioned HQ-9) in vertical-launch tubes.²⁸ This represents the most potent ship-to-air threat in China's arsenal. Also of note are the service's two Luzhou-class (Type 051C) destroyers that carry 36 SA-N-20 SAMs each and have a range of 75 km.²⁹

In sum, although China's IADs might be formidable, Second Thomas Shoal is at the very periphery of its ability to deny the air to the United States. The United States will make use of carrier-based aircraft and assets based in Guam and the Philippines to patrol the airspace and strike Chinese targets.

Chinese Anti-Access and Area Denial Versus U.S. Strike Aircraft: Outcome

Although initially outnumbered four to one, U.S. air-superiority aircraft operating mainly from Clark AB on Luzon are able to wrest a measure of air superiority over most of the northern SCS (and, by extension, the middle and southern areas as well) for U.S. strike aircraft to attack PLAN surface ships.

The first PLAN targets are those ships that pose a significant air-defense threat. U.S. submarines play an important role here (covered in the discussion of surface ships), but strike aircraft also contribute. U.S. aircraft firing Harpoon antiship missiles do have to get within HHQ-9 engagement range to attack, but only a single F-18 is lost, while two Type 052C ships are put out of action. Once this immediate threat has been tolerably abated, secondary targets for U.S. strike aircraft then coalesce around sinking remaining PLAN surface ships, especially amphibious ships, in conjunction with U.S. surface and subsurface

²⁷ Project 2049 report (Stokes, 2009, p. 18) mentioned in *Taiwan Matters to America*, 2009.

²⁸ "Luyang-II," 2014, p. 2.

²⁹ "Luzhou Class," 2013.

assets, that are prosecuting island-seizure missions against Philippine-held islands and features.

Chinese Anti-Access and Area Denial Versus U.S. Fixed Assets: Setup
China's ability to seize Philippine possessions in the SCS would be enhanced if China could effectively deny U.S. air assets the ability to operate from forward locations. Without such bases, U.S. air-superiority and special-mission aircraft would have to fly from Australia or Guam, relying on multiple aerial refuelings to support strike sorties. Overall aerial refueling demand would increase significantly and ultimately lead to a decrease in strike sortie throughput.

Clark AB and Antonio Bautista AB in the Philippines are susceptible to strikes from the entire arsenal of PLA land-based MRBMs and cruise missiles. Andrews can be threatened by ALCMs and SLCMs but is out of range of China's SRBMs and MRBMs. Australia and Guam are exceptionally difficult for China to strike. Located approximately 3,000 km from the mainland, Guam is technically within reach of an H-6K bomber with a CJ-10/DH-10 ALCM. However, in order to launch their standoff payloads, these aircraft would still have to successfully fly to a spot over the Philippine Sea roughly 1,500 to 2,000 km from Guam and would become highly susceptible to attack by U.S. air-superiority aircraft. U.S. aircraft deployed in Australia at Darwin are entirely out of reach of all PLA conventional missiles. Other fixed targets are limited, at least so long as China does not expand the war to Japan. Table 3.1 lists the missile threats to U.S. bases, and Figure 3.1 shows their ranges relative to the SCS.

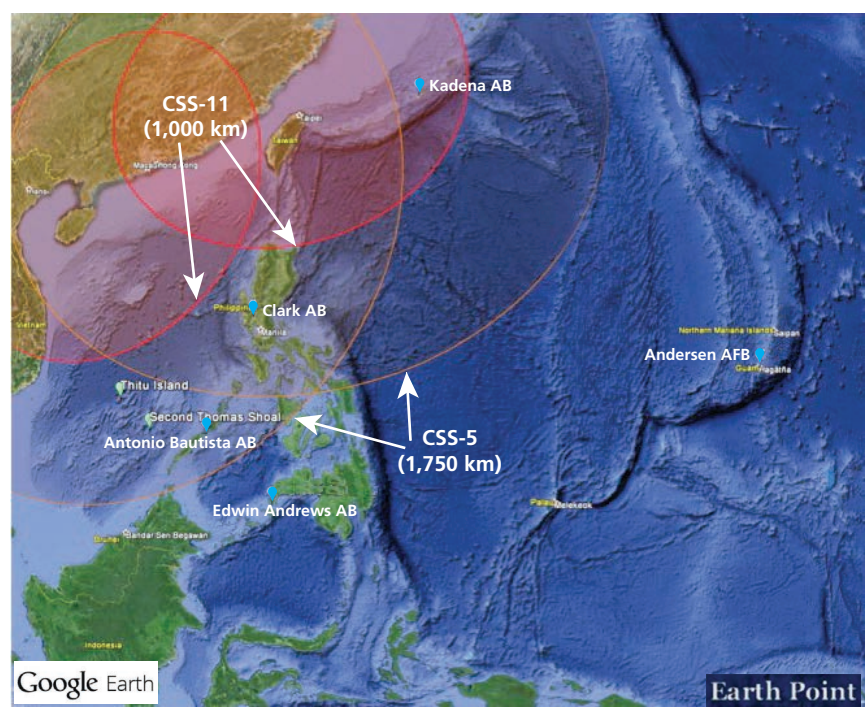
Chinese Anti-Access and Area Denial Versus U.S. Fixed Assets: Outcome

China begins a joint firepower strike to destroy or degrade the ability of U.S. bases to generate sorties. Because sustaining a modicum of air cover is a condition of allowing Chinese seizures of Philippine possession, suppressing U.S. airbases' sortie generation is an important campaign priority. In the initial stages, Clark and Antonio Bautista are targeted by a total of 200 DH-10 cruise and DF-21 ballistic missiles that severely degrade U.S. sortie generation from these bases for more than three days at Clark and a week at the single-runway Bautis-

Table 3.1
The Chinese Ballistic- and Cruise-Missile Threat to U.S. Bases in and Near the Philippines, 2015

Chinese Name	NATO Designation	Type of Missile	Total Range, in Kilometers	Missiles	Launchers
DF-21	CSS-5	MRBM	1,750	~75	36
YJ-63	—	ALCM	200	Unknown	20 (H-6H)
CJ-10	—	LACM	1,500–2,000	200–400	54
DH-10	—	ALCM	3,300–3,800	Unknown	36 (H-6K)

Figure 3.1
Ranges of Select Chinese Ballistic Missiles Relative to the Philippines, 2015



SOURCE: Google Earth.
NOTE: Missile-launcher locations are illustrative.
RAND RR1359/1-3.1

ta.³⁰ Although operations are resumed after this time, further follow-on attacks from DH-10 cruise missiles occur at both bases throughout the campaign.

Although Beijing takes a gamble, H-6K strikes against Guam are ineffective because the bombers are shot down before reaching their launch points. As a result, long-range strike assets (B-1B and B-52 aircraft) stationed there are untouched. Edwin Andrews AB in the Philippines is out of MRBM range and is also untouched. Because China does not want to widen the conflict, U.S. basing outside of the SCS, located in third-party countries, is not attacked. As a result, U.S. port and support facilities in the rest of east Asia are also unscathed.

Chinese Anti-Access and Area Denial Versus U.S. Surface Ships: Setup China's military must be prepared to counter expected U.S. military intervention, and this requires it to employ A2AD capabilities against U.S. surface ships that will be involved in U.S. attempts to defeat Chinese military operations in the SCS or carry out other military actions against China, such as strikes against mainland targets. Improvements in PLAN capabilities in the past 15 years have made it a much more formidable ASuW force, and its capabilities are complemented by those of other services (most notably the PLASAF's DF-21D ASBM) and enhanced PLA C4ISR systems.³¹

³⁰ These numbers assume that PLA ballistic and cruise missiles have a probability of kill of 1 (an extremely conservative estimate) and, because of poor ISR and BDA, must restrike targets six times in every 24-hour period (Headquarters Air Force Civil Engineer Center, *Operations: Airfield Damage Repair Options*, Washington, D.C.: Secretary of the Air Force, Air Force Pamphlet 10-219, Vol. 4, May 28, 2008, incorporating change 1 August 13, 2015).

³¹ According to the Office of Naval Intelligence's senior intelligence officer for China, Jesse L. Karotkin,

At the dawn of the 21st Century, the People's Liberation Army Navy (PLA[N]) remained largely a littoral force. Though China's maritime interests were rapidly changing, the vast majority of its naval platforms offered very limited capability and endurance, particularly in blue water. Over the past 15 years the PLA(N) has carried out an ambitious modernization effort, resulting in a more technologically advanced and flexible force. This transformation is evident not only [in] the PLA(N)'s Gulf of Aden counter-piracy presence, which is now in its sixth year, but also in the navy's more advanced regional operations and exercises. In contrast to its narrow focus [just a] decade ago, the PLA(N) is evolving to meet a wide range of missions including conflict with Taiwan, enforce-

The ASuW capabilities China can bring to bear against U.S. surface ships include PLAN surface ships and submarines, PLANAF aircraft capable of launching long-range ASCMs, and PLASAF land-based ASBMs.³² China also is developing UUVs and has considerable mine-warfare capabilities. The UUVs' capabilities are thought to be limited by range and C2 challenges in 2015, but mines could pose a threat in an A2AD role. In addition, the PLAN has been enhancing its logistics capabilities and improving in other areas, such as C4ISR systems, education, training, and exercises. ASW remains an important area of weakness for the PLAN. Nonetheless, the PLAN poses an increasingly serious threat in the region, and it is an important element of China's ability to deter U.S. military intervention or, if deterrence fails, to counter U.S. military intervention by delaying the arrival of U.S. forces and reducing the effectiveness of their operations.³³ According to one observer,

China's emerging maritime A2AD force can be viewed as broadly analogous to the sea-denial force that the Soviet Union developed during the Cold War to deny U.S. use of the sea or counter U.S. forces participating in a NATO–Warsaw Pact conflict. One potential difference between the Soviet sea-denial force and China's emerging maritime A2AD force is that China's force includes ASBMs capable of hitting moving ships at sea.³⁴

The PLAN's surface ships have improved dramatically since the 1990s, when China began acquiring modern destroyers from Russia.

ment of maritime claims, protection of economic interests, as well as counter-piracy and humanitarian missions.

See Karotkin, 2014.

³² O'Rourke, 2013.

³³ The PLAN is expected to contribute to other missions, including enforcing China's territorial claims in the ECS and SCS; challenging foreign military activities in its EEZ; protecting Chinese SLOCs; participating in noncombatant evacuation, antipiracy, and HADR operations; promoting China's regional security interests, and bolstering China's status as an emerging world power more generally. See O'Rourke, 2013.

³⁴ O'Rourke, 2013, p. 5.

In recent years, China has shed its reliance on imported surface ships and produced multiple classes of modern surface combatants, including frigates and destroyers with greatly improved ASuW and AAW capabilities. China is also building new Jiangdao-class (Type 056) corvettes and Houbei-class (Type 022) ASCM-armed fast-attack craft that feature a catamaran hull design.

The four *Sovremennyy*-class destroyers China imported from Russia are equipped with the highly capable Russian-made SS-N-22 Sunburn ASCM. China's indigenously produced destroyers feature more-modern hull designs, propulsion systems, sensors, weapons, and electronics. China's domestically produced destroyers are also armed with ASCMs, and the Luyang II (Type 052C) and Luyang III (Type 052D) DDGs feature phased-array radar systems. According to DoD, China launched the lead ship in the Luyang III class in 2013, and it will likely enter service in 2015. Furthermore, according to DoD,

The Luyang III incorporates the PLA Navy's first multipurpose vertical launch system, likely capable of launching ASCM, land attack cruise missiles (LACM), surface-to-air missiles (SAM), and anti-submarine rockets. China is projected to build more than a dozen of these ships to replace its aging LUDA class destroyers³⁵

Since the 1990s, China has also developed four new classes of indigenously built frigates, the Jiangwei I, Jiangwei II, Jiangkai I (Type 054), and Jiangkai II (Type 054A). As one analyst observes, "Compared to China's remaining older Jianghu (Type 053) class frigates, which entered service between the mid-1970s and 1989, the four new frigate classes feature improved hull designs and systems, including improved AAW capabilities."³⁶

In addition, China commissioned its first aircraft carrier, *Liaoning*, in September 2012. It is a refurbished aircraft carrier that China acquired from Ukraine in the late 1990s. It is conventionally pow-

³⁵ Office of the Secretary of Defense, 2013, p. 7.

³⁶ O'Rourke, 2014, p. 25.

ered and has a ski-ramp configuration that limits the range and payload of its fixed-wing aircraft. It is capable of accommodating roughly 30 aircraft, including fixed-wing aircraft and helicopters, but it is not expected to embark an operational air wing until after 2015. In the future, China is expected to deploy an unknown number of indigenously developed aircraft carriers.³⁷

Along with its improving surface fleet, the PLAN has a growing number of modern submarines. The modernization of China's submarine force has focused on qualitative improvements resulting in a more modern and capable submarine force. The PLAN's submarines include Kilo-class diesel submarines imported from Russia and several classes of indigenously produced submarines, such as the Song- and Yuan-class attack submarines. These are, in general terms, quieter and longer-ranged than the boats they replace. The Yuan-class submarine is believed to incorporate an AIP system. China also has two Type 093 SSNs and is building four more-improved versions of the Type 093 to replace its older Han-class Type 091 SSNs (the Type 093, in turn, will eventually be succeeded by the Type 095 SSGN). In addition, three Type 094 SSBNs are now operational with the PLAN. Each Type 094 is capable of carrying 12 JL-2 nuclear-armed SLBMs. China could deploy up to five Type 094s before it proceeds to its next-generation Type 096 SSBN sometime over the next decade.³⁸ In addition, the PLAN also still has some older, less capable submarines that could nonetheless be useful in certain roles in a Taiwan conflict, or possibly in the event of a clash in the SCS.

Chinese land-based aircraft also represent a potent A2AD threat against U.S. surface ships. The first fourth-generation fighter fielded with the PLANAF is the Su-30MK2, which is capable of targeting enemy surface ships. China's land-based naval aircraft inventory also includes ASCM-armed JH-7 fighter-bombers and older, but potentially threatening, ASCM-armed H-6 bombers.³⁹

³⁷ On Chinese carriers and carrier-based aircraft developments, see O'Rourke, 2014, pp. 15–21.

³⁸ Office of the Secretary of Defense, 2013, pp. 6–7.

³⁹ Karotkin, 2014; O'Rourke, 2014, p. 32.

Deployed on surface ships, submarines, and strike aircraft, Chinese ASCMs pose an especially serious A2AD threat to U.S. surface ships. China's inventory of ASCMs includes the Russian-made SS-N-22, carried by the PLAN's *Sovremennyy* DDGs, and SS-N-27 ASCMs, carried by eight of the PLAN's Kilo-class submarines.⁴⁰ It also has potent indigenously designed ASCMs, such as the YJ-8A (NATO designation C-801) and the YJ-62 (C-602), and the YJ-83 (C-803). These weapons all have OTH range—as much as 500 km. China has made investments in maritime reconnaissance and communication networks that allow it to take advantage of this capability to successfully target ships at distance. Furthermore, the PLASAF fields a relatively small but growing number of DF-21D ASBMs capable of targeting U.S. aircraft carriers. The DF-21D is an MRBM with a maneuvering reentry vehicle and a range of more than 1,500 km.⁴¹

In addition, China has a wide range of mine-warfare capabilities, including moored, bottom, drifting, rocket-propelled, and intelligent mines.⁴² Table 3.2 lists China's naval capabilities for this scenario.

The U.S. Navy brings the great majority of the Pacific fleet to bear. Flow of assets based elsewhere begins on D-day. About 40 destroyers and cruisers are in and around the western Pacific by D+10, along with 20 SSNs. Three CVNs are in theater by D+10 and four by D+20. About three-quarters of these assets are devoted to the SCS area of operations (AO), including south and east of the Philippines. The rest are east of Taiwan, focused on a potential geographic expansion of hostile activity.

⁴⁰ According to DoD, China

has, or is acquiring, nearly a dozen ASCM variants, ranging from the 1950s-era CSS-N-2 to the modern Russian-made SS-N-22 and SS-N-27B. China is working to develop a domestically-built supersonic cruise missile capability. The pace of ASCM research, development, and production has accelerated over the past decade.

See Office of the Secretary of Defense, 2013, p. 42.

⁴¹ See Erickson, 2010; Office of the Secretary of Defense, 2013, p. 5; and NASIC, 2013.

⁴² Erickson, Goldstein, and Murray, 2009; Karotkin, 2014.

Table 3.2
Selected Chinese Naval Capabilities, 2015

Type	Number
Destroyer	27 (including 17 modern)
Frigate	48 (including 31 modern)
Corvette	10
Missile-armed fast-attack craft	85
Amphibious ship	56
Mine-warfare ship	42
Major auxiliary ship	More than 50
Minor auxiliary ship and service and support craft	More than 400

SOURCE: Karotkin, 2014.

Chinese Anti-Access and Area Denial Versus U.S. Surface Ships: Outcome

In 2015, China can execute rapid and decisive operations against a weaker rival, such as the Philippines, but, if Beijing thought that it would be facing the Philippines alone in this conflict, it was wrong. The United States quickly responds to Manila's request for assistance and states that it will come to the defense of its beleaguered ally. Although China could have dealt with the Philippines easily enough if the United States had remained on the sidelines, blunting U.S. military intervention in the SCS is a much greater challenge for China than the Taiwan scenario because of the distance of some of the disputed areas from the Chinese mainland and Chinese weaknesses in such areas as undersea warfare.

As a result, the first week of the conflict is disastrous for the PLAN. On D+1, U.S. SSNs severely damage a Chinese amphibious ship that appears to be preparing to land forces on Thitu Island. U.S. forces also sink multiple PLAN corvettes operating in the vicinity of Second Thomas Shoal. Also on D+1, the United States begins conducting cyberattacks intended to degrade Chinese ISR and interfere with

PLA communication systems. The exact effects of the attacks are difficult to ascertain, but they appear to be at least partially successful.

On D+2, U.S. SSNs sink two Chinese destroyers, two frigates, and two more Chinese corvettes. The worst day of the conflict for the PLAN comes on D+5, when U.S. forces damage or sink a total of eight Chinese surface ships.

Despite its early losses, China still retains formidable A2AD capabilities, and the first week of the war is also a costly one for the United States. Chinese submarines and surface ships launch long-range ASCMs at several U.S. ships on D+3, sinking a DDG and heavily damaging two other U.S. ships. Later that day, Chinese mines strike a U.S. frigate, causing moderate damage and dozens of casualties.

On D+6, the United States employs another round of cyberattacks intended to degrade PLA C4ISR capabilities, allowing it to reduce the risk to aircraft carriers operating in the area. Nonetheless, on D+7, ASCMs launched by Chinese submarines heavily damage a U.S. aircraft carrier in the Philippine Sea.

This attack against the U.S. carrier triggers a major escalation of the conflict. The United States responds on D+8 by launching a series of nonkinetic counterspace actions, cyberattacks, and air and cruise-missile strikes intended to further degrade China's ability to locate and target U.S. surface ships. Up until this point, the United States had refrained from launching kinetic attacks against the mainland, hoping that it would be able to achieve its objectives while avoiding further escalation of the conflict, but the attacks against the aircraft carrier—and growing concerns that China might be preparing to escalate its attacks against U.S. space systems—prompt a change in the U.S. approach. The U.S. attacks—the first kinetic strikes against targets on the mainland in this conflict—include air strikes and SLCM attacks against Chinese OTH radars, facilities linked to Chinese ASAT capabilities, and several other targets.

In the meantime, for the next several days, U.S. SSNs continue to exact a heavy toll on Chinese surface ships, sinking multiple PLAN frigates and destroyers. Additionally, on D+10, U.S. carrier-based and land-based aircraft engage PLAAF and PLANAF fighters and bombers

in the air over the SCS. The United States loses three aircraft to Chinese AAMs but inflicts much heavier losses on the Chinese side.

On D+11, China launches ASCM strikes against another U.S. CSG. This time, the attacks against the carrier fail to hit their targets.

By the end of the second week of the war, China has suffered heavy losses. U.S. SSNs, in particular, have inflicted serious damage on the PLAN's surface fleet. The United States has suffered lighter losses, although Chinese ASuW capabilities have proven to be a formidable challenge for the U.S. forces sent to intervene on behalf of the Philippines.

Chinese Space, Information Warfare, and C4ISR Versus U.S. Counter-C4ISR: Setup

Chinese military authors note that space is essential for numerous military missions, such as ISR, military communications, navigation and positioning, and strategic early warning. According to a treatise by one former senior PLA officer,

Space will become an important battleground of confrontation between opposing forces . . . the development of manned space vehicles and new types of space weapons will enable space strength to make continuous progress, and this will make space the principal arena in future wars.⁴³

Overall, Chinese military writings on space emphasize its importance in gaining and maintaining information superiority, which, in turn, is seen as key to seizing the initiative in a conflict with a technologically advanced adversary, such as the United States.⁴⁴ Space is therefore seen as a potentially decisive arena in this 2015 SCS conflict scenario, and China seeks to ensure its ability to operate freely in space while denying the same ability to the United States.⁴⁵

Compared with a Taiwan scenario, in which the PLA is much less dependent on space than the United States is, an SCS scenario is more

⁴³ Xijun, 2005.

⁴⁴ Pollpeter, 2011.

⁴⁵ Pollpeter, 2012; Cheng, 2012.

complex for China. China can employ UAVs and other such capabilities, but it is more reliant on space in the SCS than it would be in a conflict over Taiwan because of the greater distances from the Chinese mainland. But there is still an asymmetry in the level of dependence on space systems that gives China a strong incentive to degrade or deny U.S. space systems even at the expense of U.S. retaliation in kind against Chinese satellites.⁴⁶ PLA strategists likely calculate that China is better off if both sides essentially negate each other's space capabilities than if it allows the United States to continue using its space systems in hopes of encouraging U.S. restraint.

Nonetheless, as the crisis intensifies, PLA strategists discuss the potential advantages of some limits on conflict in space, such as refraining from attacks that generate large amounts of debris, which could damage other countries' satellites and potentially bring them into the conflict when they might otherwise choose to remain on the sidelines. But, at the outset of the conflict, it is unclear whether PLA strategists view certain U.S. space systems, such as U.S. early-warning satellites, as off limits because of the potential escalation risks or as potentially legitimate targets because they play tactical, as well as strategic, roles in supporting U.S. military operations.

As for space capabilities, China has on orbit a range of satellites to support its military operations, and China is expanding its space-based capabilities in such areas as ISR, communications, and navigation and positioning.⁴⁷ China also has OTH radars that can be used along with its ISR satellites to target surface ships.

China is also developing multidimensional counterspace capabilities and has at its disposal a variety of systems that could be employed against U.S. assets.⁴⁸ These include soft-kill capabilities, such as jammers. They also include the ASAT interceptor China tested in January 2007 should Chinese leaders authorize the PLA to employ hard-kill capabilities. China's goals appear to include strategic deterrence and space control—preserving its own ability to use space while limiting

⁴⁶ Gompert and Saunders, 2011.

⁴⁷ Erickson, 2011.

⁴⁸ Tellis, 2007; Krepon et al., 2008.

or denying the adversary's ability to use space-based assets in crisis or conflict with China.⁴⁹

The Chinese military's doctrinal writings also emphasize the importance of maintaining China's own C4ISR capabilities while denying the same to the adversary. This involves such measures as camouflage, concealment, denial, and deception to protect PLA forces from detection and targeting by U.S. precision-strike capabilities.

Chinese Space, Information Warfare, and C4ISR Versus U.S. Counter-C4ISR: Outcome

As soon as China takes military action against the Philippines, it launches a series of cyberattacks that cripple military and government information systems in Manila. The United States is also a target for Chinese cyberattacks. China does not launch any preemptive kinetic strikes against U.S. forces at the outset of the conflict, but it begins conducting computer network attacks against U.S. military logistics systems on D+0.

On D+0, as soon as Beijing judges that the United States is preparing to intervene militarily on behalf of the Philippines, China begins conducting reversible counterspace operations (jamming communication links and dazzling optical sensors with low-power lasers) against U.S. space systems. China calculates that it is necessary to begin conducting these nonkinetic attacks as soon as it concludes that Washington is determined to become involved in the conflict, but it attempts to tailor its actions to avoid precipitating further escalation by the United States.

China continues to conduct reversible attacks against U.S. space systems throughout the conflict. The United States conducts similar actions to attempt to degrade China's C4ISR. In particular, U.S. cyberattacks and other counter-C4ISR actions are intended to make it more difficult for China to locate and target U.S. aircraft carriers and other surface ships. Because Chinese forces must conduct operations at considerable distances in the SCS, China must rely to some extent on

⁴⁹ Shixiu, 2007.

space systems, and U.S. counterspace actions succeed in complicating Chinese operations.

Although each side strives to ensure its ability to use space to its advantage while denying the same to its opponent throughout the two-week conflict, each refrains from any kinetic attacks in space to avoid generating debris that could damage its own space systems or those of third parties.

Conclusion of the War

China has suffered heavy losses during the two-week conflict, and U.S. military intervention has prevented China from imposing its will on the Philippines. The United States has managed to maintain sea control, and, in doing so, it has prevented China from gaining and maintaining control of the disputed features in the SCS. Nonetheless, China managed to inflict some losses on the United States, and it retains formidable A2AD capabilities.

On D+14, China indicates that it is looking for an off ramp. The United States responds by offering a cease-fire to begin negotiations to end the conflict. Washington makes clear that the negotiations should center on a return to the status quo that prevailed prior to the initiation of hostilities against the Philippines.⁵⁰

China agrees to the cease-fire, but the outcome of negotiations appears uncertain. China's failure to establish sea and air control doomed its "coral island reef seizure campaign" to failure, but it does not want to end the war on humiliating terms. After reviewing the U.S. offer, Beijing assesses that it can end the war on terms that will be acceptable in its domestic political context. Illustrating how Beijing intends to spin the outcome of the conflict as something of a victory, a senior Chinese military officer is quoted in official media immediately following China's acceptance of the cease-fire arrangements:

China ensured that no country can undermine Chinese sovereignty in the South China Sea without paying a high price and

⁵⁰ The United States emphasizes that it still does not take a position on the sovereignty claims with respect to any specific feature in the SCS. At the same time, Washington insists that China must not use force or coercion to pursue its objectives.

demonstrated that it is capable of fighting the United States toe-to-toe; we have shown the entire world we will never compromise when it comes to our territorial integrity.

Commentators on both sides welcome the cease-fire announcement, but some are concerned that the talks could collapse, especially given that the underlying cause of the conflict remains unresolved.

Net Assessment

In 2015, China cannot create a sufficient A2AD umbrella to enable it to project force into the SCS. The mainland-based capabilities that made it so effective in the 2015 Taiwan scenario—SRBMs, MRBMs, and advanced IADS in particular—have limited impact in this case. The Second Thomas Shoal is more than 1,000 km from Hainan Island and still farther from the mainland proper. China can reach some U.S. operating locations with its limited inventories of MRBMs, ALCMs, and SLCMs, but two airbases (Andersen on Guam and Edwin Andrews in the Philippines) are essentially in sanctuary. Similarly, U.S. ships can generally cruise outside the range of shore-based strike. Chinese surface ships, meanwhile, must operate without the benefit of additional, shore-based protection from U.S. aircraft and submarines. Ultimately, this is the telling vulnerability: Some measure of extended sea control is critical to Chinese conflict objectives, but China cannot sustain it in the face of U.S. strike power. The United States can swing the balance of the conflict with only very limited attacks on the Chinese mainland.

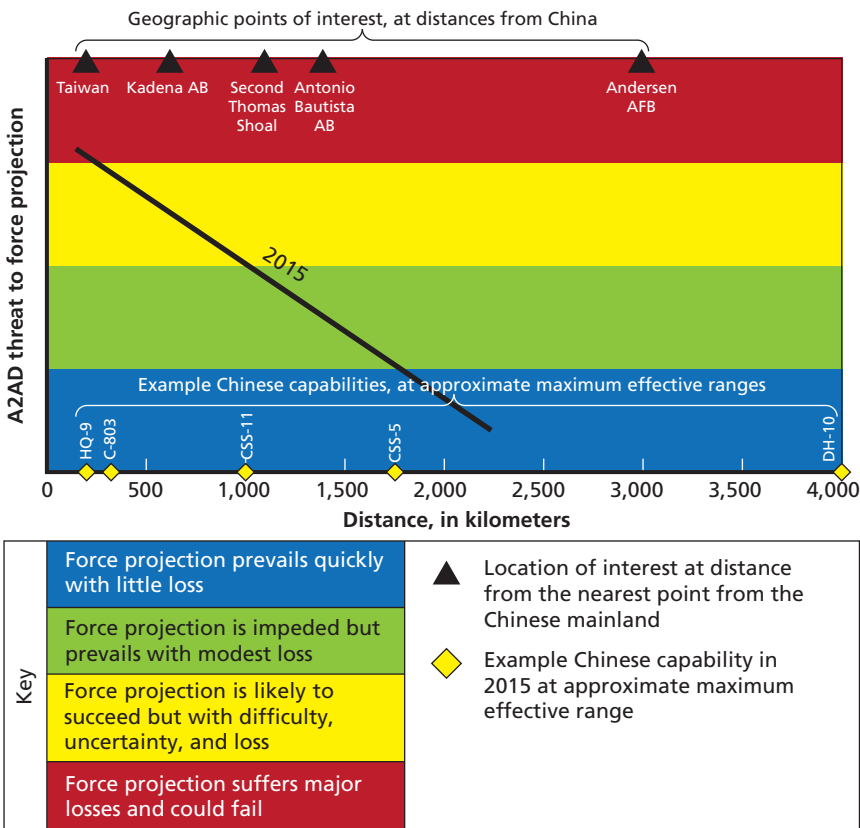
It is important to note that this conflict could unfold in ways even more challenging and costly for the United States. China did not open the war with a dramatic, comprehensive surprise attack against U.S. forces in the region, something that it might plausibly conclude is wise. Nor did the escalatory path unfold to include large-scale counterspace warfare or the use of nuclear weapons. Figure 3.2 summarizes our net assessment of this scenario, and Figure 3.3 depicts the A2AD threat to force projection in this scenario.

Figure 3.2
China–Philippines Net Assessment, 2015

Assessment	Color
The United States prevails in the capability contest quickly with little loss.	Blue
The United States prevails with some time and loss.	Green
The United States can succeed but with difficulty, uncertainty, and loss.	Yellow
The United States suffers major losses and could fail.	Red

A2AD threat to	By	Result
Surface ships	Submarines	Green
	Cruise missiles	Yellow/Blue diagonal stripes
	Ballistic missiles	Green
	Aircraft	Yellow
Strike aircraft	Air defense	Green
	Aircraft	Green
Bases	Ballistic missiles	Yellow/Blue diagonal stripes
	Cruise missiles	Green
C4ISR	Cyber	Yellow
	ASAT	Yellow
	EW	Green
Strategic risk		Yellow
Overall		Green

Figure 3.3
Chinese Anti-Access and Area-Denial Threat to U.S. Force Projection, 2015



NOTE: Effective range of an air-launched version of the DH-10 cruise missile includes the range of the bomber launching the missile.

China–Philippines, 2025

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

Background

U.S. objectives in Asia are much the same as in 2015: They include maintaining a stable relationship with China while deterring China from using force or the threat of force to resolve maritime territorial disputes. Furthermore, the United States attaches a high priority to forging relationships with new security partners and assuring long-standing U.S. allies and security partners that the United States has the capability to resist Chinese aggression. Tension between the United States and China has increased in the past decade, but the dispute has remained at a relatively low level, mostly involving Chinese use of MLE vessels to assert its claims.

Beijing's most-important objectives continue to be perpetuating CCP rule, sustaining economic growth and development, maintaining domestic social and political stability, defending Chinese sovereignty and territorial integrity, and securing China's status as a major power.⁵¹ Many Chinese observers view U.S. rebalancing as aimed at containing China and ensuring that its reemergence as a major power does not threaten U.S. interests.⁵² They see the United States as bent on maintaining its dominance and believe that U.S. power and determination to prevent China's rise from undermining its position make the United States the greatest potential threat to China's security. Nonetheless, they seek a stable relationship with the United States, one that is conducive to China's achievement of its broader domestic and international objectives. Chinese leaders frequently discuss establishing a "new pattern of major country relations" with the United States, one that avoids a major confrontation of the type that has often resulted

⁵¹ Information Office of the State Council of the People's Republic of China, 2013.

⁵² See, for example, Nathan and Scobell, 2012, and Lieberthal and Jisi, 2012.

between status quo and rising great powers and results in U.S. accommodation of China's most-important interests. Yet after pushing this concept for more than a decade, Beijing has been unable to win U.S. acceptance of its definition of the concept; many Chinese scholars believe that the relationship has become much more antagonistic, and they have suggested that Beijing should recognize this and stop using this concept to describe its vision for the future of the relationship.

In 2025, China is increasingly concerned about what it sees as challenges to its sovereignty claims in the SCS, and Beijing has been more forceful in asserting its claims in recent years. In some cases, China has basically repeated the pattern it established when it gained control over Scarborough Shoal after a standoff with the Philippines in 2012. China still prefers to rely on its formidable and growing MLE capabilities to pursue its claims, but it has also demonstrated its improving naval capabilities with PLAN deployments to the SCS.

In 2015, China's ability to conduct military operations in the more-distant parts of the SCS was limited.⁵³ In 2025, however, China's ability to conduct operations in the SCS has improved considerably. The PLAN's improved AAW capabilities allow it to provide organic air defense in the SCS, and its aircraft carriers enable it to provide fighter cover over the area.

China's rival claimants continue to welcome greater U.S. involvement as a counterweight to China in the region. Vietnam and the Philippines also aim to strengthen their own capabilities vis-à-vis China. Both have sought assistance from Japan to help them improve their own coast-guard capabilities. Vietnam has developed its own A2AD capabilities to deter Chinese military action against its interests. Yet both countries have important economic ties to China, and neither

⁵³ As one senior U.S. Air Force analyst recently observed,

A South China Sea conflict, particularly one at far reaches such as the Spratly Islands, will stress the ability of the PLAAF to project airpower in a sustained fashion. Limited aerial refueling capabilities, as well as a limited number of other "high demand-low density" assets such as Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) and support aircraft, greatly limits the PLAAF's capability to maintain presence over the expanse of the South China Sea.

See Fuell, 2014.

wants to stumble into a crisis or conflict with its larger and more powerful neighbor.

For other countries in the region, the calculus is at least equally complex. They are wary of the instability that would likely result from even greater friction between the United States and China. Moreover, even as the importance of their economic ties with China is increasing, they also value the role the United States plays in maintaining regional security and stability. Much as they have for the past 20 years or so, in 2025, they still seek to maintain good relations with Beijing and Washington, and they remain committed to avoiding being put in a position that would require them to choose between China and the United States.⁵⁴

Path to War

The path to war begins a decade earlier, with China's December 2015 announcement that it is establishing an ADIZ covering much of the SCS, including islands claimed by Vietnam and the Philippines. Following China's controversial establishment of an ADIZ over the ECS in 2013, the United States urged Beijing to refrain from making any similar moves in the SCS, especially without first consulting with other countries whose interests would be affected. Nevertheless, China concluded that establishment of an SCS ADIZ was required to more assertively press its sovereignty claims. The United States and most of the rival claimants rejected the Chinese ADIZ, and Washington responded almost immediately by flying B-52s through the claimed ADIZ without prior notification to China.

Tension over the newly announced SCS ADIZ subsided within a few months, but, by demonstrating a more aggressive Chinese approach to pursuing its interests in the region, the move set the stage for an action–reaction cycle that led to dramatically increased tension in the region.

That tension has led to violence on several occasions. Most of these have involved confrontations between MLE personnel and fishermen. Some of these incidents have resulted in diplomatic crises, such

⁵⁴ Medeiros et al., 2008.

as when a Vietnamese fisherman stabbed two Chinese MLE personnel when they attempted to detain him for violating Chinese fishing regulations in January 2018. The most serious incident thus far, however, took place in September 2020, when China and Vietnam engaged in a skirmish that left 26 Vietnamese personnel dead and dozens more injured, with a smaller number of casualties on the Chinese side.

In May 2025, the tension increases once again, when China and the Philippines begin engaging in a war of words over the status of several contested features in the SCS—most notably, Second Thomas Shoal. As the rhetoric on both sides intensifies, Beijing steps up its MLE activity in the area and sends a PLAN SAG to the SCS for what it describes as a “routine training exercise.” Beijing also uses economic pressure to try to coerce the Philippines, specifically by restricting imports of bananas, like it did at the time of the 2012 incident involving Scarborough Shoal.

Many observers suspect that Beijing is looking for an excuse to ratchet up its pressure on the Philippines, and analysts in Manila think that China might be preparing to seize what it sees as an opportunity to wrest control of some of the disputed areas in a manner similar to its handling of the Scarborough Shoal incident. But this time, the result is a much more serious crisis, one that unfolds so quickly the United States has little time to respond until it has already escalated to an extremely dangerous level.

On June 1, 2025, a large number of Chinese MLE vessels appear in the vicinity of Second Thomas Shoal, which lies about 105 nm from Palawan Island and is lightly defended by a small number of marines from the Philippines.⁵⁵ Both countries publicly reiterate their positions that they hold indisputable sovereignty over Second Thomas Shoal and warn that the other side has no legitimate reason to be there.

In Manila, leaders fear that Beijing plans to take control of Second Thomas Shoal, relying largely on its MLE capabilities to avoid escalation, if possible. They warn Washington that Beijing’s strategy is to surround Second Thomas Shoal with MLE ships in order to prevent the

⁵⁵ For an assessment that identifies Second Thomas Shoal as a potential flash point, see Glaser and Szalwinski, 2013.

Philippines from delivering supplies to the small number of marines it has stationed on the BRP *Sierra Madre*, a World War II-era landing transport ship it ran aground on the shoal in the late 1990s to establish its presence in the area.⁵⁶

Their concerns are proven correct later that week when Chinese ships begin blocking Philippine attempts to resupply the marines. Meanwhile, the PLAN SAG that had been conducting an exercise in the SCS moves toward Thitu Island, which the Philippines currently occupy.⁵⁷ Thitu Island—the second-largest island in the Spratly Islands after Taiwan-held Itu Aba—features a roughly 1,400-m-long airstrip, and approximately 50 army troops from the Philippines defend it.⁵⁸ The PLAN SAG is composed of a destroyer, two frigates, and a Type 071 amphibious ship equipped with helicopters and LCAC. PLAN carriers and other surface ships and submarines are also deployed to the SCS, as part of what appears to be a show of force designed to intimidate the Philippines.

On June 11, 2025, the situation appears to be on the verge of spiraling out of control when a collision between a Chinese MLE vessel and a Philippine Navy ship in the vicinity of Second Thomas Shoal results in the death of two members of the Chinese vessel's crew. The next morning, with tensions already running high, a video of the ship collision appears on the Internet, sparking angry protests in Beijing and other major Chinese cities.

Beijing issues a statement warning that the Philippines “will be held 100 percent accountable for the deaths of the two Chinese who gave their lives to protect our sovereignty.” Manila responds by charging that the collision was the result of a dangerous maneuver by the Chinese MLE vessel. Fearing that China is about to further escalate the conflict, Manila urgently appeals for support from the United States and other countries. Washington issues a public statement indicating

⁵⁶ On the *Sierra Madre*, see Himmelman, 2013.

⁵⁷ Thitu Island is also known as Zhongye Dao in Chinese and Pag-asa in Tagalog. For more, see Thayer, 2014.

⁵⁸ In addition, Thitu Island has a population of about 200 civilians, and it is administered under the Philippine municipality of Kalayaan.

that it does not take sides in the territorial dispute but expects China to exercise restraint and pursue its claims in a manner consistent with international norms and laws. The United States also begins adjusting its military deployments in the region to deter China from using force against the Philippines.

U.S. attempts to deter China from further escalating the confrontation fail, and, on June 14, 2025, Beijing executes what PLA doctrinal literature describes as a “coral island reef seizure campaign” to gain control over some disputed areas—most notably, Second Thomas Shoal and Thitu Island. The PLAN relies mainly on the Type 071 amphibious ship and its Yuyi-class LCACs to conduct the assault, and the Philippine forces on the island suffer heavy casualties in an attempt to repel the Chinese attack. The PLAN also sinks two Philippine surface ships near Second Thomas Shoal, and PLANAF fighters launched from China’s first indigenously developed aircraft carrier shoot down two military aircraft from the Philippines not far from Thitu Island. Within 24 hours, China controls Second Thomas Shoal, Thitu Island, and other disputed areas.

These events draw the United States directly into the fray. The president of the United States delivers a televised address in which he states that Washington is “determined to respond to Chinese military aggression against the Philippines and to preserve freedom of navigation in South China Sea. We will not remain on the sidelines when one of our allies is attacked.” The stage appears to be set for a major showdown between China and the United States.

The United States’ Conflict Objectives

U.S. conflict objectives include ensuring freedom of navigation in the SCS, preventing China from using force to resolve claims to disputed territory or maritime rights, ensuring that such issues are resolved in accordance with international norms and law instead of by coercion, and defending the Philippines from further Chinese coercion or attack. The United States also aims to restore security and stability to the region as quickly as possible, and Washington wishes to avoid a large-scale conflict with China and to limit escalation. In addition, the

United States aims to preserve its alliance relationships and maintain its influence in Asia.

China's Conflict Objectives

Chinese conflict objectives are straightforward. Beijing aims to gain control over Second Thomas Shoal, Thitu Island, and other features that the Philippines claims. China also hopes its forceful stance will give it greater bargaining leverage vis-à-vis other rival claimants, including Vietnam, Malaysia, and Brunei, enabling it to resolve the rest of the disputes in the SCS in its favor through bilateral negotiations. China seeks to deter U.S. military intervention, if possible, or, if deterrence fails, to ensure that U.S. military intervention does not prevent China from achieving its strategic objectives. In addition, Beijing calculates that its actions will undermine the credibility of U.S. security assurances and limit the United States' ability to challenge China's regional security interests more broadly.

Rival Claimants' and Other Countries' Conflict Objectives

Manila seeks to prevent China from controlling disputed islands through the use of force. In addition, Manila seeks to strengthen its relationship with the United States and gain stronger backing from other countries in the region to deter future Chinese coercion or use of force.

Like in 2015, other countries in the region make clear that they do not wish to be drawn directly into the impending conflict between China and the United States. Most notably, although Japan has publicly supported the United States and the Philippines, it has indicated that it does not want the United States to draw it into a wider war. The United States agrees to minimize direct use of Japanese facilities for operations in the Philippines. Both countries, however, take measures to prepare should the fighting spread.

Conduct of the War

This section describes the conduct of the war in the 2025 SCS scenario. It begins with a brief overview of important changes in the two sides' capabilities since 2015.

Changes Since 2015

This section briefly outlines changes in Chinese and U.S. military capabilities that distinguish the 2025 SCS scenario that follows from the 2015 scenario that we presented above. It covers qualitative and quantitative improvements in Red and Blue capabilities, as well as any posited decreases in capability over the intervening period of time (because of budget constraints, for example).

The most-notable improvements in Chinese capabilities include the addition of conventional IRBMs, increased inventories of SRBMs and MRBMs, operational carrier aviation capabilities, fifth-generation stealth fighters, S-400 SAMs, and improvements in C4ISR systems. The aircraft-carrier capability the PLAN now deploys is particularly significant in this scenario because it improves fighter coverage in the SCS, whereas, in the 2015 scenario, China relied on land-based aircraft with a limited ability to conduct operations successfully in the distant areas of the SCS. China has also upgraded its space capabilities to give them farther-ranging and more-robust ISR and communication coverage in the western Pacific and SCS and deployed counterspace systems. In addition, Beijing has further strengthened the credibility of its nuclear deterrent with the deployment of DF-41 road-mobile ICBMs capable of carrying MIRVs, and it is believed to be close to fielding an ICBM-launched hypersonic glide vehicle that could be used as a nuclear delivery system or in a CPGS role.

The United States has faced budget challenges, but it has not been standing still. Key improvements in U.S. military capabilities include enhanced offensive cyberwarfare capabilities and the LRASM, which has improved U.S. ASuW capabilities. The F-35 has been fielded. Carriers now embark limited numbers of unmanned combat aircraft, and small numbers of land-based stealth long-range UASs are available for strike and ISR. In addition, the United States has started to deploy CPGS capabilities in limited numbers.

China’s Anti-Access and Area-Denial Concept of Operations

China’s CONOPS are, broadly, unchanged from 2015. China will take and hold islands using the “coral island offensive campaign” concept and then wage an “anti-air raid campaign” designed to repel any U.S.

air strikes against forces participating in the main campaign or against important mainland military, political, or economic targets.

The United States' Force-Projection Concept of Operations

Like in the 2015 case, the United States believes that it can achieve its campaign objectives without attacking the Chinese mainland. Rather, it will be sufficient to destroy Chinese air and naval assets supporting the island seizure. Although the Spratly Islands are at a considerable distance from the mainland, PLA abilities to operate at extended ranges have substantially improved since 2015. Therefore, the United States is expecting increased air and naval resistance. Because U.S. presence in and near the SCS is very limited, U.S. air and naval forces will flow into theater. In addition to U.S. bases in Guam, the Philippine government has allowed the U.S. aircraft to operate from Clark AB, Antonio Bautista AB, and Edwin Andrews AB. Port facilities are also available at Subic Bay for the U.S. Navy.

Assessment of Chinese Anti-Access and Area Denial Versus U.S. Force Projection

Chinese Anti-Access and Area Denial Versus U.S. Strike Aircraft: Setup

The most immediate role of U.S. strike aircraft is to destroy Chinese military targets that are directly engaged in prosecuting the seizure of Philippine-held SCS islands and features. This specifically includes PLAN destroyers, frigates, and amphibious ships and possibly various Chinese state maritime enforcement vessels. Because U.S. ROE do not permit strikes against mainland targets, U.S. strike aircraft are prohibited from striking airfields, ports, conventional ballistic-missile and GLCM units, and other facilities. However, strikes against any PLA facility located on the islands and atolls that China controls in the SCS, such as on Woody Island, are permitted.

Numerous U.S. Air Force and Navy strike aircraft of multiple types can be brought to bear on PLA military forces supporting the seizure of the islands. When in theater, these aircraft will be stationed either afloat on U.S. aircraft carriers, on U.S. bases on Guam, or from airfields that the Philippines allows for U.S. use during the conflict (Clark AB, Antonio Bautista AB, and Edwin Andrews AB).

Even with the addition of the S-400, Chinese land-based SAMs do not pose a threat to U.S. aircraft operating around the Spratly Islands. Like in 2015, the likeliest threat to U.S. strike aircraft in 2025 are AAMs launched from PLAAF and PLAN fighters. However, in 2025, the frontline fighters seeking to maintain air superiority over the SCS include substantial numbers of fifth-generation J-20 and J-31 fighters. These aircraft have a maximum operational radius of 1,500 km and can stay on station for substantial periods of time to intercept U.S. strike aircraft because they can be aerially refueled with the PLAAF's and PLAN's fleet of converted H-6 bombers and Y-20 aerial refueling variants. Chinese aircraft carriers (covered in the discussion of surface ships) embark roughly two dozen J-15 aircraft.

The most-lethal PLA AAMs are the China-developed PL-21 with a range above 100 km.⁵⁹ AEW&C aircraft, such as the KJ-2000 and KJ-200, which could be integrated into China's larger C4ISR picture, will aid the PLA fighters launching these missiles. That picture includes space-based assets and an OTH radar that ranges to as much as 3,000 km, covering a substantial portion of the Philippine Sea.⁶⁰

Afloat, the PLAN has 10 Luyang II-class and Luyang III-class destroyers carrying 48 HHQ-9 SAMs in vertical-launch tubes, as well as 40 or so frigates that carry 36 of the missiles each.⁶¹ This represents the most potent ship-to-air threat in China's arsenal. Also of note are the service's two Luzhou-class destroyers that carry 36 SA-N-20 SAMs each and have a range of 75 km.⁶²

Chinese Anti-Access and Area Denial Versus U.S. Strike Aircraft: Outcome

U.S. fighters operating from the southern Philippines are severely challenged to seize air superiority over the middle portion of the SCS to enable U.S. strike aircraft to attack PLAN surface ships at will. China has approximately 150 PLAAF and PLAN fighter aircraft (roughly five

⁵⁹ "PL-12," 2013.

⁶⁰ Project 2049 report (Stokes, 2009, p. 18) mentioned in *Taiwan Matters to America*, 2009.

⁶¹ "Luyang-II," 2014.

⁶² "Luzhou Class," 2013.

regiments) in the vicinity of the SCS, as well as numerous combat support aircraft and bombers, and can bring forward additional aircraft from other areas of the country. With tankers and AEW&C aircraft, China is able to mount an effective defense of the area. U.S. ground-based tactical-aircraft sorties are sharply limited in number in the first week of the fight (see discussion of fixed assets), and carrier-based air is stretched to defend U.S. surface ships. U.S. fighters aim to wrest local superiority for certain periods of time for strike assets to launch their standoff payloads at Chinese ships and (a lower priority) forces on the ground. Simultaneously with the air-superiority mission mentioned above, U.S. Navy carrier-based F-35Cs and Air Force B-52s firing AGM-84 or AGM-158 maritime interdiction variant (also known as LRASM) first focus their attacks on PLAN surface ships that pose a significant air-defense threat.⁶³ Long-range stealthy UASs can locate and track Chinese capital ships without significant danger of detection and help direct coordinated strikes. By D+6, U.S. aircraft have damaged or sunk three Type 052D destroyers, but at least seven more are operating in the theater. Two Chinese amphibious ships are also put out of action. Early U.S. losses to air combat include six fighters and a B-52.

Chinese Anti-Access and Area Denial Versus U.S. Fixed Assets: Setup
China's ability to seize Philippine possessions in the SCS is enhanced by effectively denying U.S. air assets the ability to operate from forward locations in the Philippines. Without these bases, U.S. air-superiority and special-mission aircraft would have to increasingly rely on numerous aerial refuelings to support strike sorties. Overall aerial refueling demand would increase significantly and ultimately lead to a decrease in strike sortie throughput. Clark AB and Antonio Bautista AB in the Philippines are highly susceptible to strikes from the entire arsenal of PLA MRBMs and medium-range cruise missiles, as well as a new IRBM.

In 2025, Guam and Edwin Andrews AB are now vulnerable to strikes from sea-based and land-based systems. From the sea, China's

⁶³ "AGM-84 Harpoon," 2013; "AGM-158 JASSM," 2014.

newest SSGN, the Type 095 class, can use its complement of cruise missiles to attack targets on the island.⁶⁴ From the mainland, the PLASAF has fielded a conventional IRBM that can cover the roughly 3,000-km distance to Guam to strike targets on the U.S. territory with precision.⁶⁵ Both of these capabilities significantly extend China's A2AD perimeter. At more than 4,000 km, U.S. bases in Australia are still out of reach of PLA conventional missiles, either ground or air launched. It is also conceivable that SLCMs that the Type 095 SSGN carries might attack both bases. Table 3.3 lists the missile threats to U.S. bases in this scenario, and Figure 3.4 depicts their ranges.

Chinese Anti-Access and Area Denial Versus U.S. Fixed Assets: Outcome

China begins a joint firepower strike to destroy or degrade the ability of U.S. bases to generate sorties. Sustaining a modicum of air cover is necessary to enable Chinese seizures of Philippine possessions, so suppressing U.S. airbases' sortie generation is an important campaign priority. Of these airbases, Clark and Antonio Bautista are hit with more than 200 ALCMs, SLCMs, and SRBMs. Edwin Andrews is more difficult to target but can be reached by the new IRBM. The inundation is

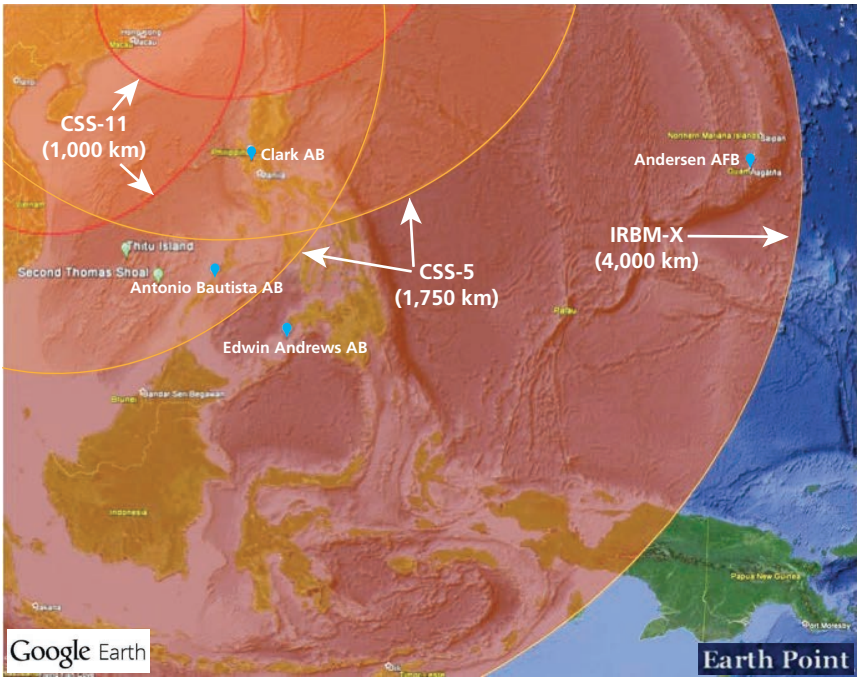
Table 3.3
The Chinese Ballistic- and Cruise-Missile Threat to U.S. Bases, 2025

Chinese Name	NATO Designation	Type of Missile	Total Range, in Kilometers	Missiles	Launchers
DF-21 variant	CSS-5	MRBM	2,500	~225	90
YJ-63	—	ALCM	200	Unknown	20 (H-6H)
CJ-10	—	LACM	1,500–2,000	400–600	54
DH-10	—	ALCM	3,300–3,800	Unknown	36 (H-6K)
U/I	—	IRBM	4,000	75	25
U/I	—	SLCM	2,000	36	3 (SSGN)

⁶⁴ O'Rourke, 2014.

⁶⁵ Office of the Secretary of Defense, 2013.

Figure 3.4
Ranges of Select Chinese Ballistic Missiles Relative to the Philippines, 2025



SOURCE: Google Earth.
NOTE: Missile-launcher locations are illustrative.
RAND RR1359/1-3.4

designed for both operational and strategic effect: Reduce or eliminate U.S. land-based tactical-aircraft sorties and push the United States quickly out of war. The former objective, at least, is accomplished: U.S. sorties are cut almost 80 percent for seven days and are degraded thereafter by sporadic follow-on attacks. None of the bases has significant hardening, and Antonio Bautista and Edwin Andrews have only a single main runway each, so they are especially susceptible to suppression efforts.

China strikes Guam and Darwin with conventional SLCMs from its Type 095 SSGN, as well as the new IRBM. As a result of these strikes, both airbases cannot generate sorties for almost two days at the beginning of the campaign. As a result, long-range strike assets (B-52

aircraft) stationed are initially hampered but can continue operations on D+3, placing more of the counter–surface strike mission in the lap of carrier-based aviation. Because China does not want to widen the conflict, U.S. basing outside of the SCS (other than Darwin), located in third-party countries, is not attacked. U.S. port and support facilities in east Asia remain unscathed.

Chinese Anti-Access and Area Denial Versus U.S. Surface Ships: Setup Like in 2015, for the United States to achieve its conflict objectives, it must prevent the PLAN from dominating the SCS and restricting freedom of navigation in the area. It must also prevent China from seizing and maintaining control of disputed features in the area. China must ensure that U.S. intervention does not prevent it from seizing and holding the territory it claims or achieving its other objectives. Specifically, China’s military must be prepared to counter expected U.S. military intervention, and this requires it to employ A2AD capabilities against U.S. surface ships attempting to disrupt the Chinese attempts to seize islands and reefs or to carry out other military actions against China. By 2025, China has significantly strengthened the PLAN’s counter-intervention capabilities, enabling China to hold U.S. assets at risk at greater distances from China.⁶⁶

The ASuW capabilities China can bring to bear against U.S. surface ships include surface ships, submarines, and aircraft all capable of launching ASCMs, as well as PLASAF land-based ASBMs.⁶⁷ Semi-autonomous UUVs can now perform an ISR role hundreds of nautical miles from the Chinese coast and even lay mines.⁶⁸ In addition, the PLAN has been continuing to enhance its logistics capabilities, and it has made important strides in other areas, such as C4ISR systems, education, training, and exercises. Even by 2025, ASW remains an important area of weakness for the PLAN. Nonetheless, the PLAN poses an increasingly serious threat to regional rivals, and it has emerged as a major element of China’s ability to deter U.S. military intervention

⁶⁶ Karotkin, 2014.

⁶⁷ O’Rourke, 2013.

⁶⁸ On UUVs, see Goldstein and Knight, 2010, pp. 30–35. On mines, see Truver, 2012.

or, if deterrence fails, to counter U.S. military intervention by delaying the arrival of U.S. forces and reducing the effectiveness of their operations.⁶⁹

The PLAN has fielded increasing numbers of its most-sophisticated ships since 2015. As mentioned above, it now has 20 domestically produced Luyang II and Luyang III destroyers, which feature phased-array radar systems and can launch ASCMs and LACMs.

In addition, China commissioned its first aircraft carrier, *Liaoning*, in September 2012. It is a refurbished aircraft carrier that China acquired from Ukraine in the late 1990s. It is conventionally powered and has a ski-ramp configuration that limits the range and payload of its fixed-wing aircraft. It is capable of accommodating roughly 30 aircraft, including fixed-wing aircraft and helicopters. It embarked an operational air wing in 2016.⁷⁰

By 2025, China has deployed two much more-capable indigenously developed aircraft carriers, and at least two more are reportedly under construction. China's carrier aviation capabilities are still much less sophisticated than those of the United States in many respects, but they are more than enough to intimidate many of China's neighbors in the region. This is especially true with respect to much weaker countries, such as the Philippines.

By 2025, China's amphibious capabilities have improved, and top PLA officers are confident of their ability to successfully seize disputed features in the SCS, especially with the improved air cover made available by their new aircraft carriers.

China also has a growing number of modern submarines. By 2025, these more-modern submarines have replaced China's older, less capable submarines. The modernization of China's submarine force has continued to focus on qualitative improvements. The fleet is capable of

⁶⁹ The PLAN is expected to contribute to other missions, including enforcing China's territorial claims in the ECS and SCS; challenging foreign military activities in its EEZ; protecting Chinese SLOCs; participating in noncombatant evacuation, antipiracy, and HADR operations; promoting China's regional security interests; and bolstering China's status as an emerging world power more generally. See O'Rourke, 2013.

⁷⁰ On Chinese carriers and carrier-based aircraft developments, see O'Rourke, 2014, pp. 15–21.

longer SCS patrols and thus of greater presence in the contested waters. It is also harder to detect, and there is a greater profusion of cruise missile-launching capability.

In addition, in 2025, five Type 094 SSBNs are now operational with the PLAN. They have been conducting deterrence patrols since 2015. Each Type 094 can carry 12 JL-2 nuclear-armed SLBMs. China is developing its next-generation Type 096 SSBN, which is expected to enter service sometime later in the 2020s.⁷¹

The land-based aircraft of the PLAAF and PLANAF also represent a potent A2AD threat against U.S. surface ships. Modern aircraft in China's inventory include Russian-made Su-27s and Su-30s; indigenously produced J-10s and J-11s; and stealthy, fifth-generation J-20s and J-31s. At least some of China's strike fighters are armed with modern ASCMs. China's land-based naval aircraft inventory also includes ASCM-armed JH-7 fighter-bombers and older, but potentially threatening, ASCM-armed land-based bombers.⁷²

The ASCMs themselves are also more lethal, with greater range and precision. The YJ-12 supersonic missile has been fielded in large numbers.⁷³ It has a range of approximately 400 km. In addition, China has a wide range of mine-warfare capabilities. By 2025, these include not only a variety of moored, bottom, drifting, rocket-propelled, and intelligent mines but also advanced capabilities, such as extended-range propelled-warhead mines, antihelicopter mines, and bottom-influence mines equipped to counter minesweeping efforts.⁷⁴

By 2025, the PLAN also has a substantial land-attack capability, with three aircraft carriers (the refurbished carrier that entered service more than a decade earlier and two indigenously produced carriers that entered service more recently) and destroyers and submarines capable of launching LACMs.

⁷¹ Office of the Secretary of Defense, 2013, pp. 6–7.

⁷² O'Rourke, 2014, p. 32.

⁷³ Office of the Secretary of Defense, 2014, p. 40.

⁷⁴ Erickson, Goldstein, and Murray, 2009.

Furthermore, PLASAF fields DF-21 ASBMs capable of targeting U.S. aircraft carriers. China’s inventory of ASBMs has increased since 2015, when only a relatively small number were deployed to PLASAF units. Approximately 90 launchers can carry DF-21 variants, triple the 2015 total. The 2025 variants of the DF-21 have a range of about 2,500 km.⁷⁵ Table 3.4 lists the Chinese naval capabilities relevant to this scenario.

Like in 2015, the U.S. Navy brings the great majority of the Pacific fleet to bear. Flow of assets based elsewhere begins on D-day. About 40 destroyers and cruisers are in and around the western Pacific by D+10 along with 20 SSNs. Three CVNs are in theater by D+10 and

Table 3.4
Selected Chinese Naval Capabilities, 2025

Type	Number	Percentage That Are of Modern Design
Aircraft carrier	3 (including 2 domestically produced)	
Destroyer	34	85 (<i>modern</i> defined as multimission or extensively upgraded)
Frigate	58	85 (<i>modern</i> defined as multimission or extensively upgraded)
Corvette	30	
Amphibious ship	55	
Missile-armed coastal patrol craft	85	
Diesel submarine	64	75 (<i>modern</i> defined as capable of firing ASCMs)
SSN and SSGN	9	100 (<i>modern</i> defined as capable of firing ASCMs)
SSBN	5	

SOURCE: Estimates based in part on 2020 estimates from O’Rourke, 2013, p. 45.

⁷⁵ See Erickson, 2010; Office of the Secretary of Defense, 2013, p. 5; and NASIC, 2013.

four by D+20. About three-quarters of these assets are devoted to the SCS AO, including south and east of the Philippines. The remainder are east of Taiwan, focused on a potential geographic expansion of hostile activity.

Chinese Anti-Access and Area Denial Versus U.S. Surface Ships: Outcome

In 2025, China is fully capable of executing rapid and decisive operations against a weaker rival, such as the Philippines, but, if Beijing thought it would be facing the Philippines alone in this conflict, it was wrong. The United States quickly responds to Manila's request for assistance and states that it will come to the defense of its ally. Although China's capabilities have improved in the past decade, blunting U.S. military intervention in the SCS is a much greater challenge for China because of such factors as the distance of some of the disputed areas from the Chinese mainland and Chinese weaknesses in such areas as undersea warfare.

The first week of the conflict is disastrous for the PLAN. In addition to the losses to U.S. aircraft described above, on D+4, U.S. SSNs sink two Chinese DDGs, three FFGs, and four Chinese corvettes. The most devastating loss comes on D+6, however, when U.S. SSNs heavily damage both of China's domestically produced aircraft carriers. The loss is humiliating politically, and it is also very serious operationally because the much less capable *Liaoning* is the only PLAN carrier still taking part in the conflict at the end of the first week. The United States also unleashes a series of cyberattacks against Chinese military communication networks and ISR systems.

Despite its early losses, however, China still retains formidable A2AD capabilities. In the 2015 scenario, U.S. aircraft carriers operated beyond the range of Chinese DF-21D ASBMs for the most part, but, in this 2025 scenario, they are threatened not only by long-range air-, surface-, and submarine-launched ASCMs but also by a new longer-range ASBM, a DF-21 variant with a range of 2,500 km.

Indeed, given China's impressive A2AD capabilities against surface ships, the United States expects a difficult fight, and the first week of the war is a very costly one for the United States. Chinese subma-

rines and surface ships launch long-range ASCMs at several U.S. ships on D+3, sinking a DDG and heavily damaging three other U.S. ships. On D+4, Chinese mines heavily damage two more U.S. ships.

On D+5, ASCMs launched by Chinese maritime strike aircraft, surface ships, and submarines heavily damage a U.S. aircraft carrier in the SCS. The Chinese attack against the U.S. carrier triggers a major escalation of the conflict. The United States launches another series of nonkinetic counterspace actions and cyberattacks, this time along with a large number of air and cruise-missile strikes—the first kinetic attacks against mainland targets in this conflict. These actions are intended to further degrade China's ability to locate and target U.S. surface ships. The U.S. attacks include air strikes and SLCM attacks against Chinese OTH radars and several other targets. The United States withheld kinetic strikes against the mainland up to this point because of concerns about strategic escalation risks but considered the strikes to be a necessity after the strikes against the aircraft carriers.

Nonetheless, U.S. actions are only partially successful, and, on D+6, multiple ASCMs and an ASBM hit another U.S. aircraft carrier. The strikes cause a large number of casualties and severely damage the carrier, effectively knocking it out of action for the remainder of the conflict. The United States is forced to devote substantial resources to rescue operations and to removing the crippled carrier from the area. In conjunction with the attacks on U.S. fixed bases, U.S. tactical airpower has been cut to a bare minimum.

In the meantime, for the next several days, U.S. SSNs continue to exact a heavy toll on Chinese surface ships, sinking multiple PLAN frigates and destroyers. Additionally, on D+10, U.S. carrier-based and land-based aircraft engage PLAAF and PLANAF fighters and bombers in the air over the SCS. The United States loses a small number of aircraft to Chinese AAMs but inflicts much heavier losses on the Chinese side.

On D+11, China launches ASBM and ASCM strikes against another U.S. CSG. The attacks against the carrier fail to hit their target, but Chinese ASCMs sink two U.S. surface ships that were part of the CSG.

By the end of the second week of the war, both sides have suffered heavy losses. U.S. SSNs and LRASMs, in particular, have inflicted serious damage on the PLAN's surface fleet, while Chinese ASuW capabilities, especially ASCMs and ASBMs, have also taken a heavy toll on the U.S. forces sent to intervene on behalf of the Philippines.

Chinese Space, Information Warfare, and C4ISR Versus U.S. Counter-C4ISR: Setup

Chinese military writings on space continue to emphasize its importance in gaining and maintaining information superiority, which, in turn, is seen as key to seizing the initiative in a conflict with a technologically advanced adversary, such as the United States. Space is therefore seen as a potentially decisive arena in this conflict scenario, and China seeks to ensure its ability to operate freely in space while denying the same ability to the United States.⁷⁶

Compared with a Taiwan scenario, in which the PLA is much less dependent on space than the United States is, an SCS scenario is more complex for China. China's own space-based capabilities have improved considerably in the past decade, with greater ISR coverage and better fidelity and a denser, more reliable communication network. China can employ UAVs and other such capabilities, but it is more reliant on space in the SCS than it would be in a conflict over Taiwan because of the greater distances from the Chinese mainland. But the asymmetry in the level of dependence on space systems gives China a strong incentive to degrade or deny U.S. space systems even at the expense of U.S. retaliation in kind against Chinese satellites.⁷⁷ Even in 2025, PLA strategists likely calculate that China is better off if both sides essentially negate each other's space capabilities than if it allows the United States to continue using its space systems in hopes of encouraging U.S. restraint.

Nonetheless, as the crisis intensifies, PLA strategists discuss the potential advantages of some limits on conflict in space, such as refraining from attacks that generate large amounts of debris, which could

⁷⁶ Pollpeter, 2012; Cheng, 2012.

⁷⁷ Gompert and Saunders, 2011.

damage other countries' satellites and potentially bring them into the conflict when they might otherwise choose to remain on the sidelines.

PLA strategists debate whether certain U.S. space systems, such as U.S. early-warning satellites, are essentially off limits because of the potential escalation risks or whether they are potentially legitimate targets because they play tactical, as well as strategic, roles in supporting U.S. military operations. By 2025, however, China has launched its own missile early-warning satellites. This makes it possible for the two countries to reach an informal understanding via various unofficial dialogues: In the event of a conflict, they should avoid attacks against space-based early-warning capabilities so as not to increase the risk of nuclear escalation. Yet it is unclear whether they will adhere to this understanding throughout the 2025 conflict over the SCS.

The Chinese military's doctrinal writings also emphasize the importance of maintaining China's own C4ISR capabilities while denying the same to the adversary. Part of this involves such measures as camouflage, concealment, denial, and deception to protect PLA forces from detection and targeting by U.S. precision-strike capabilities.

As for capabilities, China's space and counterspace capabilities have improved considerably since 2015. China has on orbit a range of satellites to support its military operations, including ISR, navigation and positioning, and communication satellites. China also has at its disposal a variety of counterspace capabilities. These include a wide range of soft-kill and hard-kill counterspace capabilities, such as kinetic-energy weapons (e.g., missiles), directed-energy weapons (e.g., laser, microwave), and systems capable of capturing, damaging, or destroying enemy equipment in space. Although Chinese officials are circumspect about discussing these capabilities in public, Chinese scholars and scientists have stated in unofficial settings that China has developed a wide range of capabilities, including direct-ascent and co-orbital ASAT.

Chinese Space, Information Warfare, and C4ISR Versus U.S. Counter-C4ISR: Outcome

China will not easily be deterred from escalating the conflict in space if it believes that the United States stands more to lose than China does.

Even though China's own reliance on space systems has increased considerably by 2025, and some of these systems are very important in an SCS scenario, Beijing still concludes that the negation of both sides' space systems, should it come to that, would have a greater impact on the U.S. military's ability to conduct operations than it would on the PLA. Consequently, in this showdown between the United States and China over the SCS, space quickly becomes an important battleground.

Space-control actions throughout the early phases of the conflict are limited to reversible measures, such as jamming. For example, the United States employs reversible means to degrade Chinese space-based ISR capabilities. However, on D+6, after U.S. mainland attacks, China escalates in space by employing a space robotic arm capability to permanently disable a U.S. ISR satellite.⁷⁸ China conducts the attack without generating debris that could present a hazard to other space systems, but the United States nonetheless views the action as a major escalation because of its permanent effects against an important U.S. space capability.

The United States responds on D+8 by launching air and cruise-missile strikes against Chinese ground-based space surveillance facilities and space-launch facilities in China, yet concerns about escalation mean that neither side is willing to employ the full range of capabilities at its disposal or to attack the full range of its adversary's space systems. One limit that holds throughout the conflict is that each side refrains from attacking the other's missile early-warning satellites for fear that doing so would increase the risk of nuclear escalation. Another is that China and the United States also refrain from debris-generating counterspace actions, calculating that destruction of the other side's satellites would constitute a major escalation of the conflict and that resultant debris would pose a threat to their own space systems, as well as those of other countries not involved in the conflict.

On D+17, China attempts to reconstitute some of the lost space-based ISR capability by using solid-fuel launchers designed for a rapid-

⁷⁸ Pollpeter, 2013.

response capability to place new satellites into orbit.⁷⁹ Beijing also threatens to escalate to direct-ascent ASAT attacks if the United States takes any further actions against Chinese satellites or launches any further strikes against Chinese ground stations or space-launch facilities.

Conclusion of the War

On D+20, China loses contact with a Type 094 SSBN that was on patrol in the SCS. The circumstances surrounding the loss of the submarine are unclear, but many Chinese analysts are convinced the United States destroyed the submarine to place greater pressure on China. They believe that the United States might be preparing to coerce China with nuclear threats, and they place a larger portion of their land- and sea-based nuclear forces on alert. The higher level of readiness is intended to increase their survivability and to signal China's resolve to the United States. The next day, official Chinese media reports quote a PLA general as suggesting that any further strategic conventional attacks risk invalidating China's NFU nuclear policy. "If U.S. strategic attacks further escalate the situation," he warns, "China might be forced to consider all means at its disposal, including nuclear weapons."

There are serious concerns in both capitals and throughout the region that the conflict could be on the verge of further escalation in space, or possibly even be getting closer to crossing the nuclear threshold. Moreover, both sides have suffered heavy losses during the three-week conflict, and neither side appears to be fully capable of imposing its will on the other. The United States can prevent China from maintaining control of disputed features in the SCS with air and cruise-missile strikes, but China retains formidable A2AD capabilities it can use to prevent the Philippines and the United States from reclaiming control over the same features.

⁷⁹ "China's First Solid-Fuel Rocket to Debut Before 2016," 2013. According to Liang Xiaohong, deputy head of the China Academy of Launch Vehicle Technology, the Long March-11 rocket will be capable of launch on short notice. "The development of the Long March-11 will greatly improve China's capabilities to rapidly enter the space and meet the emergency launching demand in case of disasters and emergencies," Liang said.

On D+22, with both sides increasingly convinced that they cannot achieve their objectives in the face of determined opposition, and with the conflict seemingly on the verge of spinning out of control, the United States and China agree to a cease-fire to begin negotiations to end the conflict. The United States emphasizes that it still does not take a position on the sovereignty claims with respect to any specific feature in the SCS. At the same time, Washington insists that China not use force or coercion to pursue its objectives, and it therefore expects China to remove all remaining Chinese personnel from the features it occupied earlier in the conflict. Nonetheless, the outcome of negotiations appears uncertain. Commentators throughout the region welcome the cease-fire announcement, but they fear that the talks could break down, possibly leading to renewed hostilities at any time.

Net Assessment

In 2025, China's ability to conduct A2AD at distance is much improved. A larger inventory of longer-range missiles enables it to threaten airbases it could not meaningfully attack in 2015. U.S. ships cruising even well south of the contested areas can be threatened, in particular by ALCMs.

Although the risk to U.S. forces is markedly increased, China cannot otherwise do much to protect its own ships. They have non-trivial organic air-defense capabilities, but they are not sheltered by mainland systems and still can be found and targeted by U.S. planes and submarines. Chinese deficiencies in ASW, like in the Taiwan case, prove critical.

Both sides take escalatory steps that they did not take in 2015. The United States is driven to earlier, more-comprehensive kinetic and nonkinetic strikes on mainland-based elements of the Chinese kill chain. Both countries engage in counterspace operations.

It is important to note that this conflict could unfold in ways even more challenging and costly for the United States. China did not open the war with a dramatic, comprehensive surprise attack against U.S. forces in the region, something that it might plausibly conclude is wise. Nor did the escalatory path unfold to include large-scale counterspace warfare or the use of nuclear weapons. Figure 3.5 shows our net assess-

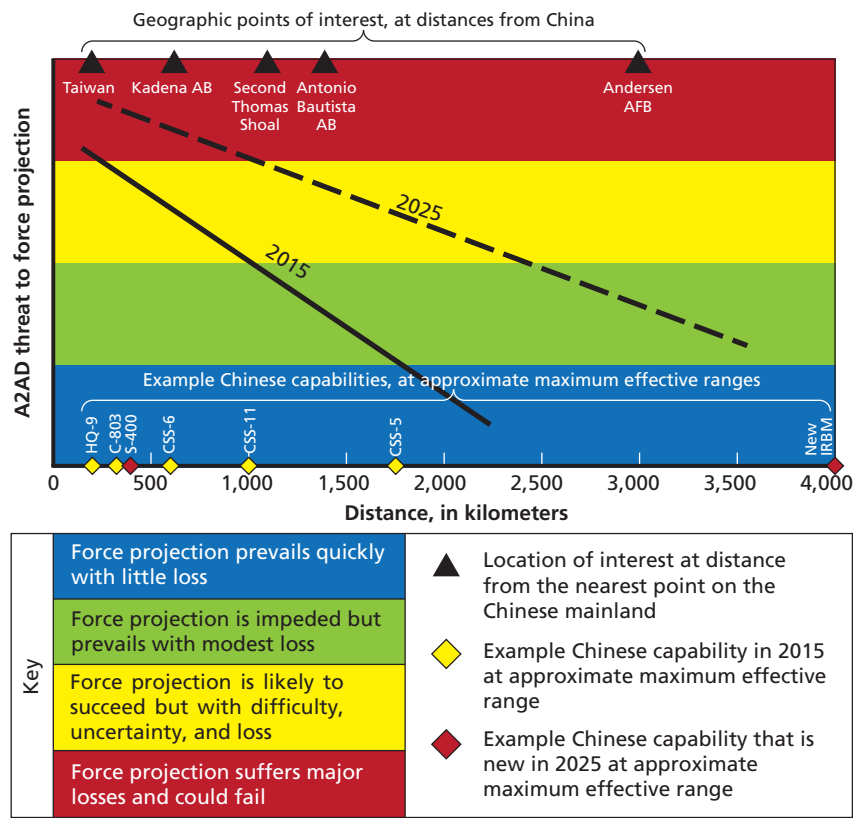
ment of the A2AD threat for this scenario, and Figure 3.6 depicts the A2AD threat to force projection for this scenario.

Figure 3.5
China–Philippines Net Assessment, 2025

Assessment			Color
The United States prevails in the capability contest quickly with little loss.			
The United States prevails with some time and loss.			
The United States can succeed but with difficulty, uncertainty, and loss.			
The United States suffers major losses and could fail.			

A2AD threat to	By	Result, 2015	Result, 2025
Surface ships	Submarines		
	Cruise missiles		
	Ballistic missiles		
	Aircraft		
Strike aircraft	Air defense		
	Aircraft		
Bases	Ballistic missiles		
	Cruise missiles		
C4ISR	Cyber		
	ASAT		
	EW		
Strategic risk			
Overall			

Figure 3.6
Chinese Anti-Access and Area-Denial Threat to U.S. Force Projection, 2025



NOTE: The 2015 and 2025 threat lines aggregate all capability contests described in this section between China and the Philippines. The lines are broad indications of how the threat to force protection changes over distance and over time—that is, as indicators of trends in relative capability between adversary AZAD and U.S. force projection. CSS-5 is the NATO reporting name for the Dong-Feng 21 medium-range ballistic missile.

Russia–Estonia

Duncan Long and Scott Boston

Russia–Estonia, 2015

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

Background

Moscow's efforts to preserve a sphere of influence over its near abroad are a likely source of tension with the West. The cases of Georgia in 2008 and Ukraine in 2014 both demonstrated a Russian willingness to risk the use of force against its neighbors in the face of international condemnation. At least two strategic objectives were made manifest in these cases. First, the Putin regime evidently strongly wants to burnish (if not reestablish) its credentials as both a regional and global power while slowing the slide of former Soviet states toward the West. Closely related to that, at least as a matter of declaratory policy, is the objective of protecting ethnic Russians in the near abroad.

Soviet planners settled Russian populations in Estonia in areas that were considered of strategic importance to the Soviet Union, frequently at the expense of the indigenous populations. This was a standard Soviet practice; a similar resettlement effort resulted in the high number of ethnic Russians in Crimea, for example. Several rounds of deportations took place under Josef Stalin that facilitated the absorption of Estonia into the Soviet Union, such that, by 1990, roughly one-

third of Estonia's population was Russian. There are now significant enclaves of Russian speakers in Estonia's north and east.¹

For its part, the government of Estonia has argued that the forced resettlement of Estonians to Siberia and repression in the country constituted genocide and has held trials to hold Soviet-era officials responsible. This issue (in concert with Estonian resentment about being incorporated into the Soviet Union from 1940 to 1991) has been an ongoing source of tensions between Russia and Estonia. Perceived mistreatment of ethnic Russians has fueled tensions as well. Since the collapse of the Union of Soviet Socialist Republics, the Estonian government has generally treated ethnic Russian minorities as *negrzhdanin*, or "the stateless." For example, despite being born in Estonia during the Soviet period, many ethnic Russians have been issued special gray passports instead of full Estonian citizenship. These so-called alien's passports allow only limited travel to the European Union (EU). The Russian state media have cited this, as well as the removal of Red Army monuments, as indicators of ethnic discrimination.

The sense of injustice on both sides fuels a potentially volatile situation that could erupt as a result of actions from either side. Russian acts in Georgia and Ukraine have contributed to an undercurrent of foreboding in Estonia, and, on the other side, Estonia's overtures to the West (and the West's happy acceptance of them) and its treatment of ethnic Russians have sparked resentment in Russia. A sense of mutual distrust could lead an inadvertent issue (or a studied provocation) to escalate rapidly into open conflict.

Unlike Georgia and Ukraine, however, Lithuania, Latvia, and Estonia are members of NATO. Although Putin has generally been careful to select relatively limited aims in these interventions, clearly the space for miscalculation could lead to a conflict between Russia and NATO over the Baltic states. As the ongoing chaos in eastern Ukraine shows (highlighted most strikingly by the downing of Malaysia Airlines Flight 17 in July 2014), it is not always possible to control events once they have been set in motion.

¹ "Estonia: Russians," *GlobalSecurity.org*, undated.

Although the strategic interests of the United States do not universally conflict with those of Russia, there is no common ground with respect to actual and potential Russian regional aggression. This is especially clear-cut in the case of the Baltic states, where, independently of its general interest in preserving a peaceful status quo or the independence of democratic states, the United States is committed by treaty to protecting its NATO allies. A Russian attack on Lithuania, Latvia, or Estonia would trigger Article 5 of the Washington Treaty, wherein NATO members have agreed to treat armed aggression against one signatory as an attack against the collective. Ignoring this provision would undermine, if not totally destroy, the alliance, one of the cornerstones of U.S. foreign policy, and do untold damage to the credibility of other U.S. global defense commitments.

Path to War

The situation in eastern Ukraine remains unsettled throughout 2014. The Ukrainian government succeeds in reducing some separatist enclaves but not in asserting effective control over the region. The separatists are increasingly well armed and widely thought to be reinforced by Russian special forces (Spetsnaz).

In the autumn of 2015, the Putin regime increases the frequency and stridency of protests of the treatment of ethnic Russians in Estonia. Simultaneously, Russia stages a series of show-of-force exercises near the Estonian border. Putin evidently perceives the West's response to events in Ukraine as feckless and anticipates that nothing will change as he attempts to bully Estonia. Estonian officials deliver a vociferous and very public denial of any mistreatment of ethnic Russians and proclaim the right to administer Estonia's internal affairs without external interference.

At 0300 one morning, Estonian border guards exchange warning shots with Russian troops "on exercises." Within hours, it becomes clear that the Russian response is, in fact, an invasion. Spetsnaz units seize key road junctions between Järve–Sillamäe–Narva, just 100 km east of Tallinn. Two brigade-sized mechanized battle groups reinforce the Spetsnaz units. Estonian-born ethnic Russians are also said to participate in the effort. Simultaneously, a series of cyberattacks affects both

military and civilian communication networks in Estonia, making communications difficult but not impossible. Military radio networks are attacked but can function, albeit at a lower level of efficiency. Some NATO nets are also attacked, but the source of the attacks remains ambiguous. The speculation is that Russia has enlisted the aid of civilian hackers to give it plausible deniability.

Estonia's military forces have improved since Estonia joined NATO in March 2004, but they remain small and lack the ability to defend their territory from Russia without substantial external aid. The primary Estonian conventional ground force consists of a motorized infantry formation of roughly brigade size. Some special forces and a reserve structure that can mobilize to provide roughly three additional brigades of infantry complement the motorized infantry formation. It lacks combat aircraft and modern air defenses, the Estonian government having taken the United States' advice that it should not spend limited funds on sophisticated and expensive systems.

Estonian forces resist the Russian incursions from the beginning, but overwhelming numerical superiority and substantial advantages in mobility, protection, and firepower by Russian combined arms formations against Estonian infantry drive Estonian forces out of their defensive positions after little more than a day of fighting. They fall back to a new defensive line and thicken their defenses with additional reserve forces. They also prepare to carry out insurgent-type operations on the flanks and in the rear of the Russian forces. Although Moscow declares that the incursion is limited to the Järve-Sillamäe-Narva area—50 km inside Estonian territory and still more than 100 km from Tallinn—Russian air and rockets strike Estonian units well outside this zone. Figure 4.1 illustrates.

The president of Russia announces via a variety of media that the Russian armed forces have had to take direct measures to protect "Russian citizens." Further, he states that these forces are to stay in their positions only temporarily while an equitable agreement about the status of all "Russian citizens" in Estonia can be negotiated. He warns that Russia is prepared to defend its honor and territory with all means at its disposal. Although Russia has the combat power to drive the Estonian

Figure 4.1
The Järve–Sillamäe–Narva Area, 2015



SOURCE: Google Earth.

RAND RR13591-4.1

forces back, Putin opts to consolidate what he already has and prepare for follow-on operations if they are deemed necessary.

Despite claims that their presence is temporary, Russian soldiers are seen emplacing defensive positions. Information coming out of Estonia is sporadic, in part because of continuing cyberattacks, and inconsistent, given Russian attempts to degrade Estonian communications and press reporting.

The Russian entry into Estonia catches NATO by surprise. NATO had been well aware of substantial Russian forces at a high state of readiness near the Estonian border but had concluded that these exercises were only posturing and intimidation, not actual preparation for war. No forces had been forward-positioned in Estonia. Even as

Russian and Estonian forces exchange fire, it is initially thought to be a localized, accidental incident, but Russian ground forces move with a speed and resolve that belie that assessment.

On D+1, an emergency session of the North Atlantic Council (NAC) invokes Article 5. The member states do not take this step lightly, particularly Germany, where anti-involvement protests spring up in Berlin, Frankfurt, and Heidelberg. The NATO secretary-general's statement strives to communicate resolve while also leaving the door open for a complete Russian withdrawal to forestall further conflict. The statement says that NATO will not tolerate this aggression and that appropriate forces will be brought to a high level of preparedness for a response.

In Scandinavia, Sweden recognizes the critical role it can play in any Baltic conflict but remains wary of direct involvement. It does grant NATO overflight rights after a spirited debate in the Swedish parliament. Finland reasserts its commitment to buying F-35s and raises the alert level of its forces.

It is not clear whether Moscow had anticipated a rapid declaration of Article 5, but Russia does not back down. It repeats its claims that it has no territorial ambitions and is concerned only with the safety of Russian citizens. It repositions some of its forces closer to the Estonian border and moves some of its aircraft to airbases farther west. It also puts part of its Baltic fleet to sea, including its submarines, knowing that NATO will step up its intelligence surveillance, detect these steps, and interpret them as evidence of Russian resolve. It also directs its forces in Estonia to improve their defense positions and establish logistical support areas close behind the front line, where they can better support a deeper incursion into Estonia.

Russia's Conflict Objectives

The Russian objective is to hold on to its enclave in Estonia to create a de facto pro-Russian satellite state in Estonian territory, similar to South Ossetia or Abkhazia. By requiring a risky and costly conventional war to counter "temporary occupation" of a relatively limited piece of Estonian territory, Russia's hopes are that NATO will acquiesce or fracture rather than respond as a united whole, thus losing cred-

ibility and influence. To satisfy domestic audiences, Russian leaders in Moscow do not want to be seen as losing to NATO military forces and will seek an opportunity to declare victory without risking defeat on the battlefield.

The conditions under which Russia will threaten to use nuclear weapons remain deliberately ambiguous. Russian doctrine since the 1990s has explicitly allowed for the first use of nuclear weapons to offset tactical weakness, although more-recent revisions to doctrine suggest that Russia has backed away from this position somewhat.² Russia has miscalculated in that it had hoped to avoid a conventional military conflict; nonetheless, its nuclear deterrent is firmly in place to guarantee its vital interests, which can be characterized to include maintaining possession of its territory, as well as the bulk of its military forces. By not deploying more than a relatively small two-brigade force into Estonia, a conventional military defeat of Russian forces would not be considered an existential threat to the Russian state. That said, any confrontation between nuclear-armed combatants is cause for concern.

The United States' and North Atlantic Treaty Organization's Conflict Objectives

NATO's overarching objective is to restore Estonia's territorial integrity. Ideally, it can convince Russia to back down in the face of a threat of military action. Should Russia stand firm, NATO's objective is to roll back Russian forces in Estonia while avoiding an escalation of the conflict into a broader war that could, possibly, go nuclear. NATO attempts to position forces such that they can credibly threaten to expel Russian units from Estonia and, if required, carry out that operation.

² According to James T. Quinlivan and Olga Oliker, *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,

Russia's new military doctrine, adopted in February 2010, declares nuclear weapon use to be limited to situations in which an adversary threatens Russia or its allies with nuclear or other weapons of mass destruction or situations in which a conventionally armed enemy threatens Russia's very existence. (p. xi)

Conduct of the War

This section briefly outlines how the combatants try to achieve their conflict objectives. In the next section, we discuss specific outcomes of the contest between select capabilities.

The Russian Anti-Access and Area-Denial Concept of Operations

Russia's plan for victory has two elements: Force NATO to pay an unacceptably high cost to project force into Estonia, and control escalation in ways that create the best battlefield and geopolitical conditions for Moscow. High initial costs will, Russia hopes, convince NATO to accept some kind of negotiated solution.

Russia does what it can to make its deployed forces a difficult target. Within a week, a motorized rifle brigade and elements of the 76th Guards Air Assault Division have deployed in Estonia and give no sign of quickly leaving; indeed, they dig in, disperse, and deploy tactical air defenses.

They are tremendously advantaged by Estonia's proximity to Russian military assets in Kaliningrad Oblast and in far western Russia, near Pskov and St. Petersburg. Kaliningrad is a defensive citadel, a bulwark defending the approaches to the Russian heartland with a dense network of defenses against air, naval, and surface attack. It is internationally recognized Russian territory and the headquarters of the Russian Baltic Fleet; two mechanized and one naval infantry brigades are stationed there, as well as numerous surface combatants, coastal antiship missiles, extensive surface-to-air defenses, and a brigade of surface-to-surface missiles. Its purpose in a conflict like this one is to leverage its exposed position to threaten approaches to the Baltic states, particularly for aircraft and naval surface vessels. Further, although Belarus is not officially a combatant, its close relationship with Russia and geographic position create a looming latent threat to NATO operations in the region.

Perhaps most notable is the fact that Russia can extend an umbrella of strategic air defenses from its homeland: S-300 (SA-10 Grumble/SA-20 Gargoyle) and S-400 (SA-21 Growler) SAMs provide overlapping coverage of Estonia from their regular deployment locations in Kaliningrad and Russia proper. Aerospace-defense brigades of

the Russian Air Force defend both Kaliningrad and the St. Petersburg area. These involve an integrated, layered defensive scheme that might take an extensive effort to reduce. Russia likewise has a ready-made defensive umbrella of combat air patrols, as well as submarines, mines, small surface combatants, and coastal ASCM batteries to deal with any surface naval forces in the Baltic. It has limited numbers of its most-capable weapons but enough to pose some problems.

Russia can also impose costs on NATO forces with conventional strike. Most threatening are its SRBMs and short-range cruise missiles. The Iskander system is capable of launching both the Iskander-M SRBM (SS-26 Stone) and the R-500 cruise missile. Long thought to have the potential to skirt the Intermediate-Range Nuclear Forces (INF) Treaty, Moscow dropped all pretenses in the fall of 2015 with publicized tests of both Iskander-fired missiles.³ The Iskander-M extended just over 500 km, and the R-500, albeit with a smaller payload, stretched 1,200 km.⁴ These missiles can strike NATO airfields, ports of debarkation, and any ground forces advancing toward Estonia, although they are available in only limited numbers.

Russia tries to impose costs and attempts to control the terms of the fight in ways that create operational advantages and make a favorable settlement more likely. A NATO under U.S. leadership is the more capable power, and Russian military planners understand this. Given time, NATO will eventually overwhelm Russian conventional forces. Russia can partially erode this advantage by attempting to control escalation, through capitalizing on strategic uncertainty about its nuclear response. Russian conventional capabilities are substantially

³ *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).

⁴ These ranges are plausible but notional. The United States indicated in January 2014 that it had raised the possibility of an INF Treaty violation with Russia, perhaps related to activity as far back as 2008. It is not clear what system or systems are involved, although speculation centers on the R-500. See Tom Z. Collina, “U.S. Raises INF Concerns with Russia,” *Arms Control Today*, March 4, 2014.

more threatening if NATO feels unable to target them fully (because they are on Russian territory) for fear of escalation of the conflict.

Russia will also strive to turn a mutual desire to avoid unconstrained conventional war to its advantage. Russia can hold targets all over western Europe at risk. Moreover, some of these targets—for example, airfields in England; ports in Germany, Belgium, and the Netherlands; Supreme Headquarters Allied Powers Europe in Mons—will be important to NATO operations. NATO space assets and even, through cyberwarfare, some of the sinews of the western economies, are within Russia's ability to strike. To lash out indiscriminately at such targets, however, might raise the perceived stakes for NATO and make even less likely the war ending with Russia still in possession of part of Estonia. For this reason, Russian strikes on assets and infrastructure far from the Baltics will, at least initially, be limited to demonstrating the capability and reinforcing for NATO the potential cost its members might have to pay.

The U.S. and North Atlantic Treaty Organization Force-Projection Concept of Operations

As the realization emerges that a concerted military response is, in fact, required, NATO focuses on projecting force to roll back the Russian invasion. The NATO approach is to set the groundwork for a full-fledged relief of Estonia by ground forces, while hoping to induce Russia to retreat before that unfolds. If the air and sea balance can be tilted clearly in NATO's favor, and if substantial ground forces are en route, Putin must decide either to reinforce his troops in Estonia or face the prospect of having them overwhelmed and defeated in detail. His other option is to withdraw and declare victory because he has ensured that the Russian minority in Estonia will be fairly treated in the future. Either defeat or withdrawal would be acutely embarrassing, but withdrawal could occur under the fig leaf that the situation in Estonia has been "settled" and that Russia has shown its resolve to defend its "citizens" wherever they are oppressed.

NATO's challenge is to neutralize Russian conventional capabilities decisively enough to bring the war to a favorable conclusion but in

ways that do not trigger a nuclear response. Hard choices will have to be made about what targets are permissible for conventional attack.

NATO adopts four major operational limits in an effort to prevent nuclear escalation:

- no attacks, kinetic or otherwise, on national C2 networks
- no attacks on strategic early-warning radars
- limited attacks on Russia proper to forces directly supporting operations in the Baltic
- no NATO ground forces to enter Russian territory.

Importantly, two elements of Russian power are *not* included in these limits: forces and assets in Kaliningrad and SAMs capable of targeting NATO aircraft operating in the region. NATO hopes to turn the threat that Kaliningrad poses to its advantage. There are compelling operational reasons to eliminate all forces there, but Kaliningrad also represents something of value for Moscow. Perhaps the implicit threat—stand down or lose Kaliningrad—will bring the war to an end.

Degrading Russian air defenses near a major Russian city (such as St. Petersburg) risks provoking strategic escalation, but the continuing danger that they pose is judged intolerable because a critical enabler of the NATO campaign is air superiority over Estonia. Air superiority will allow NATO to ramp up the threat to Russian forces on the ground considerably, perhaps permit some air mobility, and significantly reduce Russia's ability to threaten large concentrations of NATO ground forces.

While the air campaign unfolds, NATO ground forces will mobilize, assemble, and begin an advance on Kaliningrad and Estonia. Initially, these forces will be comprised of the NATO Response Force (NRF) and forward-positioned U.S. Army units, but additional U.S. forces will have to flow forward from the continental United States (CONUS) in order to assemble a force that could credibly march through the Baltics in the face of resistance. The United States hopes that other major NATO powers will provide additional heavy forces, but the reduction of their armies in the preceding five years makes this hope questionable.

After some debate, NATO decides not to expend much effort on establishing sea control in the Baltic Sea. It is extremely restricted maritime domain, with chokepoints on entry and limited room to maneuver. Aircraft carriers and other capital ships are not afforded the sanctuary of open space that they might find in, say, the western Pacific. The Russian submarine, mine, and ASCM threats are judged lethal and resilient enough that only tremendous effort could make NATO allies comfortable dispatching surface assets to the area. Land routes of advance make direct approach by sea unnecessary, but this decision still impedes the utility of a major source of NATO strike power: carrier-based air- and ship-launched LACMs. Further, NATO air forces will still need to suppress any seaborne air-defense threat in order to operate effectively out of or through Swedish airspace.

Assessment of Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Force Projection

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Strike Aircraft: Setup

Russian SAM coverage blankets the Baltics and approaches to Estonia. Russian SAMs play dual roles: They provide a vital part of the A2AD shield under which Russian army units can advance because they deny airspace to NATO combat and transport aircraft seeking to approach the Baltics, and they defend Russian territory against air and cruise- and ballistic-missile attacks.

The most capable system is the modern S-400 missile system. It can employ three types of missiles with varying characteristics, including one with a range of 400 km that could threaten bombers, transport aircraft, and other aircraft conducting missions in the area. Shorter-range missiles in this system have higher maneuverability and speed, making them very difficult to evade even by maneuvering high-performance aircraft. S-400 is also claimed to have some ability to counter stealth aircraft. Two S-400 battalions are fielded in Kalinin-grad Oblast, and several more are fielded in the St. Petersburg area, as well as in the vicinity of deployed troops. Because these are high-value targets, the S-400 firing batteries remain mobile and benefit from shorter-range coverage from the more-numerous S-300 systems that

also are deployed in the area, as well as shorter-ranged tactical systems that can provide point defense against cruise missiles and standoff conventional munitions.⁵

Although the quality of the Russian air-defense network as a whole against a concerted attack is an unknown, one additional strength is that the distances here are short enough that the S-300s and S-400s can operate from prepared positions on Russian territory. This permits them to take advantage of the great deal of work to ensure secure communications among the firing units, radar stations, and fire-control centers. Figure 4.2 illustrates S-400 coverage.

The Russian Air Force is also a threat to NATO air and ground operations. Russia's 1st Air Force, under the Western Military District, has 278 fighter aircraft assigned, consisting mostly of MiG-29 and Su-27 variants. Although NATO pilots typically enjoy a training standard of roughly two to three times as many flight-hours per year as their Russian counterparts,⁶ a greater percentage of Russia's aircraft can be at a high level of readiness in a situation in which Russia has the initiative, and additional fighters can be made available from Russia's other three military districts.

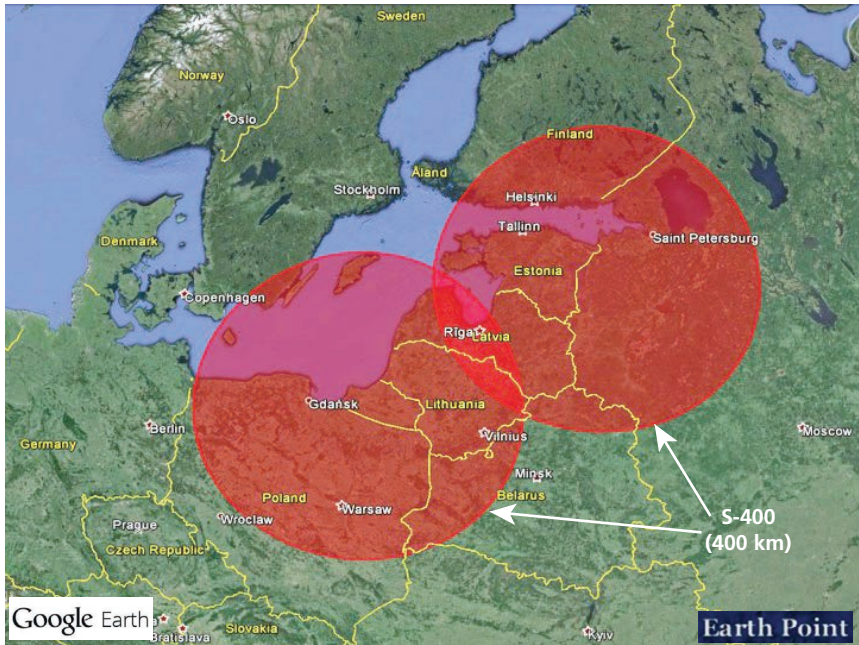
An additional major (self-imposed) limitation is that NATO decides not to carry out a comprehensive counterair campaign as called for in air-warfare campaign doctrine. Russia can shuffle combat aircraft in from other theaters; striking all the potential Russian airfields in range of Estonia would mean attacking targets across a larger part of European Russia, which would significantly raise the risk of escalation.

In numerical and qualitative terms, NATO enjoys a very large advantage in combat aircraft over Russia. About 1,200 NATO tactical aircraft (fighters and ground attack) are permanently based in reasonable striking distance of Estonia. Although some from such countries as France, Italy, and the United Kingdom (UK) are farther away, these would be quite able to operate using aerial and ground refueling at

⁵ IISS *Military Balance* gives 3rd Space and Missile Defense Army 96 S-400 (SA-21) and 1,800 S-300 (SA-10/20) launchers (IISS, *The Military Balance 2014*, Routledge, February 5, 2014, p. 181).

⁶ IISS, 2014.

Figure 4.2
Illustrative Map of S-400 Coverage, 2015



SOURCE: Google Earth.

NOTE: The map shows missiles based at illustrative points in both Kaliningrad and in Russia, near the Estonian border.

RAND RR1359/1-4.2

bases outside Russian strike range. The United States surges forward CONUS-based aircraft to supplement these—in particular, F-22s and critical ISR, C2, and refueling enablers. To avoid Russian SRBMs and short-range cruise missiles, aircraft bed-down locations are limited primarily to western Germany, Belgium, the Netherlands, the UK, and Norway. Access to Swedish airspace for combat sorties in particular greatly enhances the efficacy of those last two locations. This access also makes it possible for a CSG in the North Sea to eventually contribute to the air war. Table 4.1 lists Russia’s air-defense systems relevant to this scenario, and Table 4.2 and Table 4.3 list its short- and long-range combat aircraft inventory, respectively.

Table 4.1
Russia's Air-Defense Systems, 2015

System Name	NATO Designation	Type	Number in Service	First Delivery
High-Altitude Strategic				
S-400	SA-21 Growler	Self-propelled SAM	100	2012
S-300V1/2	SA-12a Gladiator; SA-12b Giant	Self-propelled SAM	120	1982
S-300PMU-1/2	SA-20 Gargoyle	Self-propelled SAM	40	n/a
Strela-10M/ Kolchan	SA-13 Gopher	Self-propelled SAM	350	1975
Low-Altitude Tactical ^a				
Osa	SA-8 Gecko	Low-altitude SAM	300	1968
Buk	SA-11 Gadfly	Low- or high-altitude SAM	300	1978
Tor	SA-15 Gauntlet	Low- or medium-altitude SAM	160	1986
Tunguska	SA-19 Grison	Self-propelled anti-aircraft gun or SAM system	200	1982

SOURCE: Jane's Sentinel Security Assessment, "Jane's Security: Country Risk," undated.

^a Does not include man-portable air-defense systems (MANPADS).

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Strike Aircraft: Outcome

The first tangible sign of NATO's commitment to Estonia happens immediately following the NAC emergency session. Four UK Typhoons operating out of Lithuania as part of the Baltic Air Policing initiative execute a show-of-force sortie. As they cross into Estonian air space, S-400s near Pskov target them, and Russian aircraft along the

Table 4.2
Russia's Short-Range Combat
Aircraft, 2015

Aircraft	Number
MiG-29 (multirole fighter)	216
Su-27 (multirole fighter)	289
Su-34/30/35 (fighter-bomber)	50
MiG-31 (fast interceptor)	160
Su-24 (attack)	200
Total	915

SOURCE: IISS, 2014, p. 187.

Table 4.3
Russia's Long-Range Combat
Aircraft, 2015

Aircraft	Number
Tu-160 Blackjack	16
Tu-22 Backfire	63
Tu-95 Bear	62
Total	141

SOURCE: IISS, 2014, p. 187.

NOTE: These figures represent the entire Russian inventory across all four military districts.

border warn them to turn back. When they persist, they are fired on. Two are destroyed.

NATO responds in force the following evening with the beginning of a deliberate SEAD campaign. Initial air-defense targets, hit with standoff weapons, are limited to Kaliningrad in hopes that further signals of determination will impel Moscow to stand down. This does not work out.

Realizing that the plan to carve off a piece of Estonia without significant bloodshed has not worked and that its position is weaker than NATO's in a long campaign, Russia's contingency plan is immediate escalation. It fires Iskander-M SRBMs against NATO airbases in Lithuania and Poland and surges fighter aircraft to the region from elsewhere in Russia. Most of the roughly three dozen missiles evade Patriot missile systems in Poland, find their targets, and destroy multiple combat and support aircraft on the ground. Images of a burning KC-135 tanker at Siauliai are broadcast worldwide as NATO reorganizes for a sustained campaign against the Russian IADS.

To achieve air superiority with somewhat reduced risk of escalation, NATO elects to target primarily Russian weapon platforms—mainly SAM units and combat aircraft—and limits targeting of Russian airbases. Major early-warning radar facilities are specifically excluded from targeting. In the early stages of the conflict, missions are flown predominantly by U.S. low-observable aircraft (F-22 and B-2) and European fighters employing standoff precision munitions. To reduce the risk to aircraft operating from forward airbases, airfields in Poland are used only for recovery and quick refueling operations, while major bases outside Russia's effective range are used for all other aspects of sortie generation. U.S. forces, particularly F-22A squadrons, take time to deploy but then can contribute significantly in air-to-air contests against Russian MiGs and Sukhois.

The first four weeks of the air war, and indeed of the war in general, are spent overcoming Russian air defenses and exposing forces entrenched in Estonia. Kaliningrad receives the majority of the early attention because the S-400s based there threaten any NATO aircraft approaching Estonia from western Europe. Air planners ask for and receive permission to conduct the Kaliningrad portion of the campaign without unusual restrictions, putting all radars and C2 nodes in play. By D+15, intelligence is reasonably certain that all S-400s in that enclave are eliminated, although shorter-range systems are still on the battlefield.

Destroying Russia's strategic SAMs in their Russia-based integrated network, defended in part by battlefield air-defense systems, proves more difficult and time consuming. The challenges are four-fold.

First, because of concerns about escalation, major early-warning radar facilities are specifically excluded from targeting, as are major C2 nodes in the Western Military District. This preserves Russian defensive capability generally and counterair capability in particular.

Second, Russian counterair CONOPS quickly shift to preserving a lingering threat for as long as possible. Even the strategic systems adopt so-called pop-up tactics and generally defy NATO efforts to establish true air dominance.

Third, NATO is compelled to operate from bases far from Estonia because of the threat from Russian long-range conventional strike (we cover this in greater detail in the discussion of fixed assets). The longer ranges drive down the sorties that can be generated and raise the burden of enablers.

Fourth, the lingering advanced Russian air-defense threat induces NATO to use its limited numbers of stealthy aircraft as the key assets in most missions. This too limits the number of sorties that can be generated.

With these limits, the SEAD effort consumes virtually all the NATO air forces' attention, squeezing out even efforts to hunt for Iskander missile launchers.

NATO air forces lose more than 45 aircraft, most casualties of SAMs, by D+31. At this juncture, though, NATO can begin to shift focus to air-ground sorties against Russian forces in the Järve-Sillamäe-Narva area. Such missions are still planned with significant counter-air defense packages, both because of the lingering strategic SAM threat from Russia proper and because of the air defenses organic to Russian motorized rifle forces. A Russian motor rifle brigade has extensive organic short-range air defenses, including a mix of gun-based systems, such as the Tunguska, and missile-based systems, such as variants of the Tor. At ranges under 10 to 15 km, they could pose serious problems for modern fighters overflying the area.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Naval Power Projection: Setup

Russia's small Baltic Fleet, based in Kaliningrad, poses some potential challenges to NATO forces attempting to operate in—and over—the

Baltic Sea. Free access to Estonia via the sea would be an important advantage to NATO because it could considerably speed the deployment of relief forces and bypass Kaliningrad and Belarus. It would also significantly shorten the flying distance for carrier-based strike aircraft and enhance the effectiveness of LACMs. As stated above, however, Russia's ability to contest the sea makes it unattractive to move high-value surface assets in when there is a ground alternative.

Perhaps more significant is the threat that Russian ships could pose to NATO aircraft approaching Estonia via Swedish airspace. Any of the Russian Navy's SA-20-capable ships could create an expanded SAM envelope in the Baltics, an added layer to an already formidable air-defense network.

That said, Russia has two destroyers, five frigates, and coastal combatants and mine-warfare ships in the area, but the naval military forces from just those countries that border the Baltic Sea significantly outnumber them. Russia might conclude that it gains little by further exposing its small surface fleet in the Baltic to allied aircraft when it can contest or deny sea access with ASCMs, mines, and submarines and air access with land-based systems.

Russia has three diesel-electric submarines stationed in the Baltic and could redeploy some of its SSNs to the area, but these are relatively few. By contrast, Germany has four, and Sweden and Poland each have five. In a conflict, the Baltic could be rather crowded with submarines.

In addition to the submarine threat, a further complication for surface combatants is deployment of an ASCM regiment in Kaliningrad Oblast. This regiment is equipped with an outdated antiship missile system called Redut (SS-N-3b) that permits it to augment Kaliningrad's defenses but not to dominate an extensive area of the Baltic.⁷ Table 4.4 lists vessel types in Russia's Baltic Fleet.

⁷ According to *Warfare.be*, the 25th Independent Coastal Missile Regiment has four SSC-1B launchers ("Navy," *Warfare.be*, undated).

Table 4.4
Russia's Baltic Fleet, 2015

Vessel Type	Number
Submarine (diesel electric)	2 Kilo class, 1 Lada class
Frigate	5
Destroyer	2
Mine-warfare ship	15+
Coastal combatant	15+
Aviation	2 regiments

SOURCE: "Russian Federation," *Jane's World Navies*, December 7, 2016.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Naval Power Projection: Outcome

Russia's surface vessels remain bottled up in port throughout the conflict as the air war rages overhead. Although U.S.-led NATO forces make efforts to clear the antiship missile launchers from Kaliningrad, this takes time. U.S. attack submarines can reach the area and operate with relative impunity, firing cruise missiles against targets in Kaliningrad, Estonia, and Russia. A U.S. CSG can operate in the North Sea and overfly Sweden.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Fixed Assets: Setup

Russia's most-potent conventional strike assets in this scenario are the aforementioned Iskander-launched cruise and ballistic missiles. Although these systems are capable, they are comparatively limited in number. Each Iskander tactical missile brigade has 12 launchers, each of which can fire either two Iskander-M SRBMs or four R-500 cruise missiles. Given time to prepare, Russia can have three or four brigades present in the area, including potentially in Kaliningrad. An older system, Tochka (SS-21 Scarab C), with a range of 185 km, is also

present, both in Kaliningrad and in support of fielded forces in Russia's Western Military District.⁸

Strikes from penetrating Russian aircraft are not deemed especially likely, given NATO air superiority and air defenses, but are threatening enough to compel defensive counterair sorties. Russian Backfire and Blackjack strategic bombers, however, need not expose themselves very much to have an effect: Russia's Kh-555 (AS-15 Kent) ALCM has a range of 3,500 km and can hit anywhere in France, Germany, or England with high accuracy and from within Russian airspace.⁹ The Kh-101 cruise missile has a range estimated at 2,800 km.¹⁰ Both these and other related air-launched missiles have been added in recent years to provide an expanded conventional capability to Russia's Long Range Aviation fleet; providing additional concern is the existence of variants of most of these missiles that are armed with nuclear payloads. Additionally, the Russians could launch SLCMs from their submarines in the Baltic. However, conventional warheads for such missiles are not particularly large, and launching them exposes the submarine to detection and targeting.

The chief fixed targets for Russian conventional strike capabilities, particularly in the early days of the war, are NATO airfields. Bases in Poland and eastern Germany would be ideal for supporting air operations against Kaliningrad and targets in Russia, so putting them out of operation would be important (although it would also escalate the conflict considerably). They would be hugely helpful for establishing and sustaining any sort of coverage over Estonia. The major U.S. bases at Ramstein and Spangdahlem in western Germany are approximately 1,800 km from Narva, more than twice as far from Estonia as the Polish base at Malbork. Norway and Denmark both offer closer operating locations.

⁸ IISS, 2014.

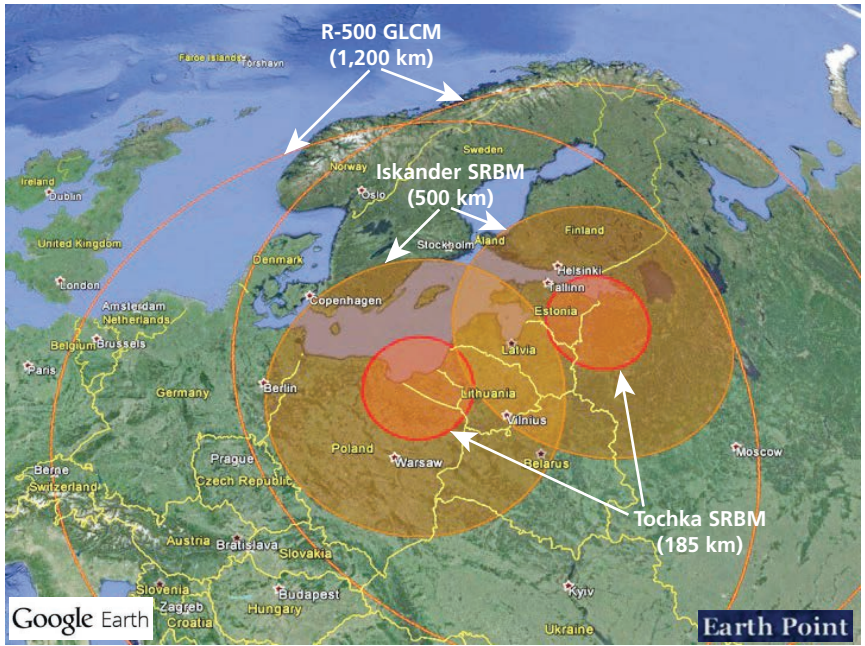
⁹ "Kh-55/RKV-500A, Kh-55SM/RKV-500B, Kh-555 and Kh-65SE (AS-15 'Kent')," *Jane's Air-Launched Weapons*, updated April 23, 2015.

¹⁰ "Kh-101, Kh-102," *Jane's Air-Launched Weapons*, updated April 9, 2015.

NATO's means to launch a credible ground attack also hinge on fixed assets. Important potential targets include seaports of debarkation (SPODs) and overland transportation infrastructure.

NATO air defenses are another target set. The U.S. Patriot missile battery at Morąg, Poland, near the border with Kaliningrad, could threaten Russian air and missile operations. Figure 4.3 illustrates Russian surface-to-surface weapon ranges.

Figure 4.3
Ranges of Russian Surface-to-Surface Systems, 2015



SOURCE: Google Earth.

NOTE: The map shows missiles based at illustrative points both in Kaliningrad and in Russia, near the Estonian border. R-500 and Iskander ranges shown here are INF Treaty violations and are constructs of the scenario. Not shown here are strategic-range systems, such as the Kh-101 cruise missile, which is potentially capable of 2,800 km and can be launched from aircraft.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Fixed Assets: Outcome

Russia follows its D+3 attack on Lithuanian and Polish airfields with similar SRBM salvos from Kaliningrad on D+4 and D+5 focused on Poland. These attacks have the desired operational effect: NATO largely abandons bases within range of Iskander SRBMs, which modestly limits NATO's ability to generate offensive sorties.

Shortly after the first NATO bombs hit Kaliningrad, Russia scores an important operational and political victory on D+4 with an attack on the Patriot battery at Morang. Russia fires a combined barrage of ballistic and cruise missiles that overwhelms the missile system. The destruction of this high-profile, high-tech capability, and the resulting U.S. casualties, communicate the message that Russia wants to send: This will be costly, and the outcome is in doubt.

Only one other target receives concerted Russian attention: the Polish port of Gdansk, a potential SPOD for U.S. forces. Gdansk is within range of both the Tochka missile system (range: 185 km) and Smerch 300-mm heavy multiple rocket system (range: 90 km) from Kaliningrad. Damage to the port is extensive.

Other Russian attacks against fixed targets are aimed at keeping NATO off balance, and conveying a threat to escalate, rather than on overwhelming. Russia conserves the remaining Iskander SRBM inventory in Kaliningrad and shifts to GLCMs and ALCMs fired from within Russia proper. Russian ISR—both space-based and OTH radar—can establish which NATO bases are hosting significant numbers of aircraft at what time and sequence attacks accordingly. ALCMs reach as far as Ramstein. An especially telling attack on D+8 destroys five U.S. F-15s operating from Orland in Norway. Advanced submunitions employed in other airbase attacks require careful explosive ordnance disposal work before operations can resume.

On D+9, taking advantage of reduced NATO counterair capability in Scandinavia, a sortie of Russian Backfire bombers from Severomorsk launch ALCMs at the Royal Air Force (RAF) base at Fairfield, to which B-1 and B-2 bombers had recently relocated. Only a single B-1 is destroyed, but the base suffers some damage.

The range of options available to NATO blunts the effectiveness of the counterairbase onslaught. Most airfields remain out of range of SRBMs, and Russia's GLCM and ALCM inventory is not sufficient to sustain an attack on the remainder. Moreover, these are the home stations of the NATO air forces—perhaps not set for a major air war, but hardly austere and with some operational resiliency.

U.S. Army force-projection enablers are part of Russia's target set. On D+8, cruise missiles hit warehouses at Grafenwoehr containing the European Activity Set of prepositioned equipment. On D+26, as the air war tips toward NATO and as the first U.S. troops arrive from CONUS, Russian ALCMs hit the ports of Antwerp and Bremerhaven. The ports do not suffer significant harm, but the Bremerhaven attack hits a marshaling yard for recently downloaded equipment.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Ground Forces: Setup

Russia deploys a reinforced regiment of Russian Airborne Troops along with a motorized rifle brigade in Estonia; a tank brigade and another motorized rifle brigade deploy into combat positions just over the Russian side of the border. They harden their positions, set up communications, and deploy extensive anti-aircraft defenses. These forces have significant ability to harass adversaries at range. They are also just a small portion of what Russia could commit—perhaps as many as 12 additional brigade-equivalents are available, and NATO must account for the possibility of their introduction in Estonia or elsewhere in the Baltics. As NATO forces approach closer to Russian positions, they will potentially face increasing numbers of Russian missile and rocket artillery systems. The aforementioned Tochka missile system and the Smerch 300-mm heavy multiple rocket system can complicate the final stages of closing with Russian land forces. Closer still, Uragan 220-mm rockets organic to Russian motorized rifle brigades can reach targets at up to 34 km.¹¹

Like with projecting air and sea power to Estonia, Kaliningrad complicates planning for a ground campaign. Russian forces there

¹¹ "BM-27 Uragan: Multiple Launch Rocket System," *Military-Today.com*, undated.

could menace the line of advance that NATO forces must take through Lithuania. Although the air war will reduce that threat somewhat, long-range missile and rocket fire and the possibility of a quick counteroffensive must be accounted for. Further, there is some uncertainty about what Belarus will do. The Belarusian army, though of poor quality, has mobilized and massed near the Lithuania/Poland border. Regular Russian army units are not present, but there is little doubt that Moscow can largely orchestrate any Belarusian move and will do what it can to support it.

Although the Russian missile threat is nontrivial, NATO has significant depth and ability to marshal land forces free of harassment. Inside of 500 km, the limited number of Iskander missiles could potentially target ground units with great precision. However, using them in this way essentially dilutes their effects: The number of targets in a land formation is substantial and, unless the Russian missiles can target key headquarters or logistical chokepoints, they will have limited impact.

NATO's ground forces are generally of higher quality in terms both of equipment and personnel than those of Russia. However, it will be a challenging campaign. Russian soldiers will employ combined arms tactics, and they are well equipped with heavy armor and anti-armor weapons. To defeat this adversary convincingly in these conditions, it is preferable to have a coordinated air and ground offensive with substantial heavy forces on the ground. Although European NATO forces are capable and their equipment generally better than the Russians, they are not prepared (or organized) to project force outside of their borders and so are not prepared to lead the counterattack. U.S. capabilities to conduct this kind of conflict in Europe have been largely relocated back to CONUS. As of 2013, the last U.S. heavy brigade combat team (BCT) (a mixed formation with older equipment) was inactivated, leaving an airborne brigade in Italy and a Stryker brigade, the 2nd Cavalry Regiment, in Germany. No fire brigades remain in Europe, and the United States lacks an active corps or division headquarters permanently stationed in Europe to plan and participate in a major campaign.

The United States does muster a task force in short order, using the 2nd Cavalry Regiment, reinforced with the surviving pieces of

the combined arms battalion set (with Abrams and Bradley fighting vehicles) at Grafenwoehr. Helicopters from the 12th Combat Aviation Brigade, also based in Germany, and the 173rd Airborne BCT in Italy support this element. On D+4, an infantry BCT (IBCT) from the 82nd follows these units. The counteroffensive, however, waits for additional, heavy forces.

III Corps, the 1st Cavalry, 10th Infantry Division and 4th Infantry Division headquarters, and 12 BCTs based in CONUS are given deployment orders, and reserves are mobilized. The first substantial elements will not arrive with their equipment until D+25, and a full force flow will not be complete until at least D+90. Germany, France, and the UK each provide a brigade to fall in under Eurocorps headquarters, which other NATO commands augment to provide it with a true corps operational capability. U.S. Army Europe provides some personnel and equipment. NATO Allied Land Command deploys from Turkey to Germany and assumes overall command of all NATO land forces, with Supreme Allied Commander Europe commanding the overall operation.

For these reasons, and because the threat of a full NATO response might induce Russia to back down, NATO's initial ground objective is to position a demonstration force near Kaliningrad. The NRF, supplemented with all Europe-based U.S. units, constitutes this initial element. This permits NATO to indicate a threat to invade Kaliningrad and fixes the Russian forces there in place while a force robust enough to liberate Estonia is assembled.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Ground Forces: Outcome

By D+45, NATO has at its disposal in western Poland and eastern Germany the NRF, one U.S. Stryker BCT (the 2nd Armored Cavalry Regiment), three IBCTs, three armored BCTs, and a division headquarters, along with III Corps' advance tactical operations center. Other U.S. units are starting to arrive, and more-robust French and UK contributions are forthcoming, but Russian attacks on SPODs are slowing deployment. Commanders elect for a rolling start to the campaign, judging it important to respond rapidly rather than wait for

an overwhelming force to be supplemented with arriving U.S. forces and less-ready European units. The bulk of ready Polish forces, bolstered by a Czech brigade, move east of Warsaw to be ready to react to Belarusian intercession and to ensure that Belarusian forces remain in place. NATO ground forces gather near Lodz and, on D+40, begin to move overland toward Kaliningrad—whether to seize it or hold Russian forces in place is not clear to Moscow.

Russia employs cruise missiles and SRBMs against the response force, but its targeting capabilities by this point in the conflict are significantly degraded. Instead of firing at the ground forces themselves, Russian units attempt to destroy key bridges and rail junctions. These attacks slow but do not halt NATO reinforcements. Although Russian ground forces can pose a challenge in the defense against NATO heavy forces, Russian ability to deny NATO movement through Poland and points west has more of a harassment character than an effective attempt at AD.

Conclusion of the War

By D+45, Russia's capacity to resist NATO has been significantly reduced. Its inventories of its most-advanced weapons—platforms and ordnance alike—have declined through use and attrition in combat. It retains some S-300 and S-400 coverage of the Baltic states but only enough to harass rather than stop the burgeoning bombing campaign against forces on the ground in both Estonia and Kaliningrad. And now NATO has positioned forces sufficient to seize Kaliningrad, three heavy BCTs are on ships heading to Europe, and the remaining CONUS units are closing on their embarkation points. Preparations to “set the theater” for the incoming forces are well advanced and are being accomplished with the active participation of all major NATO nations. Eventual defeat on the ground seems inevitable unless Russia escalates the war or evacuates Estonia.

Russia has escalatory options. Moscow could pull Belarus into the fight and hugely complicate the NATO relief of Estonia. It could invade one of the other Baltic states. Although a general mobilization is underway and, on paper, the ground combat power that Russia has in the Western Military District has doubled since D-day, these units

are filled with conscripts, and confidence in their ability to conduct maneuver warfare is justifiably low, particularly because they would be constantly exposed to NATO aircraft.

Facing a likely defeat on the ground and the attendant humiliation, which would all but certainly lead to the collapse of Putin's government, Russia takes one final step: It detonates a nuclear warhead at an old Soviet test facility in Siberia, and it signals through back channels that it is prepared to accept a cease-fire and abandon its claims to Estonian territory. This at once sends the message that any NATO incursion into Russian territory will lead to a nuclear exchange and provides a demonstration of strength for domestic audiences. Simultaneously, it embarks on a major domestic public relations campaign to show that it has secured the interest of Russian citizens in Estonia and, by virtue of its demonstrated resolve, the other Baltic nations: Mission accomplished! A tenuous cease-fire is reached, Russian soldiers withdraw, and Europe begins to pick up the pieces.

Net Assessment

In 2015, Russia has substantial defensive capabilities but has not adopted a conventional extended-range A2AD strategy. There are at least two reasons for this. First, until it abandoned the INF Treaty in 2015, Russia was prohibited from building GLCMs or ground-launched ballistic missiles with ranges between 500 and 5,500 km. This did not stop development entirely but did suppress both capability and capacity, keeping Russia from mirroring important parts of the A2AD approach attributed to China. Second, Russia's military resources and energy have gone to reforming its military forces, with marginal success. What remains of its military attention has been focused more on conflicts with insurgents in Chechnya, limited wars against its neighbors, and modernizing its nuclear forces. Russia's principal reaction to its military weakness compared with NATO has been to rely on tactical nuclear weapons to offset the imbalance. Russia also relies on nuclear weapons as the ultimate guarantor of its territorial integrity. When combined with the fact that many of its most-effective AD capabilities (such as SAMs) can also serve as a means of early warning and

defense against nuclear strikes, this makes any conflict near Russian territory highly problematic and subject to escalation.

Despite this, Russia was still a formidable challenge. Some of the military capabilities on display—the S-400, the Iskander missile system, and the Kh-101 ALCM—are among the most advanced of their kind and designed with countering NATO in mind. It might also be worth noting that many of the Russian systems that play key roles in permitting it to deny airspace and basing near its borders are offered for sale overseas; open conventional conflict might be avoided with Russia, but Russian-developed weapons are available around the world, and this includes export versions of S-300 and Iskander (with a 280-km range in order to comply with Missile Technology Control Regime restrictions).

Perhaps most significant is the fact that the conflict highlighted the inherent difficulty in defending the Baltic states. Once a conflict seems imminent, any deployment of forces directly to the Baltics by air or sea is at great risk. Should deterrence fail and should significant NATO forces not be on the ground to contest a Russian invasion, NATO will be confronted with rolling back forces already enveloped in an A2AD umbrella. It will take a long time for the United States to move forward sufficient heavy forces to isolate Kaliningrad and march through the Baltics along a broad front of Russian territory.

It should be noted, however, that geography was by no means a hindrance in every respect. Although Russia enjoyed the balance of the benefits of proximity to Estonia, this was still in NATO's backyard as well. Compared with other potential scenarios in other regions of the world, the United States and its allies enjoyed ready access to the theater and were supported by a robust infrastructure.

Although the conflict came to a relatively abrupt (and, for NATO, favorable) conclusion, this need not have been the case. Attacks on Kaliningrad and Russia proper hold an inherent risk of crossing Russia's nuclear-response threshold. Besides the use of nuclear weapons, Russia had the capability to escalate the war conventionally (with additional strikes on western European infrastructure, by invading other Baltic states, or by broadening the war through Belarus) and unconventionally (in space and cyberspace). Moreover, it could have resisted

NATO further, necessitating a long and delicate advance that would undoubtedly have resulted in significant destruction throughout Estonia and Kaliningrad.

Lastly, this scenario depicts an unambiguous Russian conventional attack on Estonia. The *modus operandi* with which Moscow has had recent success in Ukraine is quite different: low-grade, deniable aggression. Russia could present NATO with a very different challenge, one in which the balance between force projection and A2AD might be less directly relevant. Figure 4.4 presents our net assessment for this scenario, and Figure 4.5 summarizes the A2AD threat to force projection.

Figure 4.4
Russia–Estonia Net Assessment, 2015

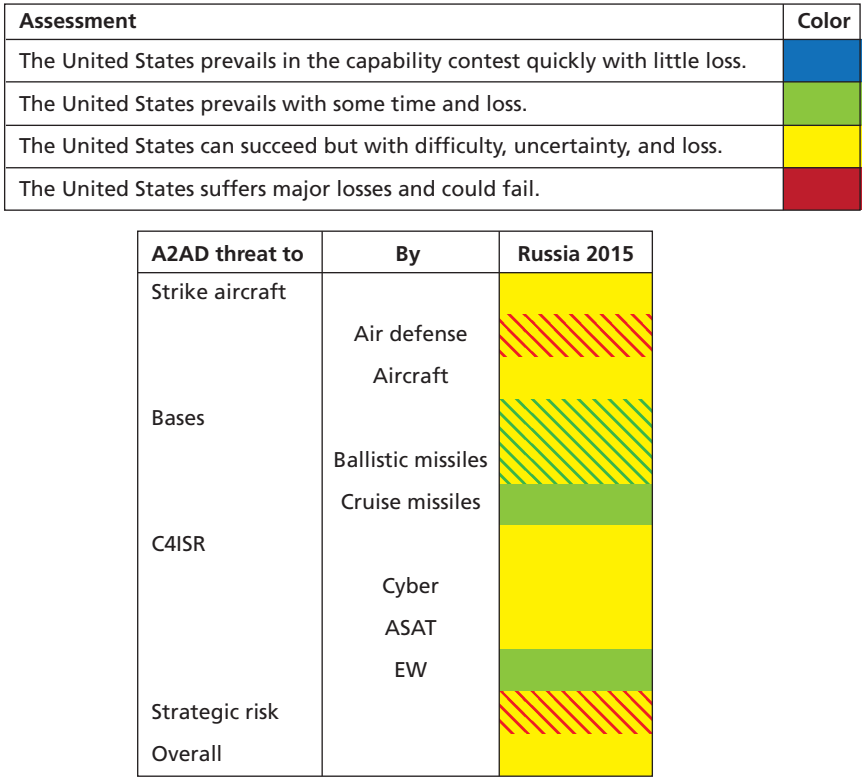
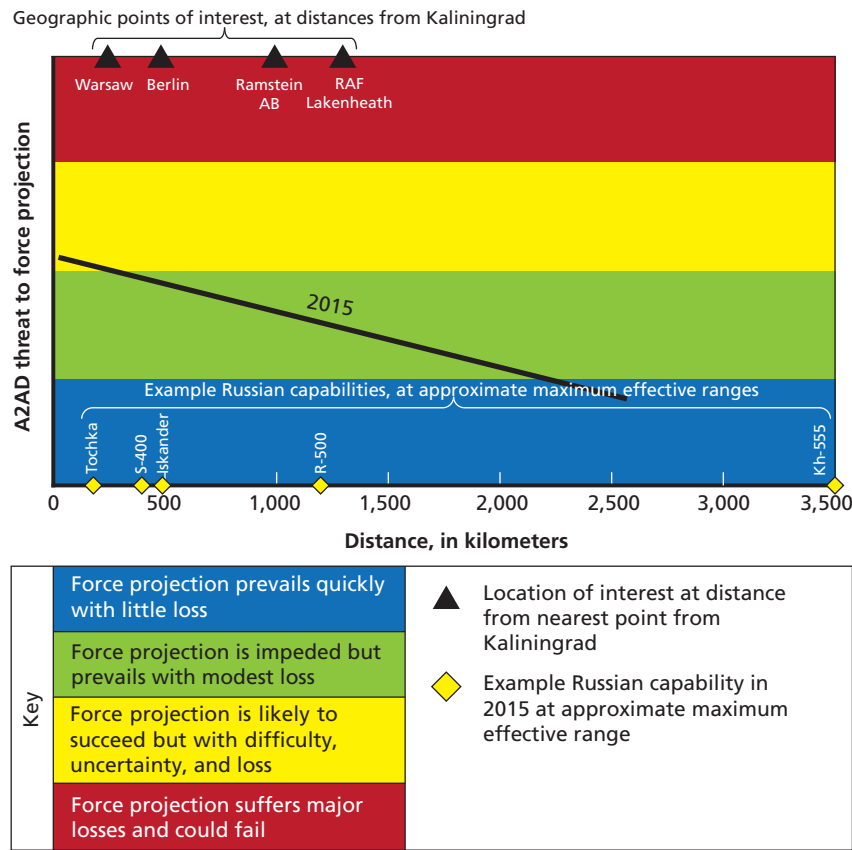


Figure 4.5
Russian Anti-Access and Area-Denial Threat to U.S. and North Atlantic Treaty Organization Force Projection, 2015



Russia–Estonia, 2025

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

Background

By 2025, the Ukraine–Russia crisis of 2015 has resolved into a new normal: a seemingly stable, if uneasy, Russia–NATO relationship. Russian incursions into Ukraine are not reversed, but, after continued unrest that runs into mid-2015, an unofficial recognition of the status quo takes hold. Portions of eastern Ukraine fall under de facto separatist governance, and, even though Ukraine still claims them, it makes no armed efforts to assert those claims. Regional political reintegration is not achieved, and eastern Ukraine still suffers from sporadic violence.

The received wisdom in the NATO capitals was that the alliance must be newly on its guard toward Russia but also that Moscow had learned a harsh lesson and would not soon repeat the mistake. Further, although some European energy import diversification took place, the inherent advantage of Russian exports proved impossible to beat, and Russia returned as an economic partner. And so the posture and capabilities of the alliance are not hugely different from what they were in 2015. Western Europe largely arrested its post–Cold War decline in military spending at approximately 1 percent of gross domestic product spending on defense but did not reverse it. The United States did not restore forces removed from Europe in 2013–2017, and NATO did not permanently station forces in the Baltics, though the Air Policing mission continues and battalion-sized elements deploy for exercises on an irregular basis. The United States did, however, invest in maintaining an additional prepositioned armored brigade unit set in Germany in 2015.

In the intervening years since the Ukraine events, Russia has focused resources on modernizing and improving its armed forces. The most-notable advances have been in its conventional strike capacity.

These missiles include a robust inventory of Iskander variants, some of which violate the INF Treaty. Air defenses have also been improved, with greater numbers of S-400 batteries and some limited fielding of an even more capable system, the S-500.

Several factors, however, have limited what Russia has been able to accomplish. A prolonged recession beginning in 2014 limited the resources available for military modernization. Ukraine-related sanctions were harmful, but the collapse of the price of oil was the dominant factor.¹² The fiscal health of the Russian government depends heavily on the revenues derived from the sale of oil and natural gas. Moscow devoted an even greater share of the state budget to defense but was forced to be judicious about what could be accomplished. Improvements in naval and air forces have been limited. Improvements in ground forces were largely limited to air defense, specialized units (including a new generation of light armored fighting vehicles), and army aviation.

Russia has also been held back by the fact that its military continues to depend on conscripted manpower: Attempts to shift to an all-volunteer force have not been successful. The short period of time that conscripts serve on active duty limits the amount of collective training they get and yields a force with limited competence. Russia's shrinking population has made matters all the worse. Like in 2015, the rapid-reaction forces, including Spetsnaz and Russian Airborne Forces, have higher-quality personnel and are generally regarded as quite competent. Although there are four divisions of airborne forces and half a dozen Spetsnaz brigades, these still represent a small portion of available ground forces.

NATO capabilities have improved in some select areas. The F-35A is fielded to Denmark, Norway, the Netherlands, and the UK, in addition to the United States, providing more-survivable tactical airpower. A follow-on to the Medium Extended Air Defense System program has bolstered air and missile defenses in Germany and Poland. The United

¹² The price of oil fell from well over \$100 per barrel in early 2014 to below \$50 while this scenario was in review. How these circumstances affect Russia's military investments remains to be seen. The trajectory described here, however, cannot be discounted.

States also has a limited inventory of stealthy, multirole unmanned aircraft.

Against this backdrop, the parties' strategic objectives in the Baltics are comparatively unchanged. Russia still seeks a paramount regional role and still touts the rights of ethnic Russians in the near abroad as a chief interest. The United States is still deeply invested in NATO and in preserving the credibility of its defense commitments.

Path to War

In 2019, Russia begins a series of exercises called *Fpered na Zapad* (Forward to the West, also a popular slogan in 1944) conducted jointly between Russia and Belarus and involving units in the St. Petersburg and Pskov areas. The exercises are said to aim at improving interoperability and enhancing defenses to deter NATO aggression. They are held annually each spring thereafter.

In the spring of 2025, a group of extreme Russian nationalists in Estonia demonstrate against the "fascist government" of Estonia just before the scheduled Zapad 2025 exercise kicks off. Escalating tensions between protestors and government security forces result in clashes of increasing severity, with lives lost on both sides. Believing that European opinion about the clashes is divided, Russia launches an invasion of Estonia that it declares is a "punitive action" and announces its intent to deploy an international peacekeeping mission in northeastern Estonia to secure the rights of ethnic Russians there. Belarus mobilizes additional forces along its borders with Latvia, Lithuania, and Poland.

Upon convening, the alliance countries agree that the Russian invasion of Estonia triggers an Article 5 response. There is less consensus on the specifics of how to respond. Although NATO nations recognize the need to stand up to Russian aggression, the specter of nuclear weapons makes them cautious about ensuring that they know what is going on in Estonia before reacting, on what goals they are willing to pursue, and how they are willing to pursue them.

Russia's Conflict Objectives

Like in the 2015 case, Russia hopes to expand its sphere of influence over its near abroad and intimidate the smaller neighbor states. Estab-

lishing a small enclave in eastern Estonia will serve as a permanent lesson to its neighbors. It also intends to damage, if not outright dismantle, NATO as an effective organization by promoting disagreements over courses of action among its members and causing it to demonstrate its fecklessness when it comes to Article 5 violations (NATO's *raison d'être*).

The United States' and North Atlantic Treaty Organization's Conflict Objectives

The United States and most of its NATO allies recognize that a vigorous military response is needed. However, a coercive campaign targeting the core elements of Russian power and economic centers is ruled out because of the high likelihood that such a course of action would risk a nuclear confrontation. It is thus NATO's hope that it can put Russia into a position in which it faces imminent defeat of its fielded forces in Estonia and convince Moscow that the costs of this adventure outweigh its benefits without having Russia conclude that it faces an existential threat.

Conduct of the War

This section briefly outlines how the combatants try to achieve their conflict objectives. In the following section, we discuss specific outcomes of the contest.

Russian Anti-Access and Area Denial Concept of Operations

Russia's A2AD CONOPS is much the same as it was in the 2015 case: Raise the cost of NATO force projection with conventional weapons while blunting NATO's advantages with the threat of nuclear response and conventional escalation. Russia's conventional capabilities have improved by degrees. Russia has greater numbers of professional troops and more forces (collectively), as well as larger inventories of advanced precision-strike and air-defense weapons. Nuclear posture is largely unchanged: an ambiguous threat to use nuclear weapons in the face of an existential threat.

U.S. and North Atlantic Treaty Organization Force-Projection Concept of Operations

NATO is ill positioned to bring large ground forces to bear on the Baltics in the short term. No NATO forces are stationed there, and only a small force regularly conducts exercises there. It cannot effectively resist the initial Russian invasion. The concept, like in 2015, is to use air and sea power to achieve air superiority and then move ground forces toward Estonia to eject Russian forces, hoping that a combination of demonstrated resolve to see the campaign through and the immediate threat to Kaliningrad will induce Russia to back down.

Assessment of Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Force Projection

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Strike Aircraft: Setup

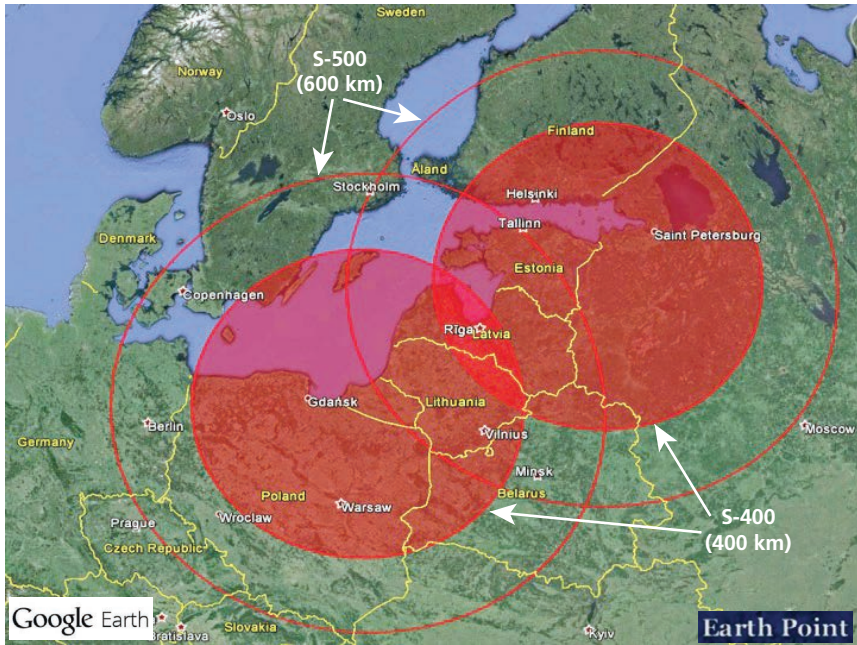
Russian anti-aircraft capabilities in this case are truly formidable. The S-500 has a range of 600 km, although it is fielded in only limited numbers.¹³ The S-400 has been fielded in much greater numbers than in 2015. Russia claims that the S-500 is even more effective against stealth aircraft than the S-400 is. A system called S-350, which is highly mobile and carries more missiles per launcher, has largely replaced the remaining S-300 units.¹⁴ Figure 4.6 depicts Russian SAMs and their ranges.

Russia's air forces have also gotten somewhat better; improved versions of some of its more-prominent fighter types (MiG-35 and Su-27 variants) are available, as well as limited numbers of the Sukhoi-developed fifth-generation fighter, the PAK-FA. The PAK-FA is not as stealthy as its U.S. counterparts but does have stealthy characteristics as a very high-performance aircraft with modern sensors and weapons. Its chief disadvantage is limited numbers; rather than risk them against U.S. F-22s or F-35s, Russia instead tries to use them against Swedish

¹³ "S-500 Prometheus," *Missile Threat*, April 26, 2013.

¹⁴ See "S-350E Vityaz 50R6 Surface-to-Air Defense Missile System," *Army Recognition*, July 6, 2013.

Figure 4.6
Select Russian Surface-to-Air Missiles, 2025



SOURCE: Google Earth.

NOTE: The map shows missiles based at illustrative points in both Kaliningrad and in Russia, near the Estonian border.

RAND RR1359/1-4.6

Gripen and Polish F-16s, which will make up significant numbers of the aircraft most closely based to the Baltics.

Russian C4ISR is also improved, enabling Russia to integrate these and other tactical air-defense systems into a more robust IADS than it had in 2015. This advance, as much as any other, significantly increases the challenge for NATO air assets, particularly early in the conflict. Table 4.5 lists Russia's air-defense systems in this scenario, and Table 4.6 shows its modern combat aircraft.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Strike Aircraft: Outcome

Improved Russian counterair and IAD capabilities force two changes on NATO. First, reliance on stealthy aircraft and standoff strike is

Table 4.5
Russia's Air-Defense Systems, 2025

System Name	NATO Designation	Type	Number in Service	First Delivery
High-altitude strategic				
S-500		Self-propelled SAM	100	2016
S-400	SA-21 Growler	Self-propelled SAM	200	2012
S-350		Self-propelled SAM	200	2015
S-300PMU-1/2	SA-20 Gargoyle	Self-propelled SAM	120	1982
Low-altitude tactical ^a				
Pantsir-S1	SA-22 Greyhound	Low-altitude SAM or gun system	120	2010
Osa	SA-8 Gecko	Low-altitude SAM	400	1968
Tor	SA-15 Gauntlet	Low- or medium-altitude SAM	160	1986
Tunguska	SA-19 Grison	Self-propelled anti-aircraft gun or SAM system	200	1982

SOURCE: Jane's Sentinel Security Assessment, undated.

^a Does not include MANPADS.

redoubled. Fortunately, NATO has more such aircraft than in 2015. The numbers of mobile, advanced SAMs make total suppression of Russia's IADS impossible. Carefully crafted strike packages are required even weeks into the campaign, and loitering for time-sensitive targets is unworkable. Cruise-missile inventories are rapidly drawn down because they are the primary system used to strike Russian targets under its A2AD shield. Second, Russia can threaten air campaign enablers—refueling and ISR aircraft—in a way it had not previously. For example, Russian fifth-generation fighters armed with advanced,

Table 4.6
Russia's Combat Aircraft, 2025

Aircraft	Number
Fighter	660
Fighter, ground attack	320
Strike	210
Bomber (medium range) ^a	105
Transport	280
Attack helicopter	400
Transport helicopter	500
Total	2,475

SOURCE: Jakob Hedenskog and Carolina Vendil Pallin, eds., *Russian Military Capability in a Ten-Year Perspective: 2013*, FOI-R—3734—SE, December 2013, pp. 27–28.

^a This is a count of Tupolev Tu-22M3s, some of which are outfitted for reconnaissance.

long-range AAMs mount an attack on a tanker orbit over Norway on D+8 and subsequently force NATO to devote additional resources to defensive counterair. On top of this, like in 2015, the SRBM, ALCM, and GLCM threat (covered in our discussion of fixed assets) forces NATO to operate from more-distant airfields.

The net result is that NATO's air objectives early in the campaign shift somewhat from 2015. Kaliningrad is again the primary target but, in this case, to the exclusion of significant operations against Russia proper. Even though NATO has more stealth aircraft, including stealthy UASs, than in 2015, the additional threat that Russian stealth aircraft and improved air-defense systems pose limits what can be done with fourth-generation aircraft. NATO simply does not have the survivable assets to conduct a comprehensive campaign with multiple foci. Russian forces emplaced in Estonia are hit with cruise missiles, but

there is no concerted SEAD in the Pskov or St. Petersburg regions in the first weeks of the campaign.

Even these more-limited initial objectives take more time. The S-400 and S-500 threat from Kaliningrad, from which the missiles could range all the way to Berlin, is not tolerably abated until D+27.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Naval Power Projection: Setup

By 2025, Russia has fielded several of its latest *Lada* diesel-electric and *Yasen* SSBNs. If they perform as advertised, they can challenge control of the Baltic (in the case of the *Ladas*) and holding naval and fixed targets at risk in the North Atlantic (in the cases of the *Yasens*). Three *Lada* and two improved Kilo-class subs are known to be located in the Baltic Sea in 2025. They can deploy mines and remain under the protective umbrella of Russian air defenses. Russia has also expanded its coastal missile-defense regiment in Kaliningrad to a full brigade, including three battalions of its Bastion missile system, which has a range of 300 km firing P-800 Oniks (SS-N-26) ASCMs.¹⁵

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Naval Power Projection: Outcome

An older *Shchuka-B*-class (NATO: Akula-class) submarine is detected while approaching a U.S. CSG in the northern Atlantic and is attacked by helicopters attached to the group. It appears to escape and is not relocated. Given the risk of air attack by long-range Russian aviation, as well as submarines, a great deal of the CSG's efforts are diverted to ensuring the survivability of the carrier itself. One *Lada* and both Kilo-class submarines are believed sunk by U.S. and Swedish subs in the Baltic, but the presence of mines, the lack of knowledge of the two remaining *Ladas*, and, above all, Russian aircraft operating out of bases in Russia prevent the U.S. Navy from sending major surface combatants into the Baltic Sea in force.

¹⁵ "Third Bastion Missile System Has Been Delivered to Black Sea Fleet," *RusNavy.com*, January 19, 2011.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Fixed Assets: Setup

With the full deployment of the Iskander-launched cruise and ballistic missiles, Russia has increased its capability against NATO airfields and other fixed infrastructure. Inventories of these missiles (both launchers and reloads) are roughly triple their 2015 totals.

Russia has also increased its ALCM inventory, though not the survivability of the aircraft themselves. Similarly, the presence of the *Yasen*-class SSGNs provides a launch platform for up to 32 LACMs each.

The fixed infrastructure that NATO needs is approximately the same as in 2015. Airbases close to Estonia are desirable, but there are many serviceable options outside of SRBM range. Ground operations will require the deployment by sea of U.S. troops and plenty of subsequent intratheater movement, so transportation infrastructure is sensitive.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Fixed Assets: Outcome

Like in 2015, Russia can drive NATO from airbases in the Baltics, Poland, and eastern Germany mainly with SRBM attacks—air operations inside of 500 km from Kaliningrad are too costly to continue. In 2025, however, Russia is able to mount a more sustained and wider-reaching campaign using deeper inventories of cruise missiles and better long-range ISR to undercut NATO's attempt to disperse air forces. By D+7, Russia strikes 11 airbases in England, western Germany, Belgium, the Netherlands, and France using ALCMs and GLCMs. Just over half the missiles are shot down, but 28 aircraft are destroyed on the ground. From that point forward, raids of between four and ten missiles on a single base are more typical. Russia seems to have little trouble distinguishing which bases are most active at which times. As losses mount, NATO commanders struggle to balance dispersion with limited available point defenses, and are forced to dedicate fighter combat air patrols to counter cruise-missile attacks.

Russia is mindful of the importance of deploying U.S. forces to the NATO response. U.S. prepositioned equipment in Germany is among

the first targets to be hit. Some cruise missiles have conventional high-explosive warheads and destroy several warehouses, but most scatter submunitions. The chaos is such that usable surviving equipment is not available for use until D+24. Like in 2015, dual-purpose infrastructure, such as ports, roads, and bridges, are not subject to widespread disabling attacks, but, on D+35, as the first U.S. troops arrive from CONUS, Russian GLCMs hit the ports of Antwerp and Bremerhaven. The ports do not suffer significant harm, but the Bremerhaven attack hits a marshaling yard for recently downloaded equipment.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Ground Forces: Setup

Russian forces actually on the ground in Estonia are not materially different from what they were in the 2015 case, in either number or capability. The approximately two division-equivalents positioned in the enclave or just on the Russian side of the border are the best the Russian army has to offer and have accomplished their objectives with speed and comparative ease. The majority of the combat strength of the Russian Army is elsewhere in the Western Military District. This, though, is not NATO's immediate concern. Like in 2015, it first has to assemble sufficient forces to conduct an overland advance to Estonia. Russian forces or their Belarusian allies (for the moment, officially noncombatants) could maneuver against NATO's main force or its lines at any point from the Polish border north. Like they did before, Polish forces mobilize to guard their border and, by doing so, also fix the Belarusian forces, which cannot join hostilities and engage in the Baltic states without exposing their homeland to a much more capable NATO (Polish) force invading from west to east. As a result, although they continue to pose a latent threat, Belarusian forces remain on the sidelines.

Russia's ability to target logistics in the U.S. rear area through standoff weapons (ALCMs, GLCMs, and SRBMs) has improved in the interim; the weapons can cause casualties but lack the ability to target and deliver enough force to seriously degrade the NATO combat forces that are mobilizing and preparing for a counteroffensive. The primary impact is to force U.S. units to operate in a more distributed

fashion and force tactical movements from much farther away from Russian-held territory, although there is little latitude to do so once the advance through Lithuania begins. Also, on such an advance, long-range rockets and artillery become a greater threat.

NATO's capacity, capabilities, and posture are likewise broadly similar to what they were in 2015. The 2015 Ukraine crises halted but did not reverse the trend toward smaller armies in the western European countries. The United States keeps two BCTs in Europe—a Stryker BCT in Germany and an IBCT in Italy. It has an armored BCT equipment set prepositioned in Germany. It regularly deploys battalion-sized forces for exercises and six-month stays to Poland and Romania. A heavy battalion is in Poland taking part in an exercise when hostilities begin.

Russian Anti-Access and Area Denial Versus U.S. and North Atlantic Treaty Organization Ground Forces: Outcome

Given the similarities in the balance of forces to the 2015 case, it is unsurprising that the scenario unfolds in a similar fashion. NATO is more deliberate in its advance. Like in 2015, the United States deploys III Corps headquarters, two heavy and one light division headquarters, and 12 BCTs from CONUS to Europe in support of the NATO effort to oust Russia from Estonia. Other U.S. forces begin efforts to improve their readiness, and the President authorizes a partial call-up of the reserve components of the military.

Forces do not move to isolate Kaliningrad in support of a push into the Baltics until D+55, when four CONUS-based U.S. BCTs are fully deployed. This is due in part to increased respect for Russian defensive capability in that region and in part because the air campaign has not yet achieved assured superiority north of the Lithuanian border. A campaign to neutralize Kaliningrad will necessarily include reducing both air defenses and the ability of Russian forces to fire tactical missiles or long-range artillery against the NATO lines of communications leading into Lithuania. Without the ability to provide continuous close air support, the march on Narva will not begin, so there is little point in rushing the advance on the initial objective.

Conclusion of the War

Moscow is emboldened that its forces on the ground in Narva have not yet been significantly bloodied and that its air defenses for them are largely intact, but it is ultimately not sanguine about its chances to turn back a NATO march on Estonia. NATO's resolve in the face of Russia's incursion into Estonia denies Russia its principal strategic objective, the substantial weakening or implosion of NATO. If that is the war's ultimate end, Russia is unwilling to escalate either horizontally by invading other European territory or vertically to nuclear conflict. Furthermore, continued hostility could put its hold on Kaliningrad in danger. Yet, Russian leaders decide to make one more attempt to cause NATO to back down.

Russia makes a futile but extremely costly attempt to level the score and force NATO to some negotiated outcome. Citing both the continued NATO air and artillery attacks on Russian forces in Kaliningrad and the so-called terrorist activities of Estonian resistance forces in the Narva region, Moscow launches a punitive strike on Tallinn on D+59. Under the continued protection of Russia-based SAMs, tactical aircraft pound every high-value site they can reach in the capital: the port, airport, power plants, and the parliament building. Two armored brigades begin to advance west.

In the meantime, Russian forces put up stiff resistance in Kaliningrad. Rocket artillery, enabled by tactical UAVs, is particularly effective against NATO forces maneuvering near the enclave. Russian short-range anti-air systems make the environment extremely hazardous for fixed-wing close air support and rotary-wing attack aviation.

NATO, however, offers no sign of an opening. Effective resistance in Kaliningrad is gradually drawing to an end, and more brigades are coming forward through Poland as the U.S. forces from CONUS and the German, UK, Dutch, and French forces in the Allied Command Europe Rapid Reaction Corps arrive and move toward the front. NATO European countries announce that they are mobilizing their reserves, and Canada moves to send two brigades organized in a combat command to Europe.

Russian leaders decide that they are unwilling to escalate and so declare that they have successfully defended the Russian ethnic minor-

ity in Estonia, punished the political leadership there who treated them like second-class citizens, and is prepared to return to the status quo ante. The NAC decides that this outcome is preferable to a continued war and defers questions about reparations to subsequent political negotiations. Although Estonia is unwilling to settle for this, in the end, it finds that it is ultimately more attractive than a long and unpredictable continuing campaign fought on its territory.

Net Assessment

This scenario is very similar to the 2015 case, with Russian capabilities increasing only by degree and not to the extent that they enable different operational approaches from those they could already execute. Their A2AD capabilities do, in fact, improve but only enough to change some elements of NATO's prospective approach to the war—most notably, its ability to use airpower throughout but in the early stages of the campaign in particular. The most noticeable effect is that the timeline is set back, and more damage is done to Estonia and to NATO air and land forces. But, NATO is able to gain the same strategic outcome—Russian capitulation—without making the same operational gains—most notably, against the air defenses. Nevertheless, key aspects of the conflict are worth reviewing:

- Like in 2015, compounding features of Russian capability and posture, NATO posture, and, above all, Baltic geography make defense of Estonia very challenging. Once the war begins, significant ground forces are needed to achieve victory, and those take time to assemble. Setting conditions for their successful employment, including gaining air superiority, will be slow and costly.
- NATO's campaign to defeat Russian IAD and counterair takes longer than in 2015. Combat air and airlift operations are more limited than in 2015.
- Like in 2015, NATO does have the benefit of fighting in and near its own territory. Compared with their access in other scenarios in other areas of the world, the United States and its allies enjoy easy access to the theater and to infrastructure that supports power projection within it.

- Like in 2015, this could have been a longer, messier, bloodier conflict. Use of nuclear weapons is the most striking example. Russian tactical use against military targets would place an enormous decision at the feet of Supreme Headquarters Allied Powers Europe. Even removing nuclear weapons from consideration, Russia has several options to escalate—further invasion of Estonia, involvement of Belarus, additional long-range strikes against western Europe—none of which it exercised to the full extent.

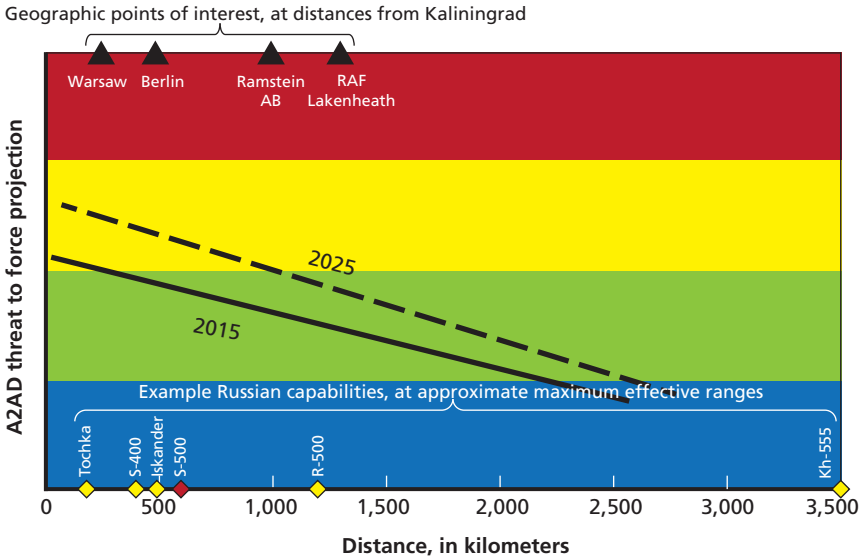
Figure 4.7 provides our net assessment of this scenario, and Figure 4.8 shows the A2AD threat to force projection for this scenario.

Figure 4.7
Russia–Estonia Net Assessment, 2025

Assessment			Color
The United States prevails in the capability contest quickly with little loss.			
The United States prevails with some time and loss.			
The United States can succeed but with difficulty, uncertainty, and loss.			
The United States suffers major losses and could fail.			

A2AD threat to	By	2015	2025
Strike aircraft	Air defense Aircraft		
Bases	Ballistic missiles Cruise missiles		
C4ISR	Cyber ASAT EW		
Strategic risk			
Overall			

Figure 4.8
Russian Anti-Access and Area-Denial Threat to U.S. and North Atlantic Treaty Organization Force Projection, 2025



Key	Force projection prevails quickly with little loss	▲ Location of interest at distance from nearest point from Kaliningrad
	Force projection is impeded but prevails with modest loss	◆ Example Russian capability in 2015 at approximate maximum effective range
	Force projection is likely to succeed but with difficulty, uncertainty, and loss	◆ Example Russian capability that is new in 2025 at approximate maximum effective range
	Force projection suffers major losses and could fail	

Iran–United States

Duncan Long

Nonnuclear Iran–United States, 2015

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

Background

America's dominant strategic objective in the Persian Gulf is to ensure the free flow of energy exports. Consequently, it has an interest in continued regional stability, which external aggression toward Persian Gulf–state allies or internal turmoil in those same countries could threaten, and in the continued security of SLOCs. Other global strategic objectives also apply to the Persian Gulf, including an interest in limiting the spread of WMD and in promoting human rights.

Iran is seen as a threat to each of these interests. Iran's pursuit of nuclear weapons in particular is problematic—proliferation is undesirable in its own right, particularly in a state with close ties to terrorism, but it could also embolden Iran to follow through on some of its bellicose rhetoric, believing that the United States would be deterred from intervening. Indeed, it would raise the stakes of any intervention dramatically.

Iran's dominant strategic objective is to assert itself as a regional power. It perceives a threat to this ambition from the United States and its Persian Gulf allies. In U.S. support, including military assistance, to Saudi Arabia, Qatar, Bahrain, the United Arab Emirates (UAE),

Afghanistan, and others, it sees encirclement, tinged by the fact that these are Sunni regimes. Its nuclear weapon program is an effort to ensure regime survival and change the regional strategic calculus. It has internalized the lessons of Iraq and Afghanistan and recognized that perhaps the most realistic way to deter the United States from any effort to change the regime is with nuclear weapons.

Although the Persian Gulf states are hardly monolithic, their strategic objectives are broadly similar. Each of these energy-rich partners of the United States wants to ensure the steady, secure export of its oil and gas resources. Each also has strategic political and other goals, but these are largely subordinate to the flow of oil that makes them possible. The United States is a means to that end, a partner that will provide military assistance and provide an implied guarantee of their security from attack by other states. Iran is the only current state threat to either their territorial integrity or their exports.

Path to War

The optimism raised by P5+1 talks in the fall of 2013 collapses by fall of 2015.¹ Hardliners reassert control over the Hassan Rouhani administration. Iran very publicly flouts the November 2013 agreement, denying inspectors access to all facilities. Intelligence indicates a steady, clandestine increase in enrichment activity—more to 20 percent uranium-235 (low-enriched) and possibly some to weapon grade—and significant progress in weaponization.

The United States, in concert with western European governments, levies further sanctions aimed at Iran's oil exports, effectively bringing them to a halt.

Iran reacts with more than usual vehemence, claiming that this is an act of naked aggression if not an outright declaration of war. Over a period of three weeks, tensions mount. A U.S. frigate transiting the Strait of Hormuz is subject to harassment by Iranian fast-attack craft. DoD lets it be known that some strike aircraft are being temporarily deployed to the region and that an aircraft-carrier rotation will be

¹ *P5+1* refers to the five permanent members of the UN Security Council (China, France, Russia, the UK, and the United States) and Germany.

extended. On November 2, Iran abruptly announces that the Strait of Hormuz is closed to all traffic. It claims to have laid mine fields throughout the strait and threatens any vessels attempting passage, whether commercial vessels or warships, with cruise-missile, submarine, air, and small-boat attack. It also threatens that it will act against the aggressors through all means at its disposal and will consider any regional states that provide support to those aggressors to be combatants as well. It does, however, say that the Iranian navy will graciously provide escorts through the strait for ships belonging to those of its neighbors that publicly reject U.S. aggression.

Iran makes good on this threat within the hour: A Houdong fast missile boat launches a C-802 ASCM at a U.S. destroyer on theater BMD patrol in the Persian Gulf. The ship's countermeasures defeat the attack. A short time later, there are two attacks in the strait proper: Just south of Qeshm Island, a small pack of patrol boats set on a westbound Kuwaiti-flagged tanker, and an eastbound Saudi tanker experiences a similar attack. Both ships absorb several hits from C-802 missiles. The Kuwaiti tanker limps toward Abu Dhabi, while the Saudi tanker loses propulsion and drifts toward the Musandam peninsula. Further D+1 incidents show the range of threat. A UAE patrol craft reports being fired on by artillery from Greater Tunb island. An Iraq-bound freighter strikes a probable mine in the northernmost part of the westbound channel and begins to sink. Ships approaching from either direction turn back. Outbound shipping begins to accumulate east of Qatar.

The U.S. president condemns Iran as a clear menace to the international community and suggests that its rash attacks require an immediate response and indicate that the Iranian nuclear program cannot be countenanced. The United States will therefore take all necessary measures both to restore the freedom of navigation and to eliminate the nuclear threat. U.S. proclamations, however, carefully suggest that regime change is not an inherent objective and that the United States is not posturing for a full-scale invasion.

Iran's Conflict Objectives, 2015

Iran's hopes for a favorable outcome rely on sustaining the closure long enough to inflict pain on the world economy while appealing to world

public opinion to blame the United States for this outcome. Although Iran's original reason for hostilities was tension over its nuclear status, it soon realizes that it has miscalculated and could both lose large parts of its nuclear infrastructure and scientific workforce and suffer great harm to its economy—the combination of which could itself threaten the regime's credibility. Facing the challenge of an extended campaign to overcome Iranian defenses and mounting international pressure, Iran hopes that the United States might open the door to some resolution that could save face for both parties: Perhaps a cessation of the bombing campaign could be announced, at which point Iran could reopen the strait to commerce while imposing limits on the passage of warships, limits that the United States could refuse to acknowledge but not immediately challenge. In short, Iran needs to appear strong to its people while not suffering catastrophic losses.

The United States' Conflict Objectives

Initial U.S. objectives are limited to the reduction (and, if possible, elimination) of the Iranian nuclear threat and the restoration of the freedom of navigation through the Strait of Hormuz. Note that regime change is *not* an objective at the outset because this is deemed to require the long-term commitment of substantial land forces. Such a commitment is unacceptable after the recent experiences in Iraq and Afghanistan, so U.S. planners are willing to assume the risk that Iran will adopt an even more hostile posture in the future and reconstitute its nuclear program or menace the strait as soon as it regains the ability to do so.

U.S. planners hope that a combination of rapid attrition of the capabilities Iran needs to threaten the strait, economic pressure, and clear signaling that the regime is not a target will convince Iran both that its current position is hopeless and that it can survive to have a future, and so compel it to back down. Closing the strait will be devastating to the Iranian economy as well, limiting not just exports but also imports, especially refined-petroleum products.

Persian Gulf States' Conflict Objectives

The Persian Gulf states are the most useful audience for the Iranians to convince of their cause, or at least of the physical and economic

damage that they will incur if they back the United States, because they could have a serious impact on U.S. force-projection capabilities if they were to deny use of facilities on their soil. However, they are also, in important ways, the least likely to be convinced. Their main objective (after the elimination of Iranian nuclear capability) is the rapid restoration of freedom of navigation, which ensures a steady stream of oil and gas revenue, which, in turn, is a key element of regime survival. They would, of course, like to minimize the threat to their homelands, but they also have an eye toward the future: They already regard Iran as a threat and see that no good could come from allowing Iran to be in any way rewarded for its action. In view of the limited direct military threat that Iran poses to them, they are willing to accept some short-term hazard to curtail a longer-term menace.

Conduct of the War

This section briefly outlines the basic means by which the combatants try to realize their conflict objectives. We then discuss specific outcomes of contests between select capabilities in turn.² Figure 5.1 illustrates the strait and its shipping lanes.

Iranian Anti-Access and Area-Denial Concept of Operations

Iran attempts to close the Strait of Hormuz by menacing all shipping traffic with mines, ASCMs, small attack boats, and submarines. It then employs two fundamental approaches to keeping the strait closed: direct action on U.S. military forces in and approaching the area and attacks on those countries that provide access for U.S. military forces. Iran poses a sporadic threat to shipping deeper into the Persian Gulf in order to spread U.S. resources as thin as possible, but it will concen-

² A sizable body of literature imagines how a U.S.–Iran war would unfold. We are especially indebted to Mark Gunzinger and Christopher Dougherty, *Outside-In: Operating from Range to Defeat Iran's Anti-Access and Area-Denial Threats*, Washington, D.C.: Center for Strategic and Budgetary Assessments, January 17, 2012, and Caitlin Talmadge, "Closing Time: Assessing the Iranian Threat to the Strait of Hormuz," *International Security*, Vol. 33, No. 1, Summer 2008, pp. 82–117. We drew other facts and analysis bearing on Iran's military capabilities from the work of Anthony Cordesman and his colleagues at the Center for Strategic and International Studies and from work by our colleague at RAND, Jacob Heim.

Figure 5.1
The Strait of Hormuz with Approximate Shipping Lanes



SOURCE: Google Earth.

RAND RR1359/1-5.1

trate the bulk of its efforts around the strait itself, where its geographic advantages are greatest.

For direct action on U.S. military forces, Iran knows that it is overmatched. Its approach is governed by a desire to extend the conflict long enough to identify a strategic opening, an opportunity to wind down hostilities on terms that will leave the United States thinking hard about any future bombing campaign. It does its best to conserve forces and increase the time and resources the United States must commit to eliminate them. Working to its advantage is the fact that the strait cannot be cleared from afar. Mines must be swept by ships operating close to the Iranian shore, within the range of ASCMs and other direct- and indirect-fire assets; swarms of small boats; and sub-

marines. Mines can be laid, cruise missiles positioned, and submarines and small boats based under the umbrella of SAMs.

For U.S. regional partners, Iran's hope is that the threat of attack is sufficient to deter Persian Gulf-state support for the United States, but it will follow through as well as it can should deterrence fail, to try to compel a change of heart. The means at its disposal are SRBMs and MRBMs and attacks by irregular forces. The most-likely targets for missiles are population centers and other wide-area targets because Iran does not have a large supply of precision-guided missiles with which to attack point targets at range. Although these targets are risky in terms of achieving the desired political effect, they are also a matter of necessity: Attacks by irregular forces could also hit so-called soft targets and might be attempted against military targets as well.

U.S. Force-Projection Concept of Operations

The United States must confront both pillars of the Iranian attempt to close the strait.³ It attempts to eliminate Iran's capacity to threaten shipping and its capacity to threaten the Persian Gulf states. Its CONOPS will be constrained by a general desire not to escalate the fight any further than it has to. The best outcome, after all, is for Iran to capitulate and abandon its efforts to close the strait. Any military activity against Iran that would seem to signal intent to end the regime is undesirable because that could remove any Iranian incentive to back down. Likewise, U.S. losses that would make it politically difficult to stop short of regime change must also be avoided. One effect of this is to rule out the introduction of conventional ground forces, at least as an initial feature of the U.S. plan. Another is to limit the breadth of airstrikes to targets around the strait.

Other Parties' Concepts of Operations

The Persian Gulf states confine their military activities to homeland defense. As a result, this narrative does not discuss in any detail the

³ Note that we do not discuss the U.S. counternuclear campaign further. We assume it to be substantially over after five to seven days with minimal aircraft losses and unknown effect on Iran's nuclear infrastructure. After that point, those resources committed are available to reopen the strait.

contributions of potential allies—where relevant, we mention these contributions. Other U.S. global partners could join the United States in this campaign, but, although they share an interest in the renewed flow of energy exports, they are not keen to associate themselves with the concurrent U.S. counternuclear campaign.

Assessment of Iranian Anti-Access and Area Denial Versus U.S. Force Projection

Iranian Anti-Access and Area Denial Versus U.S. Strike Aircraft: Setup
Establishing air supremacy is critical to U.S. efforts to reopen the strait. It feeds two important, and mutually supportive, objectives: to enable U.S. aircraft to target the means by which Iran threatens shipping and to enable U.S. aircraft to suppress Iranian ballistic-missile attacks on Persian Gulf allies.

The United States will need to hit some fixed sites supporting Iranian action in the strait—in particular, the naval facilities at Bandar Abbas. The chief demand, though, will be for combat air patrols (both manned and unmanned) hunting for mobile or unlocated targets, patrols that will need to be enabled by suppression and destruction of Iranian air defenses. Overwater patrols with both fixed- and rotary-wing aircraft will be needed to find and target minelayers, to protect minesweepers and other ships from small boats, and to hunt for submarines. Hunting for ballistic missiles and ASCMs will draw U.S. aircraft over Iranian territory.

For these tasks, the United States can draw on a formidable array of forces. About 350 land- and carrier-based strike aircraft are available within a week of D-day, with substantial C4ISR and refueling enablers. The long-dwell armed reconnaissance that MQ-1 and MQ-9 UASs can provide is ideally suited to looking for pop-up targets, such as ballistic- and cruise-missile launchers and small boats, particularly after Iranian air defenses are suppressed. Some of these air forces are already in theater supporting the remaining presence in Afghanistan, and some were added in a pre-D-day deployment surge. Available assets are below circa 2003 Operation Iraqi Freedom (OIF) levels but enough for a large, sustained air campaign.

Iran's chief means of stopping this air campaign is its air-defense system. Although the Iranian air force has approximately 300 aircraft, they are antiquated, with no more than 60 percent operational at a given time,⁴ and their pilots are poorly trained. At present, Iran's anti-air defenses are of limited capability, and they are spread around the country, protecting nuclear sites, oil facilities, and other government locations. The system is not integrated—Iran lacks the command, control, communication, and computer infrastructure.⁵ The concentration of greatest concern for our purposes is on the strait, at Bandar Abbas. There, Iran has an S-200 (NATO designation SA-5 Gammon) battery, along with HQ-2 and I-Hawk SAMs. The S-200 is a strategic system with a range of nearly 200 miles, so the Bandar Abbas site can cover the entire strait, as well as its approaches. The HQ-2 is a Chinese-made derivative of the Russian S-75 (NATO designation SA-2 Guideline). The I-Hawk is a U.S.-made system that Iran has had in service since before the Iranian Revolution in 1979. The HQ-2 and I-Hawk each have a range of about 20 miles and, as a result, can provide protection for naval facilities at Bandar Abbas but cannot threaten aircraft operating in the southern or even central part of the strait. These missiles could, however, be shifted to islands in the strait, including Abu Musa, toward the middle of the western approach.

Iran does have two modern, mobile, shorter-range systems, the Tor-M1 (SA-15 Gauntlet) and Pantsir-S1 (SA-22 Greyhound). These are useful for point defense. It claims to have developed or imported more-capable systems, including S-300s (SA-10 Grumble/SA-20 Gargoyle), and to have made a mobile version of the S-200. These claims are judged to be not credible.

Iran is thought to have modernized its tactics, drawing the lessons from the air war over the Balkans, where Serbian pop-up defenses troubled attacking aircraft. Because its central objective is to prolong

⁴ 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, p. 55.

⁵ Gunzinger and Dougherty, 2012, p. 44.

hostilities as long as possible, it has additional incentive to preserve some of its batteries by not operating their radars, making them harder to find. As long as some systems continue to exist, U.S. aircraft will have to take care.

In sum, this equipment does not pose a significant threat to U.S. strike capabilities. The targeting radars are not sufficiently sophisticated to effectively track advanced aircraft.⁶ The firing units and radars are emplaced and highly vulnerable to SEAD and destruction of enemy air defenses.⁷ Even should these systems work well and prove survivable, the airspace over much of the strait is not threatened because of range. Figure 5.2 illustrates the ranges of Iranian SAMs in this scenario, and Table 5.1 lists Iranian air defenses for this scenario.

Iranian Anti-Access and Area Denial Versus U.S. Strike Aircraft: Outcome

The United States establishes air supremacy over the strait within 96 hours of the attack on the destroyer (i.e., D+4). The fixed SAM sites, including the S-200 site, were well studied and quickly targeted. Although they are not near nuclear targets, and not much of a threat to stealthy, penetrating aircraft, the batteries impeded access to the Iranian interior and threatened potential combat search and rescue (CSAR) actions. (Much deeper into the Persian Gulf, the air defenses around Bushehr—home to a major nuclear site, as well as military facilities and the Kharg oil facilities—were near the top of the counternuclear target list.) Those air force elements located around Bandar Abbas were likewise destroyed in their hangars. At the start of the campaign focused on the strait, then, the A2AD threat to strike aircraft over water is already all but gone. Additional sorties performed BDA and follow-up strikes while EW aircraft stood watch for target radar signatures.

U.S. UASs and strike aircraft do, however, need to conduct numerous sorties over Iranian territory to hunt for cruise and ballistic missiles. (We cover those efforts in our discussion of fixed assets.) Here,

⁶ Cordesman, Wilner, et al., 2013, pp. 74–75.

⁷ Cordesman, Wilner, et al., 2013, pp. 74–75.

Figure 5.2
Select Iranian Surface-to-Air Missile Ranges Relative to the Strait of Hormuz, 2015



SOURCE: Google Earth.

NOTE: Ranges are shown from an illustrative point at Bandar Abbas.

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Iran poses a lingering threat. Roughly one-quarter of Iran's approximately 40 Tor-M1 and Pantsir-S1 systems are thought to be around the strait at the start of the conflict. Some might be scattered between Bandar Abbas and Kharg; intelligence is not definitive. Four were found in the preparation for the bombing of the nuclear facilities and destroyed. Between six and ten remain unaccounted for.

Perhaps the greatest challenge for the United States in these early days is the number of targets that must be served by the assets in place. For the first seven days of the campaign, the main focus of U.S. air-power continues to be nuclear and missile infrastructure, along with associated air defenses. That target list is quite extensive: about 400 tar-

Table 5.1
Selected Iranian Air Defenses, 2015

System	NATO Designation	Number	Range, in Kilometers	Mobile?
S-200	SA-5 Guideline	1	300	No
I-Hawk		3	50	Yes
HQ-2		1	30	Yes
Tor-M1	SA-15 Gauntlet	10–12	25	Yes
Pantsir S-1	SA-22 Greyhound	2–4	20	Yes

SOURCE: Cordesman, Wilner, et al., 2013.

NOTE: We adjusted the Iran totals to estimate systems in the vicinity of the strait.

gets, exclusive of SAM and radar sites.⁸ It requires about 1,000 sorties and cruise-missile strikes.⁹ The most-survivable planes—B-2s, F-22s, and some B-1s—are fully engaged against that target list. Many of the enablers resident in theater—EW aircraft, Airborne Warning and Control System (AWACS) aircraft, and refueling aircraft—are dedicated to supporting them, as are planning and intelligence resources. Although some targets were incorporated in the counternuclear campaign plan (most importantly, the major air-defense installations), suppressing local air defenses, striking naval facilities, and hunting for cruise and ballistic missiles place new demands on U.S. air forces. There is just enough Iranian activity in the northern Persian Gulf that some attention must be devoted there as well.

U.S. air war planners reprioritize to hit some high-leverage Strait of Hormuz targets. Where locations are known, they strike Iranian assets that will be used to support the closure of the strait before Iran can fully employ them, such as naval bases with minelayers and fast-attack boats, and any local air defenses that intelligence was able to

⁸ Anthony H. Cordesman and Bryan Gold, *The Gulf Military Balance*, Volume II: *The Missile and Nuclear Dimensions and Options for Deterrence, Defense, Containment, and Preventive Strikes*, Washington, D.C.: Center for Strategic and International Studies, July 18, 2013, p. 127.

⁹ Cordesman and Gold, 2013, p. 127.

identify. For the first week, however, aircraft are not available to establish complete air superiority over the Iranian littoral. An air-defense threat lingers, impeding the ability to patrol for (and suppress) cruise missiles and ballistic missiles and thus impeding the ability to limit the threat to ships in the strait and to Persian Gulf allies (both covered in our discussion of surface ships).

When the United States does turn more assertively to suppressing threats around the strait, it faces a challenging mission. Missile launchers are comparatively small, mobile targets. ASCMs must be launched from near the shore, or at least with line of sight (LOS) on the strait, but some of Iran's longer-range SRBMs have thousands of square miles in which to operate. (In our discussion of fixed assets, we cover missile-hunt success.)

Iranian air defenses exact a modest toll. On D+7 of the strait campaign, a Tor-M1 brings down an F-16CJ. On D+8, an F/A-18 is shot down. In the latter case, the aircraft is lost 30 km inland, northwest of Bandar Abbas. For the next eight hours, CSAR becomes the top priority, as air forces are devoted to inserting and extracting a response team (operating from Al Dhafra). Iranian forces beat the team to the crash site, but the pilot is apparently deceased; at any rate, no mention is made in Iranian media. Three of the four helicopters carrying the response team suffer heavy small-arms damage, but all return safely. Although these are the only U.S. aircraft losses to hostile fire, the continued threat constrains operations.

Iranian Anti-Access and Area Denial Versus U.S. Fixed Assets: Setup

Iran knows that it cannot prevail if the United States has ready access to airbases in the Persian Gulf, particularly at Al Udeid in Qatar and Al Dhafra in UAE. Iran had a faint hope that its initial threat would prompt at least some of the Persian Gulf states to announce that they would not host U.S. forces. It is loath to directly attack the Persian Gulf states, presuming that this will guarantee their support for U.S. operations. Forty-eight hours after the states' announcement (on D+3), however, Western news channels are showing footage of U.S. strike planes arriving in Qatar and Abu Dhabi.

Iran has two means to follow through on its threat to punish this kind of assistance: ballistic missiles and terror attacks conducted by small proxy groups. On D+3, it initiates both.

Iran has a fairly extensive arsenal of SRBMs, as well as some MRBMs. The SRBMs are the Fateh-110, Shahab-1, and Shahab-2. The Shahab-1 and Shahab-2 are both Scud derivatives. Iran has about 150 of each. They have ranges of 300 km and 500 km, respectively, allowing them to reach all prospective U.S. bases along the Persian Gulf littoral, although the Shahab-1 could do so only if fired from very close to the Iranian coast. They are not, however, accurate enough to do militarily significant damage with any degree of confidence. The Shahab-1 has an estimated circular error probable (CEP) of around 500 m, while the Shahab-2 has a CEP of 700 m.¹⁰ Analysis suggests that it would take a salvo of dozens of Shahab-1 missiles to put the runway at Al Dhafra temporarily out of action.¹¹ Key oil infrastructure could be threatened—the sites are huge—but causing truly significant damage would be difficult. One analysis estimated that it would take more than 1,300 Shahab-1 missiles to cause truly significant damage to Abqaiq, perhaps the single most important of the Saudi facilities.¹² The Fateh-110 is somewhat more accurate, with a CEP of 100 m, but although Dubai and the northernmost emirates are within its 200-km range from southernmost Iran, Al Dhafra, Al Udeid, and Bahrain are not.¹³ Iran has around 500 Fateh-110 missiles.

The SRBM force has other limitations as well. Although they are road mobile, the Shahab missiles are liquid fueled and so cannot be kept in a ready state and require about an hour to make ready to

¹⁰ Jacob L. Heim, "The Iranian Missile Threat to Air Bases: A Distant Second to China's Conventional Deterrent," *Air and Space Power Journal*, Vol. 29, No. 4, July–August 2015, pp. 27–50.

¹¹ Heim, 2015.

¹² Joshua R. Itzkowitz Shiffrinson and Miranda Priebe, "A Crude Threat: The Limits of an Iranian Missile Campaign Against Saudi Arabian Oil," *International Security*, Vol. 36, No. 1, 2011, pp. 167–201.

¹³ Heim, 2015.

fire—this significantly increases their exposure to U.S. strike.¹⁴ Iran also has a limited number of launchers, perhaps 20 total transporter-erector-launchers for the entire Shahab inventory.¹⁵ The Fateh-110 is solid fueled and so is harder to detect.

Iran has a small inventory of MRBMs. It fields modest numbers—perhaps two dozen—of a Shahab-3 missile and variants thereof capable of ranges as great as 2,500 km, long enough to reach Israel.¹⁶ The CEP, however, is likely no better than 1,850 m, even worse than the Shahab-1 and Shahab-2. A solid-fueled missile called the Sejil-2, which might or might not be fielded,¹⁷ has a likely range of 2,000 km and an unknown CEP. Like with other military capabilities, Iran has claimed greater performance for its systems than unclassified Western analysis credits. Figure 5.3 illustrates ranges of Iranian ballistic missiles for this scenario.

In sum, Iran's missile force is one of its few options to extend its military reach beyond its borders, and that missile force is best suited as a terror weapon against Persian Gulf population centers. These missiles are more than capable of hitting cities. However, these attacks will not go unopposed. U.S. aircraft try to locate and destroy launchers before they fire. Significant missile defenses are also in place. Bahrain, Qatar, UAE, Saudi Arabia, and Kuwait all receive additional U.S. Patriot deployments prior to the start of hostilities.¹⁸ All of these countries except Qatar also operate Patriot batteries purchased from the United States. One Aegis cruiser and three BMD-capable destroyers are on station in the Persian Gulf with the 5th Fleet.

Iran can complement its missile attacks on the Persian Gulf states with attacks by proxy forces. It has shown a willingness, principally through support of Hezbollah and of Shi'a militias in Iraq, to achieve

¹⁴ Cordesman, Wilner, et al., 2013, p. 24.

¹⁵ Heim, 2015.

¹⁶ Heim, 2015.

¹⁷ Cordesman, Wilner, et al., 2013, p. 32.

¹⁸ Similar deployments happened in 2010 (Adam Entous, "U.S. Expanding Missile Defenses in Gulf," Reuters, January 31, 2010).

Figure 5.3
Select Iranian Ballistic-Missile Ranges Relative to the Strait of Hormuz, 2015



SOURCE: Google Earth.

NOTE: Ranges are shown from illustrative points at Bandar Abbas (easternmost) and 120 km southeast of Bushehr.

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its goals by providing substantial capability to proxies. Here, it has a chance of inflicting significant damage on U.S. military forces operating from the Persian Gulf states. The Iranian Revolutionary Guard Corps (IRGC) Quds Force, acting directly or through local militants, could be capable of attacks on U.S. operating locations and personnel with guided rockets, artillery, mortars, and missiles (G-RAMM) or simpler means.¹⁹ It could also insert MANPADS near airbases. In addition to providing, in effect, accuracy and range that the missile

¹⁹ Gunzinger and Dougherty, 2012, p. 40.

force cannot match, use of proxy forces also helps Iran overcome its ability to do targeting at range. Although airbases and the like are fixed, the value of hitting certain points at certain times rises and falls. Table 5.2 lists Iran's SRBMs and MRBMs for this scenario.

Iranian Anti-Access and Area Denial Versus U.S. Fixed Assets: Outcome

Iran cannot further its conflict objectives with ballistic missiles because their threat and use do not deter the Persian Gulf states to any real extent, but they do present the United States and its Persian Gulf partners with a challenging problem. The U.S. counter–nuclear bombing campaign targeted missile infrastructure but did not make significant progress against the mobile, operational missiles—three out of an estimated 20 Shahab-1 and Shahab-2 launchers were identified by intelligence and taken out in early strikes. Iran, recognizing that it cannot pose a real threat to military bases or oil infrastructure, employs its SRBMs and MRBMs as terror weapons. The targets are cities in Israel, Qatar, UAE, and Bahrain, the countries providing the most-significant material support to the United States.

The attacks on Israel are not effective. Seven Shahab-3 variants are fired from western Iran, all on the night of D+3. Of these, three are intercepted by Israeli defenses and one by a U.S. cruiser in the eastern Mediterranean. One missile falls in the water off Tel Aviv, and two fall in the suburbs, shaking residents but causing fewer than 20 casualties. With the strait as the main focus after the nuclear infrastructure, the United States cannot devote significant resources to hunting

Table 5.2
Iranian Short- and Medium-Range Ballistic Missiles,
2015

Type	Number	Range, in Kilometers	CEP, in Meters
Fateh-110	500	200	100
Shahab-1	150	300	500
Shahab-2	150	500	700
Shahab-3	24	2,500	1,850

for launchers in western Iran, and the Israeli Air Force cannot sustain patrols at that distance. Iran nevertheless conserves its remaining MRBM inventory, recognizing that these systems are vulnerable and that U.S. attacks have degraded its ability to manufacture more.

Some of the Persian Gulf states are targeted with Shahab-1 and Shahab-2 missiles. Iran's preferred employment approach is to fire salvo attacks, although its lack of launchers limits its ability to do so (and simplifies the missile-defense challenge). On the same night of the initial attacks on Israel, two Shahab-2 missiles are fired simultaneously at Doha while two are fired simultaneously at Abu Dhabi. Aegis ships in the Persian Gulf bring down both missiles aimed at Qatar. A Patriot intercepts one of the missiles aimed at Abu Dhabi, but one missile strikes an apartment building near the city center. Casualties are expected in the low hundreds, and the news footage is striking. Three salvos of four Fateh-110s are fired at Dubai. UAE's missile defenses are concentrated around Abu Dhabi, and U.S. ships are not close enough to help, so these rounds come in unopposed. Three land in the ocean and one in the desert, but two hit residential buildings, and one hits a mall crowded with people.

One of the launchers for the Shahab attacks is destroyed, along with three of the Fateh launchers, but the rest escape before U.S. aircraft can respond. The Fateh has sharp range limits, but the Shahab launchers can operate on road networks 50 km or more from the coast and still reach meaningful targets on the other side of the Persian Gulf. Illustratively, they could operate from opposite Bahrain to the west and to the Bandar Abbas area in the east. That frontage is approximately 500 km long; at a depth of 50 km, it would provide an operating area of 25,000 sq. km. With sufficient resources, a combination of satellite cueing, airborne ground moving target indicator collection, AWACS vectoring and patrolling strike aircraft, and UASs, the United States will eventually be able to suppress these missiles—they are confined to roads, take at least an hour in the firing process, and generate a significant signature when fired. In these early days, however, the ISR and strike aircraft are also occupied with SEAD and other littoral targets.

After that first attack (on D+3), Iran fires one missile nightly for the following five days, forgoing the preferred salvo approach for a tactic

designed to sustain the missile threat as long as possible. As the counternuclear air campaign winds down, more U.S. air assets are available for SEAD and missile-hunting in the Persian Gulf littoral. As mentioned above, missile-hunting is a challenging mission. U.S. aircraft destroy one launcher on D+7 and another two on D+10, but most of the launchers evade detection. Half of those missiles fired evade missile defenses. Abu Dhabi suffers a second hit, and Doha suffers two hits. Net casualties are in the 300s. With roughly half of Iran's Shahab-1 and Shahab-2 launchers out of service, attacks cease.

Iran has somewhat more operational success with irregular forces. Quds Force operatives, evidently equipped and in place before the outbreak of hostilities, mount attacks on both Al Dhafra and Al Udeid with guided mortars on D+4. A mine, evidently laid locally, hits and sinks a Bahraini patrol boat in Manama harbor on D+5.

The attack on Al Dhafra is especially effective: Two KC-135s are hit on the parking apron, destroying both aircraft. For a period of more than 12 hours, operations from Al Dhafra are curtailed to the bare minimum as the means of attack is established, and the base is secured. The loss of the aircraft has a continued impact on U.S. sortie generation, particularly for carrier-based aircraft operating from the Arabian Sea. Although the U.S. command elects to risk the resumption of high-tempo operations, the security situation is not satisfactorily resolved. The UAE government is unwilling to let U.S. quick-reaction forces operate outside the base, and coordination between Emirati security forces and U.S. base security (which has some fire-detection capability) is fraught. The launchers are eventually located, but the perpetrators are not.

Although these attacks can cause delays in operations, they are not a real threat to operations or the bases themselves. They are too small, and security operations to defeat ground attacks at the bases are adequately robust for these sorts of attacks.

These attacks provoke the reaction that Iran had originally feared: The Persian Gulf states are increasingly determined to remove Iran as a military threat and, in fact, encourage U.S. leadership to strike regime targets more extensively and clamor for additional missile defenses. Iran's attacks demonstrate little more than hostile intent—the rate and

impact of strikes do not threaten the Persian Gulf–state regimes. Any Iranian information-operations campaign targeted at restive populations falls flat in the face of population-focused attacks.

U.S. operations are impinged slightly by the attacks, but host-country access is by no means denied. Air operations continue and, in fact, increase in tempo as more and more assets flow into theater. Strike aircraft, UASs, and C4ISR aircraft can generate long periods on station, easing the stress that their overwatch-focused tasks pose. Among those overwatch tasks, though, is a continued hunt for SRBMs and MRBMs—the ballistic-missile threat adds to an already lengthy air tasking order.

Iranian Anti-Access and Area Denial Versus U.S. Surface Ships: Setup

Although the United States hopes to compel Iran to cease hostilities as soon as possible, it must carry on as though the battle for the Strait of Hormuz will not be won until it has established sea control. Iran threatens all shipping, and the U.S. Navy in particular, with mines, ASCMs, submarines, and fast-attack craft. These capabilities form a layered defense that is not simple to overcome. Although each can threaten shipping independently, it is useful to consider the mines as the primary means of closing the strait, and the ASCMs, submarines, and fast-attack craft as means to disrupt any attempt to clear the mines.

Iran has at least 2,000 mines.²⁰ The composition of this stockpile is unclear, but perhaps as many as one-quarter are fairly modern, Russian-made MDM-6 influence mines. These mines are powerful and can be set to detonate in response to acoustic, magnetic, or pressure influence at range of as much as 60 m.²¹

Iran can lay mines from its three Kilo-class submarines, three frigates, two corvettes, and ten of its missile boats.²² It also has about 150 smaller naval craft (not all based around the strait) that could contribute less sophisticated mines, and even civilian craft could be employed. The U.S. Navy has eight mine-countermeasure (MCM)

²⁰ Talmadge, 2008.

²¹ Talmadge, 2008, p. 92.

²² Talmadge, 2008, p. 101.

ships stationed in the Persian Gulf, along with mine-hunting helicopters, and can count on support from four forward-deployed Royal Navy MCM ships.²³ Recent unclassified analysis suggests that Iran's assets could perhaps lay a field of nearly 700 mines over a period of days if not challenged.²⁴ It would take U.S. and UK ships, if operating unopposed, three to five days to clear a route through the field and about a month to clear 80 percent of all the mines.²⁵

The challenge for the Iranian vessels, however, will be to lay mines unobserved. It is decisively easier to defeat the mine threat before it comes into being, so the United States will do all it can to find and target minelayers and their bases.²⁶ For those mines that are laid, the challenge for the United States will be to create an environment in which MCM ships can operate.

Iran's chief means of attacking MCM ships, along with other surface combatants, are ASCMs. Iran has several hundred ASCMs, which can be fired from at least a few dozen mobile shore batteries or any of about 50 ships.²⁷ Of these, the most capable is the C-802, of which it is believed to have fewer than 100.²⁸ With a range of 120 km, it can cover the entire strait. Crucially, however, its targeting radar, which is LOS dependent, limits its effective range. These missiles could notionally be fired from deep within Iranian territory but, as a practical matter, are constrained by the need to either find elevated points or accept significant range limitations—illustratively, a radar and launcher at ground level would be able to hit a ship only using LOS targeting from about 16 km away.²⁹ The missiles will need to be used at some elevation to

²³ Richard Scott, "Hunting in Warm Waters: UK Reinforces Expeditionary MCM Capability in Gulf," *Jane's International Defence Review*, July 2009, pp. 28–31; Bryan Blair, "Two MCMs Redeploy from 5th Fleet AOR," *America's Navy*, March 6, 2013.

²⁴ Talmadge, 2008, p. 93.

²⁵ Talmadge, 2008, p. 97.

²⁶ Talmadge, 2008, p. 98.

²⁷ Cordesman, Wilner, et al., 2013, p. 99; Talmadge, 2008, p. 100.

²⁸ Cordesman, Wilner, et al., 2013, p. 87.

²⁹ Talmadge, 2008, p. 105 footnote.

threaten the main shipping channels. This works at cross-purposes with radar effectiveness, which declines the higher radars are perched, looking down into sea clutter.³⁰ To improve the chances of finding a ship worth shooting, radar would likely have to be used for surveillance, as well as targeting, increasing the chances of U.S. EW aircraft discovering and countertargeting it.³¹ Any launch is likely to give U.S. aircraft, cued either by satellite to the booster or by EW aircraft to the radar, an opportunity to destroy the launcher.

Iranian naval vessels, including small boats, also represent a risk for commercial traffic and U.S. ships. The nature of the campaign that these forces face severely limits their utility. Iran's conventional naval forces do not pose a serious problem for the U.S. Navy (except submarines, addressed in the next paragraph); they are outdated and comparatively easy for U.S. air, surface, and subsurface assets to target. Iran understands this and has been open about its intent to adopt asymmetric tactics at sea, principally using small packs of machine gun-, rocket-, and missile-armed boats that the IRGC Navy (IRGCN) commands to swarm larger ships.³² These vessels are most dangerous when approaching targets unawares. In this case, Iran will have the advantage of the initiative. However, there is no sanctuary from which these ships can operate; naval bases will be vulnerable to attack. Iranian military officials have indicated that they might seek to disperse their forces as much as possible, thus preserving a threat for which enemies must continue to plan.³³

Iran also operates three capable Kilo-class diesel attack submarines and about 20 midget submarines. The Persian Gulf and the Strait of Hormuz are very difficult environments for both submarines and ASW. The Kilos, particularly given their size, are most likely to operate

³⁰ William D. O'Neil and Caitlin Talmadge, "Correspondence: Costs and Difficulties of Blocking the Strait of Hormuz," *International Security*, Vol. 33, No. 3, Winter 2008–2009, p. 193.

³¹ O'Neil and Talmadge, p. 193.

³² Cordesman, Wilner, et al., 2013, pp. 91–95.

³³ Cordesman, Wilner, et al., 2013, p. 95 footnote.

in the Gulf of Oman.³⁴ U.S. nuclear submarines, however, should be well positioned to strike those boats that put to sea. The midget submarines are of unknown capability. They can carry torpedoes or mines. Given their slow speed and limited range, they would be most effective as pickets, but that could be a challenging problem in the strait. Their effectiveness, though, will hinge on how hard they are to find and how capable their sensors are of finding targets.³⁵

Against these A2AD threats, the U.S. Navy has an enhanced expeditionary strike group (ESG) in the Persian Gulf, SSGNs in the Arabian Sea, and, by D+10, three CSGs in the Gulf of Oman. In addition to the aforementioned airpower, this force can provide more than 700 LACMs and substantial BMD capability.³⁶ Table 5.3 lists Iran's naval forces for the scenario, and Table 5.4 its ASCMs and their ranges.

Iranian Anti-Access and Area Denial Versus U.S. Surface Ships: Outcome

Ultimately, the war at sea is won from the air. Because of the threatening Iranian behavior before the actual closure of the strait, the United States was well postured at the start of hostilities. It kept its ships out of the strait itself. An ESG, enhanced with two extra BMD-capable destroyers, was inside the Persian Gulf and contributed cruise missiles to D-day targets in support of the counternuclear campaign. The CSGs were out in the Gulf of Oman and Arabian Sea.

As soon as Iran made good on its threat to take hostile action in the strait, a deliberate campaign of bombing and missile strikes was begun (although, as discussed earlier, this campaign was limited by the need to devote resources to the counter–nuclear bombing and to not threaten regime survival). Iran's minelaying activities were largely confined to what it could accomplish with irregular craft on D-day

³⁴ Cordesman, Wilner, et al., 2013, p. 85.

³⁵ Cordesman, Wilner, et al., 2013, p. 86.

³⁶ Estimate based on apportioning 25 percent of available vertical-launch system tubes to LACMs. In OIF, the United States used almost 800 Tomahawks out of an inventory of approximately 1,400 (U.S. Government Accountability Office, *Military Readiness: DoD Needs to Reassess Program Strategy, Funding Priorities, and Risks for Selected Equipment*, Washington, D.C., GAO-04-112, December 19, 2003).

Table 5.3
Iranian Naval Assets, 2015

Type	Number
Frigate	3
Corvette	2
Patrol boat, missile	53
Patrol boat, other	63
Kilo-class submarine	3
Midget submarine	20

SOURCE: Cordesman, Wilner, et al., 2013.

NOTE: The table combines IRGCN and regular navy. We have decremented the total to estimate forces localized around the strait.

Table 5.4
Iranian Antiship Cruise Missiles, 2015

Type	Number	Range, in Kilometers
C-802	80	120
C-801	85	42

SOURCE: Cordesman and Gold, 2013.

NOTE: We decremented the total inventory to estimate forces localized around the strait.

and early on D+1. As open war set in in the strait, the ambient traffic dropped precipitously, especially in the main shipping lanes. As a result, fewer than 100 mines were laid overall, and most of these were older, simpler buoyed or drift mines that unconventional ships laid. These bore fruit immediately, when the freighter hit a mine on D+1, but the only other victim was a large dhow near the Musandam peninsula on D+2.

The U.S. Navy and Air Force destroy most of Iran's conventional naval forces in the areas of Bandar Abbas and Chah Bahar and farther north at Kharg. The fast-attack craft, for the most part, disperse, as the strait ceases to be a target-rich environment once the shooting has begun, and cruising in open water only invites U.S. attack. One Kilo-class submarine is at sea on D-day but with an SSN tail. It is sunk on D+1.

Iran's ASCMs play only a limited role in the first few days. Iran does not engage in wholesale targeting of Persian Gulf shipping on D+1, both because it would prefer to reserve ASCMs for military targets and because it initially holds out hope that the Persian Gulf states can be convinced to limit U.S. access. In subsequent days, however, there simply is not much to shoot: Commercial shipping has stopped attempting passage, and U.S. countermine efforts will not begin until air superiority is firmly established and as much of the Iranian navy is destroyed as possible. The U.S. CSGs are operating in the Gulf of Oman, toward the Omani coast and about 450 km from Bandar Abbas. This imposes a cost insofar as carrier-based air requires refueling to generate useful loiter time near the strait, but it keeps the ships well outside of cruise-missile range. Iran knows that the ships are in the area but lacks the ISR to figure out where. Four patrol boats, probably armed with ASCMs, venture out from the new base at Gwadar, but U.S. aircraft spot them well over the horizon; two are destroyed. Something of an ASCM stalemate holds in the strait through D+8—the missiles are not used, but U.S. aircraft find and strike few radars and launchers.

Iran makes a modest effort to extend the war at sea outside the confines of the strait. At some point, irregular naval forces lay drift mines in the northern Persian Gulf; it is not clear how many or on what day. There is sufficient ambient traffic to cover such activity, especially with U.S. ISR focused farther south. On D+6, a Kuwaiti tanker hits a mine north of Al Jubail. It can return to port but loses a substantial portion of its cargo. Two smaller merchant vessels hit mines the following day, and one sinks.

On D+9, four MCM ships from the 5th Fleet base at Bahrain enter the strait from the west, accompanied by two *Arleigh Burke*

destroyers and heavy land-based air cover. They commence sweeping for mines. A targeting radar is detected on Qeshm island by an EW aircraft and targeted with radiation-seeking missiles. It ceases emitting. A second radar pops up, followed soon thereafter by the launch of two C-802s. Countermeasures defeat one missile, and the close-in weapon system on one of the *Burke* destroyers defeats the other. The U.S. flotilla continues to operate unmolested.

Conclusion of the War

Iran's last gasp is the SRBM attack on Abu Dhabi on D+11, in which the missile is shot down. At that point, Iran confronts the fact that it holds a losing hand. It does have assets remaining, including the bulk of its ASCMs, a large number of patrol craft, and about three-quarters of its SRBM launchers. These could be carefully metered, prolonging the threat in and around the strait for weeks. But prolong to what end? Iranian efforts are not having a useful effect. The United States is evidently prepared to continue with an overwhelming application of airpower. It is free to build up and operate air forces just a short distance from the strait in comparative sanctuary. Minesweeping in the strait will inevitably clear the way for shipping, and Iran can do little to interfere.

In addition, a U.S. ground attack seems likely to the Iranian leadership. U.S. ground forces are moving into position—the 82nd Airborne Division headquarters has deployed to Kuwait, and III Corps' advanced tactical operations center has deployed, along with the corps commander. Its expeditionary sustainment command is mobilizing to deploy. An airborne brigade is in the Persian Gulf, the prepositioned equipment in Kuwait has been issued to a BCT, and two other BCTs are en route. Six additional BCTs have been given orders to complete their training and prepare to deploy (they are not yet in the so-called trained and ready phase of the Army's force-generation process). The 1st Infantry Division and 1st Cavalry Division headquarters and the 3rd and 10th combat aviation brigades are also preparing to deploy. A U.S. Army National Guard BCT has also been given mobilization orders, as have many elements of the reserve components. U.S. news networks report all of this.

International opinion toward Iran is less sympathetic than it was on D-day: Iran successfully portrayed itself as the target of aggression in some regions to start with but is now roiling world oil markets, attacking commercial vessels, and shelling civilians. Even the domestic standing of the regime has been eroded—the U.S. attacks engendered widespread anger and nationalistic fervor, but the domestic economy has since seized entirely, with massive inflation and a shortage of refined-oil products.

Iran simply lacks an attractive option to escalate the fight, while the United States can ramp up the bombing campaign until there is nothing left to hit. Perhaps Iran's best chance to change the military balance in its favor is to be so persistent with ASCMs and occasional harassing attacks from small boats and drift mines that the United States feels compelled to land ground forces at points in the littoral, where they would be more readily targeted with irregular means—G-RAMM, suicide attacks, and improvised explosive devices—than with air and naval forces. This, though, is unattractive from a regime survival standpoint. And there would be a chance that, once engaged on the ground, U.S. forces would not stop until they had seized Tehran. This might lead to a protracted, difficult, and extremely costly occupation, but that would hardly help the current regime.

On midday of D+12, Iran announces that it has struck a blow for the sovereignty of all states. It recognizes, though, that its struggle against the aggressors is causing others pain and so has elected to yield to a Chinese appeal to cease hostilities.

At this point, the United States has accomplished all it could hope to accomplish with a counternuclear campaign and significantly reduced Iran's military capability to threaten the Persian Gulf. It announces a bombing pause, although it promises to respond immediately to any Iranian attacks.

Net Assessment

Iran has nontrivial A2AD capabilities, but U.S. force projection overmatches it. This would likely be true in almost any circumstances, but those described here are especially unfavorable: The United States considered and prepared for likely Iranian actions and was willing to con-

duct a major bombing campaign. Iran did not have effective options to threaten U.S. operating bases in the Persian Gulf states, either through direct action or by working to weaken the political will of its southern neighbors. The U.S. ground-based aircraft could batter Iran from standoff, rolling back those defenses that presented themselves as targets until it achieved air dominance, thus exposing all of Iran's conventional A2AD capabilities to near-constant overwatch and interdiction. U.S. ground forces gathering in theater and preparing to deploy from the United States presented Tehran with a clear threat of regime removal, should it persist beyond the point at which they are in the Persian Gulf region in sufficient strength to attack Iran proper.

Although the conditions were clearly set for U.S. success, and although that success came with little loss of life or materiel, it took a great deal of effort. The mass of airpower applied took virtually all of the ready forces of the U.S. Air Force along with three carrier air wings. Nor was success on the battlefield overwhelming. Although air superiority had been established, it was by no means clear that constant air patrols would sufficiently abate the Iranian missile threat. The ballistic missiles had perhaps shown themselves not to be decisive, but Iran retained a large number of ASCMs, and the United States had not had great success finding them from the air. If Iran had chosen to persist, a troop-intensive and complex ground incursion might have been required.

With an overwhelming advantage in every capability area, the United States can escalate the fight with Iran, but Iran does not have the same option. The very act of closing the strait is probably Iran's most damaging avenue for escalation; having committed to striking the nuclear infrastructure, this was a risk that the United States was willing to accept. Thereafter, it was the United States that was in the position to increase or decrease the intensity of the fight through the scope of the bombing campaign.

There are two noteworthy exceptions to this. First, Iran could turn to terrorist attacks by proxy forces, perhaps far from the battlefield and long after the conventional fighting ends. Again, this was a risk that the United States accepted when it bombed the nuclear sites. Iran might have the capability to assay sequential tit-for-tat terrorist attacks

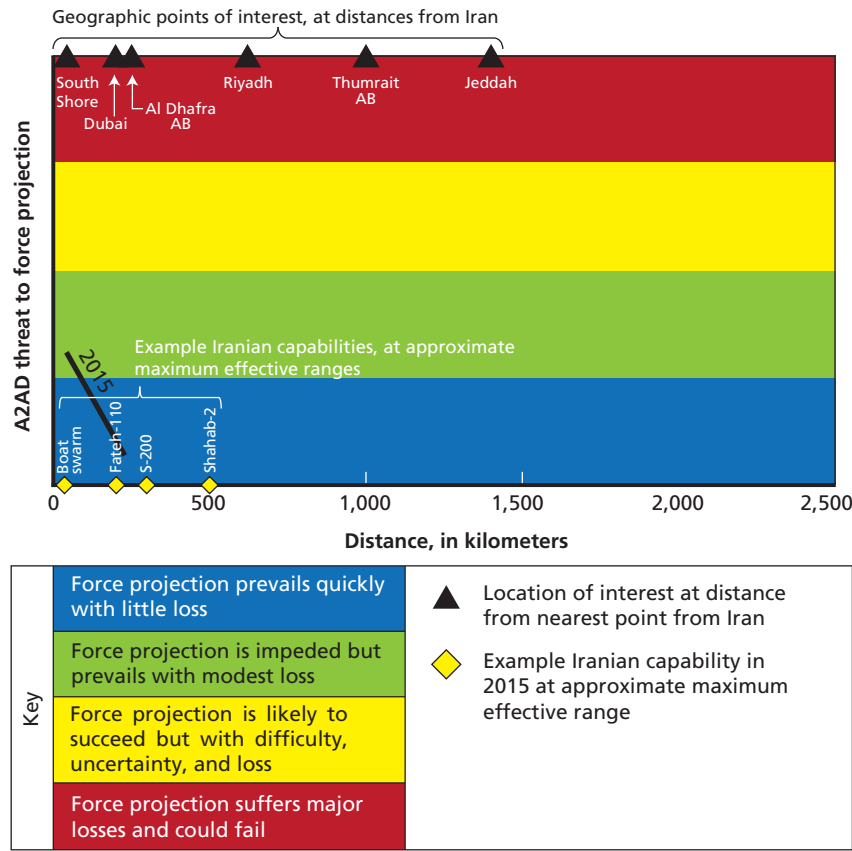
through which it could try to control escalation and deter further U.S. strikes. Second, if Iran were sufficiently determined, it could simply resist economic and political pressure and resign itself to suffering from bombing. At some point, the United States could run out of targets to bomb. Shipping through the strait might be restarted without much continuing risk, but, if Iran continued to maintain a state of war, the United States would be hard pressed to find a clean end to the conflict. It might find itself conducting Operation Southern Watch–type operations for the indefinite future or having to opt for invasion and possibly for regime change. Figure 5.4 gives our net assessment of this scenario, and Figure 5.5 summarizes the Iranian A2AD threat to force projection for this scenario.

Figure 5.4
Nonnuclear Iran–United States Net Assessment, 2015

Assessment	Color
The United States prevails in the capability contest quickly with little loss.	Blue
The United States prevails with some time and loss.	Green
The United States can succeed but with difficulty, uncertainty, and loss.	Yellow
The United States suffers major losses and could fail.	Red

A2AD threat to	By	Iran, 2015
Surface ships	Submarines	Green
	Cruise missiles	Yellow
	Ballistic missiles	Blue
	Aircraft	Blue
Strike aircraft	Air defense	Green
	Aircraft	Blue
Bases	Ballistic missiles	Blue
	Proxy attack	Blue
C4ISR	Cyber	Green
	ASAT	Blue
	EW	Blue
Strategic risk		Blue
Overall		Blue

Figure 5.5
Iranian Anti-Access and Area-Denial Threat to U.S. Force Projection, 2015



Nonnuclear Iran–United States, 2025

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

Background

In 2025, America's dominant strategic objective in the Persian Gulf remains to ensure the free flow of energy exports. Consequently, the United States has an interest in continued regional stability, which external aggression toward Persian Gulf–state allies or internal turmoil in those same countries could threaten, and in the continued security of SLOCs. Other global strategic objectives also apply to the Persian Gulf, including an interest in limiting the spread of WMD and in promoting human rights.

Iran remains a threat to each of these interests. Iran's dominant strategic objective is to assert itself as a regional power. It perceives a threat to this ambition from the United States and its Persian Gulf allies. In U.S. support, including military assistance, to Saudi Arabia, Qatar, Bahrain, UAE, Afghanistan, and others, it sees encirclement, tinged by the fact that these are Sunni regimes. Under the Rouhani regime and its successor, it abided by the 2013 agreement not to enrich uranium to weapon grade but otherwise did not substantially alter its international posture or style and, in fact, made significant progress upgrading select military capabilities. China has assisted it in this latter regard. Although both Iran and China deny it, and the level of activity has been kept to a low enough level that the Western nations have never let it imperil relations with Beijing, China is widely believed to have been providing arms and expertise to the Iranians in exchange for preferential energy deals.

The Persian Gulf states remain largely reliant on the United States for support on security issues, but their military relationship with the United States has stagnated. The Iranian threat to oil flow from the Strait of Hormuz has come to be seen as part of the status quo, something that can be managed rather than a crisis waiting to happen.

Sales of military hardware diminished over time because Iran's nuclear ambitions seemed to be permanently on hold. U.S. deployments to the region tailed off after withdrawal from Afghanistan. The United States maintains a 5th Fleet presence at Bahrain and occasionally deploys forces to Qatar, UAE, and Oman in training exercises. Although the Persian Gulf states are hardly monolithic, their strategic objectives are broadly similar. Each of the energy-rich partners of the United States, chief among them Saudi Arabia, Kuwait, Qatar, Bahrain, and UAE, wants to ensure the steady, secure export of its oil and gas resources and the security and stability of its regime.

Path to War

In early 2025, prompted by street protests on economic issues that open the prospect of greater democratic liberalization, hardliners in Iran overthrow an elected moderate government. Within four months, intelligence indicates a steady, clandestine increase in uranium-enrichment activity—more to 20 percent and possibly some to weapon grade—as well as significant progress in weaponization. Rattled by the coup and a new regime that is seen as both conservative and unstable, the United States and western European allies institute harsh new sanctions. Like in 2015, this leads to weeks of Iranian saber-rattling. Iran then announces that the Strait of Hormuz is closed to all traffic. It claims to have laid mine fields throughout the strait and threatens any vessels attempting passage, whether commercial vessels or warships, with cruise-missile, submarine, air, and small-boat attack. It also threatens that it will act against the aggressor through all means at its disposal and will consider any regional states that provide support to the aggressor to be combatants as well. It does, however, say that the Iranian navy will graciously provide escorts through the strait for ships belonging to those of its neighbors that publicly reject U.S. aggression.

Iran makes good on this threat within the hour. Iran locates the U.S. ESG at sea in the Persian Gulf east of Qatar, likely with a UAV. A dozen C-803 ASCMs, launched from fast-attack craft 12 miles off the Iranian coast, home in on the flotilla. Countermeasures and defenses defeat ten, but two strike the San Antonio–class amphibious transport

dock (LPD). There is significant loss of life, and the ship must be taken under tow to Bahrain.

The U.S. president condemns Iran as a clear menace to the international community and states that its rash attacks indicate why the Iranian nuclear program cannot be countenanced. The United States will therefore take all necessary measures both to restore freedom of navigation and to eliminate the nuclear threat. U.S. proclamations, however, carefully suggest that regime change is not an inherent objective and that the United States is not posturing for a full-scale invasion.

The United States is reasonably well postured for a response. Iran's belligerence in the weeks following the sanctions had put the United States on war footing. The ESG is in the Persian Gulf, and a CSG is in the Arabian Sea, with two other CSGs already en route. Additional air forces are flowing into theater. The United States prevails on Qatar, Bahrain, and UAE to allow C4ISR, CSAR, and refueling aircraft to use their bases. Bahrain consents to strike aircraft as well. These bases, however, are not used initially because they are within range of significant numbers of Iranian ballistic missiles, some of which are of higher quality than those present in Iranian forces even a decade earlier. Rather, aircraft are dispersed to Thumrait in Oman and, after delicate negotiations, to Prince Sultan airbase near Riyadh and to Saudi Air Force facilities located at King Abdulaziz International Airport in Jeddah, on the Red Sea. Some strike aircraft are also dispatched to Diego Garcia.

The United States' Conflict Objectives

Initial U.S. objectives were limited to the reduction (and, if possible, elimination) of the Iranian nuclear threat. In view of the Iranian response, the United States has the additional objective (on which this scenario focuses) of restoring freedom of navigation through the Strait of Hormuz. Notably, regime change is *not* an objective—this is deemed to require the long-term commitment of substantial land forces and some hope of creating an alternative Iranian state. Such a commitment is highly undesirable—memories of OIF and Operation Enduring Freedom have dimmed but persist, and U.S. ground forces are not sized for a conflict followed by an extended occupation. U.S.

planners are willing to assume the risk that Iran will adopt an even more hostile posture in the future and reconstitute its nuclear program or menace the Persian Gulf region and beyond as soon as it regains the ability to do so.

The most effective path to reopen the strait is judged to be in compelling Iran to cease its efforts at closure. Reducing Iranian capabilities is possible, but eradicating them altogether would be difficult and time consuming, and time is a consideration—the longer the strait is closed, the greater the economic impact. U.S. planners hope that a combination of rapid attrition of the capabilities Iran needs to threaten the strait, economic pressure, and clear signaling that the entire regime is not a target will convince Iran both that its current position is hopeless and that it can survive to have a future and compel it to back down. Closing the strait will be devastating to the Iranian economy as well, limiting not just exports but also imports, especially refined-petroleum products.

This compellence campaign will have to strike a delicate balance. Iran has formidable anti-access capabilities that give it some hope that closing the strait will lead to operational success. Because of this, and because those capabilities are rooted in part in a nationwide defense network, any U.S. bombing campaign will need to be broad, deep, and prolonged and might look to Iran very much like an effort to bring down the regime. If Tehran concludes that the United States is bent on regime change, it will have little incentive to cease fighting.

Iran's Conflict Objectives

Iran's hopes for a favorable outcome rely on sustaining the closure long enough to inflict pain on the world economy while appealing to world public opinion to blame the United States for this outcome. Facing the challenge of an extended campaign to overcome Iranian defenses and mounting international pressure, the United States might open the door to some resolution that could save face for both parties: Perhaps a cessation of the bombing campaign could be announced, at which point Iran could reopen the strait to commerce while imposing limits on the passage of warships, limits that the United States could refuse to acknowledge but not immediately challenge.

Iran knows that any chance of such an outcome rests on holding hostilities below a point at which the United States feels that it must invade and change the regime. Starting a campaign of unrestrained global terror through proxies, for instance, would court that danger. At the same time, it recognizes that the United States is itself reluctant to invade, and it is that tension—impose enough pain that the United States will assent to a face-saving resolution but not so much pain that it becomes a fight to the death—Tehran must exploit.

Conduct of the War

This section briefly outlines the basic means by which the combatants try to realize their conflict objectives. In the following section, we discuss specific outcomes of the contest between select capabilities.³⁷

Iranian Anti-Access and Area-Denial Concept of Operations

Much like in the 2015 scenario, Iran attempts to close the Strait of Hormuz by menacing all shipping traffic with mines, ASCMs, small attack boats, and submarines.³⁸ Iran poses a sporadic threat to shipping deeper into the Persian Gulf in order to spread U.S. resources as thin as possible, but it will concentrate the bulk of its efforts around the strait itself, where its geographic advantages are greatest. It will be difficult for Iran to provide good centralized C2 of these distributed efforts, but the premium on exquisite coordination is low; even the independent initiative of local commanders poses a potent challenge. It then employs two fundamental approaches to keeping the strait closed: direct action on U.S. military forces that approach the area and attacks on those countries that provide access to U.S. military forces. Unlike in 2015, however, that latter approach is positioned to be more successful.

For direct action on U.S. military forces, Iran knows that it is overmatched. Its approach is governed by a desire to extend the conflict long enough to identify a strategic opening, an opportunity to wind down hostilities on terms that will leave the United States think-

³⁷ This section draws in part on Gunzinger and Dougherty, 2012.

³⁸ The 2025 scenario, to be clear, takes place on a different imagined timeline from that of the 2015 scenario. By design, the setups for the scenarios are highly similar.

ing hard about any future bombing campaign. It does its best to conserve forces and increase the time and resources the United States must commit to eliminate them. Working to its advantage is the fact that the strait cannot be cleared from afar. Mines must be swept by ships operating close to the Iranian shore, within the range of ASCMs, swarms of small boats, and submarines. Mines can be laid, cruise missiles positioned, and submarines and small boats based under the umbrella of SAMs.

For U.S. regional partners, Iran's hope is that the threat of attack is sufficient to deter Persian Gulf–state support for the United States, but it will follow through as well as it can should deterrence fail, to try to compel a change of heart. The means at its disposal are SRBMs, MRBMs, and attacks by irregular forces. It can target airbases, oil infrastructure, and population centers with an inventory of ballistic missiles that is improved over what it had in 2015. Attacks by irregular forces could also hit so-called soft targets but might be attempted against military targets as well. In the latter case, Iran knows that it cannot take and hold a major base, but it can inflict damage and slow U.S. operations.

U.S. Force-Projection Concept of Operations

The United States must confront both pillars of the Iranian attempt to close the strait.³⁹ It attempts to eliminate Iran's capacity to threaten shipping and its capacity to threaten the Persian Gulf states. Iran's very real ability to threaten air and naval bases along the southern Persian Gulf coast constrain U.S. CONOPS. While doing what it can to address threats in the strait, the United States must suppress Iranian ballistic missiles to enable the use of close-in bases. Control of the air will be critical to establishing overwatch over the strait, and this will be very difficult if aircraft have to operate from hundreds of miles away.

³⁹ Note that we do not discuss the counternuclear campaign further. We assume it to be substantially over after seven to 12 days. Some U.S. aircraft are lost, but not so many as to materially affect U.S. combat power or (in one direction or the other) resolve. The effect on Iran's nuclear program is unknown. Much of Iran's critical infrastructure is buried or otherwise hardened. Full destruction of nascent nuclear capability is not possible, and the returns on additional sorties diminish rapidly.

U.S. CONOPS will also be constrained by a general desire not to escalate the fight any further than the United States has to. The best outcome, after all, is for Iran to capitulate and abandon its efforts to close the strait. Any military activity against Iran that would seem to signal intent to end the regime is undesirable because that would remove any Iranian incentive to back down. Likewise, any significant U.S. losses that would make it politically difficult to stop short of regime change must be avoided. The hits on the LPD on D-day are a dramatic step in the wrong direction—the ship might still be lost, and the U.S. Navy has not lost a major combatant to hostile action since 1945.

Other Parties' Concepts of Operations

This narrative does not discuss in any detail the contributions of potential allies. We assume that the Persian Gulf states confine their military activities to homeland defense—where relevant, we mention these contributions. Other U.S. global partners could actively join the United States in this campaign, but we assume in this case that, although they share an interest in the renewed flow of energy exports, they are not keen to make a substantial contribution when the United States is evidently prepared to shoulder the burden on its own.

Assessment of Iranian Anti-Access and Area Denial Versus U.S. Force Projection

Iranian Anti-Access and Area Denial Versus U.S. Strike Aircraft: Setup
Establishing air supremacy is critical to U.S. efforts to reopen the strait. It feeds two important, and mutually supportive, objectives: to enable U.S. aircraft to target the means by which Iran threatens shipping and to enable U.S. aircraft and UASs to suppress Iranian ballistic-missile attacks on Persian Gulf allies. If the United States is sufficiently successful in the latter task, it can move to much better-positioned airbases.

The chief demand will be for combat air patrols (manned and unmanned) hunting for mobile or unlocated targets, patrols that will need to be enabled by suppression and destruction of Iranian air defenses. Overwater patrols with both UASs and fixed- and rotary-wing aircraft will be needed to find and target minelayers, to protect mine-sweepers and other ships from small boats, and to hunt for submarines.

Hunting for ballistic missiles and ASCMs will draw U.S. aircraft over Iranian territory. These patrols can focus in part around the strait, but Iran can deploy ASCMs and other assets anywhere in the Persian Gulf littoral, and the ballistic missiles could be fired from a vast area of the interior. Unlike in 2015, Iran has a force of accurate MRBMs that it could fire on targets in the Persian Gulf from anywhere in the country, as well as a deeper inventory of SRBMs.

U.S. forces will also need to hit an array of fixed targets. The majority of targets to be serviced for the strait campaign are in and around the strait, like the naval facilities at Bandar Abbas. The counter-nuclear campaign requires deeper penetration, and some of the targets (C2 networks, air defenses) also affect the strait campaign. Further, if the blockade drags on, the United States might have to consider a broader range of countrywide targets whose destruction could compel Iran to back down.

For these tasks, the United States can draw on a formidable array of forces. Iranian belligerence after the announcement of the sanctions led to extensive deterrent preparations. More than 300 U.S. land- and carrier-based strike aircraft are available on D-day or shortly thereafter, with substantial C4ISR and refueling enablers. The long-dwell armed reconnaissance that MQ-1 and MQ-9 UASs can provide is ideally suited to looking for pop-up targets, such as ballistic- and cruise-missile launchers and small boats, particularly after Iranian air defenses are suppressed. The United States also has modest numbers of UASs with stealthy qualities that are survivable against most air defenses.

These forces are in Oman and central and western Saudi Arabia on D-day, between 1,000 and 2,000 km from the strait. In the following section, we discuss the reason for this caution, but note that there are also space constraints. Thumrait and Prince Sultan are almost 1,000 km closer to the AO than King Abdulaziz airport in Jeddah, but the third base is necessary to handle the crush of aircraft, and, even then, quarters are tight.

Iran's chief means of stopping this air campaign is its air-defense system. The Iranian air force has actually shrunk since 2015 because obsolete airframes were retired, and no real attempt has been made to reconstitute it to compete with a capable adversary. Iran's anti-air

defenses, however, have improved. They are integrated in a way that they were not in 2015—there is a countrywide warning and targeting radar network, and the regional subnetworks have hardened C2 links. This integration, however, is not central to Iran's air-defense concept, which anticipates that the United States can destroy or disrupt its C2 and successfully target any static defenses. As a result, Iran has focused on acquiring capable, mobile systems that can provide either a pop-up or fixed defense and can operate with relative autonomy.

Iran still disperses its air defenses to cover political and military sites around the country. The concentration of greatest concern for our purposes is on the strait, at Bandar Abbas. There, Iran keeps three or four HQ-9 batteries, along with the older HQ-2 SAMs. The HQ-9 is a modern, Chinese-made strategic system with a range of 200 km, similar in capability to the S-300 system (NATO designation SA-10 Grumble/SA-20 Gargoyle) that Iran had once sought to buy from Russia. These missiles in the vicinity of Bandar Abbas can cover the entire strait, as well as its approaches. The system is mobile, and U.S. intelligence is not certain how many of Iran's assets are near the strait. The potential coverage afforded to ballistic-missile firing locations is also a concern. The total Iranian HQ-9 inventory is 12 systems.

Less capable SAMs provide layered coverage. The HQ-2 SAMs (similar to Russian S-75 systems, designated by NATO as SA-2 Guideline) are around Bandar Abbas and are thought to be placed to provide coverage over the firing locations of mobile ASCM batteries, along the shore and islands of the strait. Iran has also invested in additional Pantsir S-1 systems. These mobile missile/gun hybrid systems will be colocated with HQ-9 batteries and other assets, both fixed and mobile.

Because Iran's central objective is to prolong hostilities as long as possible, it has additional incentive to preserve some of its batteries by not operating their radars, making them harder to find. As long as some systems continue to exist, U.S. aircraft will have to take care.

In sum, this poses significant risk to U.S. strike aircraft, which will be forced to operate against modern systems of unknown disposition for a long period of time. However, the United States has invested substantially in stealth, and it is very familiar with these Chinese-made systems. Once it can eliminate the HQ-9s, most of the airspace over the

strait will not be threatened because of range. The increased numbers of shorter-range, mobile systems, though, will complicate any overland operations. Table 5.5 lists Iranian air defenses for this scenario, and Figure 5.6 shows their ranges.

Iranian Anti-Access and Area Denial Versus U.S. Strike Aircraft: Outcome

The United States establishes near supremacy of the air over the strait within 12 days of the attack on the ESG (i.e., D+13). Because of the threat they pose, U.S. intelligence tracked the HQ-9 batteries as part of normal practice. Two around Bandar Abbas had been hit immediately (as had the systems guarding the nuclear facilities at Bushehr, in the northern Persian Gulf). Electronic and cybermeasures thoroughly degraded the regional and national integration of the air-defense system. Those air force elements located around Bandar Abbas were likewise destroyed in their hangars.

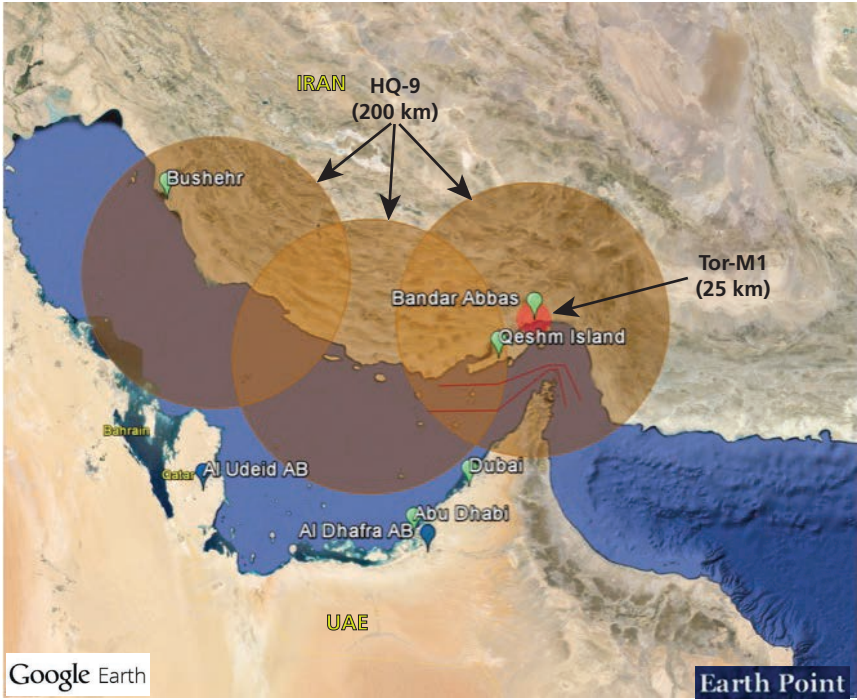
That left one or two HQ-9 batteries in the region, with the lingering possibility that Iran would introduce others from elsewhere in the country. Of the rest of the inventory, three remain. The assets needed for SEAD packages are largely consumed with ongoing counternuclear activity, but U.S. air forces succeeded in flushing out a radar signature from one HQ-9 on D+12. A well-integrated C4ISR network was able to track, fix, and destroy the target early on D+13.

From that point forward, U.S. aircraft operate over the strait in a substantially less threatening environment, although they must accept the risk that an additional HQ-9 might be able to target them. That

Table 5.5
Selected Iranian Air Defenses, 2025

System	NATO Designation	Number	Range, in Kilometers	Mobile?
HQ-9		3–4	200	Yes
HQ-2		4	30	Yes
Tor-M1	SA-15 Gauntlet	10	25	Yes
Pantsir S-1	SA-22 Greyhound	22	20	Yes

Figure 5.6
Select Iranian Surface-to-Air Missile Ranges Relative to the Strait of Hormuz, 2025



SOURCE: Google Earth.
NOTE: Ranges are shown from illustrative points at Bandar Abbas (easternmost), 120 km southeast of Bushehr (westernmost), and 140 km west of Qeshm Island (center).

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risk is heightened in the northern Persian Gulf; there have been few patrols between the western reaches of the strait and Bushehr.

U.S. strike aircraft do, however, need to conduct numerous sorties over Iranian territory to hunt for cruise and ballistic missiles. The fundamental challenges of this effort are little changed since 2015: Comparatively small, mobile systems in a large possible area, revealing themselves at times and places of their choosing, are hard targets. These efforts (covered in our discussion of fixed assets) begin in earnest after D+13, when the HQ-9 threat has been reduced and coincident

with a decrease in counter–nuclear bombing. Over land, Iran poses a continuing, additional threat with its shorter-range air-defense systems. Roughly one-third of Iran’s approximately 80 Tor-M1 and Pantsir-S1 systems are thought to be around the strait at the start of the conflict. Six were found in the preparation for the bombing of the nuclear facilities and destroyed. About 24 remain unaccounted for. Some of these are believed to be on Qeshm and Greater Tunb islands in the strait, along with ASCMs.

The density of this lingering threat complicates the cruise-missile and ballistic-missile hunt and overwatch for attack boats. SEAD aircraft are kept on station along with aircraft focused on missiles, effectively doubling the combat air patrols that must be sustained with refueling aircraft. The United States can, however, make use of assets it did not have in large numbers a decade ago: stealthy F-35s, an orbit of stealthy RQ-180s, and semistealthy Unmanned Carrier-Launched Airborne Surveillance and Strike aircraft. The unmanned aircraft in particular provide long-dwell overwatch deeper over land.

By D+15 of the strait campaign, the United States has lost two EA-18Gs and an Unmanned Carrier-Launched Airborne Surveillance and Strike to hostile fire, all to Pantsir-S1. A P-8 is lost on D+16 well to the north.

The greatest challenge for the U.S. air campaign is sustaining presence of strike aircraft. Thumrait and Prince Sultan AB are both about 500 nm from the strait, at the extreme edge of the F-35A’s effective unrefueled range and just beyond that of the F-22. Once HQ-9s have been eliminated, tanker orbits are moved over the Persian Gulf and Omani airspace, but sortie length is still constrained. Patrols over the Persian Gulf away from the strait proper are extremely limited.

The tyranny of distance (combined with some Iranian disruption of sortie generation, covered in our discussion of fixed assets) forces U.S. air planners to effectively abandon the hunt for MRBMs west of Tehran. It is simply not feasible to create the on-station time necessary to persecute pop-up targets, such as transporter-erector-launchers, from the bases in the Persian Gulf. The use of Incirlik AB, or even Turkish airspace, would ease matters considerably, but Turkey has denied the United States access. This is not so much from fear of Iranian mili-

tary capabilities as from domestic political pressure at and displeasure about not being forewarned about the U.S. counternuclear offensive. U.S. strikes more than 300 km beyond the Persian Gulf are limited to deliberate attacks on known, fixed targets.

Iranian Anti-Access and Area Denial Versus U.S. Fixed Assets: Setup

Iran knows that it cannot prevail if the United States has ready access to airbases in the Persian Gulf, particularly at Al Udeid in Qatar and Al Dhafra in UAE. Even the operating locations in Saudi Arabia and Oman are problematic. Iran had a faint hope that its initial threat would prompt at least some of the Persian Gulf states to announce that they would not host U.S. forces and moreover would deny use of their airspace. It is loath to directly attack the Persian Gulf states, presuming that this will guarantee their support for U.S. operations. Forty-eight hours after its announcement (on D+3), however, the conflict is not going well, and Iran feels that it has to take a long shot: Punish the Persian Gulf states extensively, and hope that they will drop out of the war.

Iran has two means to follow through on its threat to punish this kind of assistance: ballistic missiles and terror attacks and raids conducted by small groups. On D+3, it tries both.

Iran has (with Chinese assistance) made its ballistic-missile arsenal the focus of a decade's worth of investments. It has an extensive arsenal—an estimated 200 missiles and 70 mobile launchers—of domestically produced equivalents of China's CSS-6 (Chinese designation DF-15). It has a range of 600 km and a CEP of about 30 m and is solid fueled. Unlike the Shahab-1 and Shahab-2, this missile is effective against military targets. A large, unhardened target, such as a hangar, could be dispatched with high confidence with a single missile, and submunitions could play havoc with airfield operations and aircraft on the tarmac.⁴⁰ Key oil infrastructure can likewise be targeted. Iran has also fielded roughly 30 convincing decoy launchers.

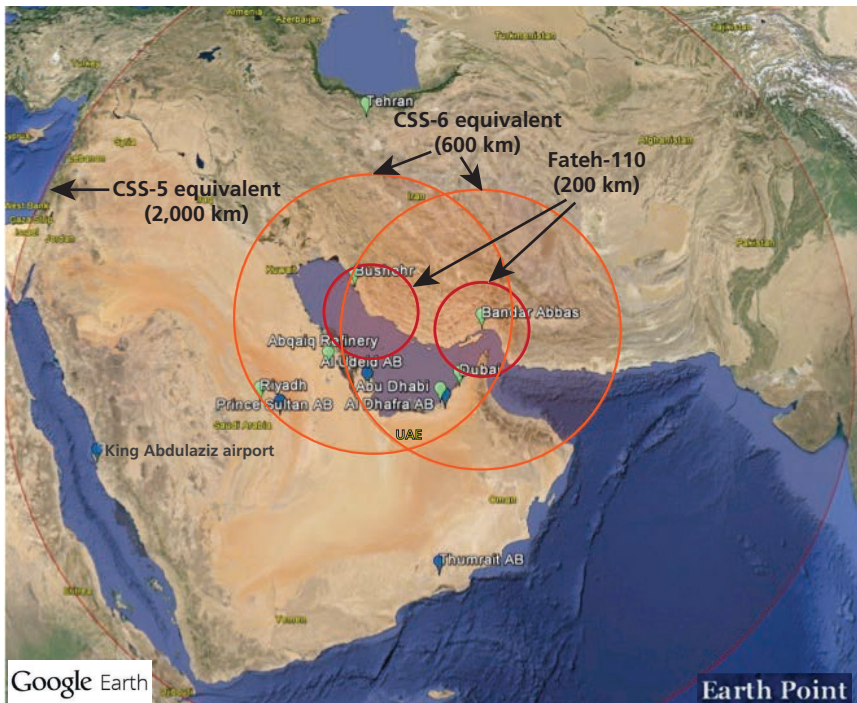
Iran's MRBMs have likewise grown more accurate. In addition to the Shahab-3, it now has three dozen CSS-5 (Chinese designation

⁴⁰ Heim, 2015.

DF-21) equivalents, with a range of 2,000 km and a CEP of 100 m. These can reach all U.S. operating bases in the Persian Gulf from virtually anywhere in Iran. Most of these missiles are kept to the west of Tehran, to threaten Israel, but 12 are deployed in the vicinity of Gerash, less than 1,000 km from Riyadh and Thumrait. Figure 5.7 shows ranges of Iranian ballistic missiles.

Against these missiles, the United States tries both to kill the launchers and shoot the missiles down with Aegis at sea, and Patriot and THAAD on land. U.S. aircraft try to locate and destroy launchers before they fire, although aircraft are simultaneously required to

Figure 5.7
Select Iranian Ballistic-Missile Ranges Relative to the Strait of Hormuz, 2025



SOURCE: Google Earth.

NOTE: Ranges are shown from illustrative points at Bandar Abbas (easternmost) and 120 km southeast of Bushehr (westernmost).

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prosecute the counternuclear campaign and patrol for threats near the strait, and Iran has an uncertain number of capable air-defense systems near potential missile-firing locations. Bahrain, Qatar, UAE, Oman, Saudi Arabia, and Kuwait all receive additional U.S. Patriot deployments prior to the start of hostilities.⁴¹ All of these countries also operate Patriot batteries purchased from the United States, and UAE and Qatar both have THAAD. One Aegis cruiser and three BMD-capable destroyers are on station in the Persian Gulf with the 5th Fleet.

Iran can complement its missile attacks on the Persian Gulf states with attacks by proxy forces. It has shown a willingness, principally through support of Hezbollah and of insurgents in Iraq, to achieve its goals by providing substantial capability to proxies. In the past decade, the price of lethal weaponry has dropped. G-RAMM and Chinese-derived MANPADS are being given not just to the most trusted of agents but also to willing proxy groups. Table 5.6 lists Iranian SRBMs and MRBMs for this scenario.

Iranian Anti-Access and Area Denial Versus U.S. Fixed Assets:
Outcome

Iran wreaks significant havoc with its missiles. The U.S. counter-nuclear bombing campaign targeted missile infrastructure but did not make significant progress against the mobile, operational missiles—

Table 5.6
Iranian Short- and Medium-Range Ballistic Missiles, 2025

Type	Number	Range, in Kilometers	CEP, in Meters
Fateh-110	500	200	100
Shahab-1	150	300	500
Shahab-2	150	500	700
Shahab-3	24	2,500	1,850
CSS-5 equivalent	36	2,000	100
CSS-6 equivalent	200	600	30

⁴¹ Similar deployments happened in 2010 (Entous, 2010).

intelligence identified three out of an estimated 20 Shahab-1 and Shahab-2 launchers that were then taken out in early strikes, along with four Fateh-110 launchers and two of 70 CSS-6 launchers. This leaves the Iranians with a significant inventory. Iran opts to throw about half the SRBM launchers in the region into a day's worth of attacks. This burst is enabled by intensive training and by investment in communication networks that can be rapidly reconstituted. The tactical advantage of concentrating attacks, and moreover of mixing missile types, is to stress missile-defense systems. The strategic advantage is to maximize the psychological impact on the Persian Gulf states and the United States.

Bahrain, Qatar, Abu Dhabi, and Saudi Arabia are the focus of the missile barrage. CSS-6 missiles damage the U.S. naval base at Bahrain while several Shahab-2 missiles strike the nearby city. All U.S. Navy ships are at sea, but key maintenance facilities are entirely destroyed, and the 5th Fleet headquarters is damaged. A similar attack is launched at Abu Dhabi and Al Dhafra, with major damage to the runway and the loss of a half dozen UAE Air Force jets parked close together on the apron. U.S. and Qatar missile defenses successfully fend off an attack on Al Udeid. Although not hosting U.S. air operations, the base is the site of the combined air operations center from which the U.S. command is running the air war—its loss would have been devastating.

Oil infrastructure in UAE and Saudi Arabia is also targeted, with missiles concentrating on a few high-value sites. The terminal at Jebel Ali is hit with two CSS-6 missiles, with one damaging a supertanker and spilling oil into the Persian Gulf. Quds Force spotters on the ground, who saw the target of opportunity and relayed the information, guided this shot. The refinery at Ruwais suffers a hit that takes it offline and starts a major fire. The refinery at Abqaiq, which processes about 75 percent of Saudi oil, receives two hits—it will not be out of commission for long, but it temporarily takes 13 million barrels per day off the world market. The terminal at Ras Tanura is also struck but to little effect.

Both the Shahab-3 and the shorter-range Fateh-110s are employed against population centers. Three salvos of four Fateh-110s are fired at Dubai. UAE's missile defenses are concentrated around Abu Dhabi,

and these rounds come in unopposed. Three land in the ocean and one in the desert, but two hit residential buildings, and one hits a mall crowded with people. The Shahab-3 is used against Riyadh—nearly a dozen missiles are fired, and four fall in and around the city.

Iran is able to touch the U.S. military directly with MRBMs. Iran launches CSS-5 attacks on Prince Sultan AB and Thumrait. It expends its entire regionally available inventory because it recognizes that U.S. forces are as concentrated as they will ever be and believes (correctly) that U.S. intelligence will not be certain that it has no more missiles of that range remaining. Each base is targeted with six missiles. The runways are the focus at Prince Sultan because aircraft are dispersed and protected, in most cases, by berms. At Thumrait, intelligence operatives indicate that a particular parking apron has grown crowded with tankers. Two penetrate defenses at Prince Sultan and two at Thumrait. The missiles at Prince Sultan do, in fact, hit the runway, but sufficient contiguous distance remains that limited air operations can continue until maintenance crews can make repairs.

The missiles at Thumrait have a dramatic effect. They are carrying submunitions rather than the standard unitary warhead. These submunitions destroy 11 KC-135s on the ground, two through direct hits and the rest in the resulting massive fire. The fire also destroys four F-35s parked on an adjoining ramp. Aircraft that the fire leaves unharmed are put out of service because they cannot get around the destroyed planes to access the runway at the crowded base. Runway operations are suspended outright for 24 hours and limited for days thereafter while damage-control crews police debris from the attack and look for unexploded munitions.

This day of missiles has both an operational and strategic effect. The impact on U.S. operations is to cut the number of sorties on D+4 by two-thirds and by roughly one-quarter on D+5 through D+11. This is principally because of the loss of refueling aircraft and runway operations at Thumrait. It seriously impedes the U.S. ability to prosecute the counternuclear campaign while also suppressing Iranian air defenses around the strait and hunting for ASCMs and Iranian vessels. Air-war planners prioritize penetrating counternuclear strikes, delaying U.S. efforts to begin to lift the threat to the strait and, ironically, efforts to

hunt for SRBM and MRBM launchers. The U.S. command considers relocating from Prince Sultan and Thumrait entirely but opts instead to assume continued risk. There are numerous bases in the region, but none outside CSS-5 range. The U.S. Air Force is not well postured to support and sustain intense operations from distributed locations, particularly locations that would have to be established while war was ongoing, and not willing to operate from out of the region entirely: Either option would mean prolonging the conflict.

The strategic effect is mixed. Iran's strikes mortally threaten Saudi Arabia, which had been reluctant to let the United States use its bases. Saudi Arabia strongly urges the United States to shift campaign objectives to remove the regime entirely. UAE, on the other hand, is cowed. It considers the scale and effectiveness of the Iranian attack and the many billions of dollars of capital investment in its cities and oil infrastructure and opts to sit out the war. It makes a pretense of saying that the United States had failed to deliver promised effective missile defenses and places its facilities, waters, and air space off limits to U.S. forces.

After that first attack (on D+3), Iran fires one or two SRBMs nightly for the following 12 days. About one-third of those missiles evade defenses, and luckily none hits targets of special significance. Three MRBMs are fired on D+11 at Prince Sultan AB; one fails in flight, but two scatter submunitions across a runway, suspending flight operations.

From D+15 forward, the United States has occasional success finding SRBM launchers (the MRBMs remain out of reach). Iranian air defenses are largely suppressed, and availability of aircraft has improved since the Thumrait attack. The SRBM launchers can notionally roam a massive area but are confined to roads and present a significant signature when fired. The United States can credibly threaten them with patrolling strike aircraft and UASs, guided by a combination of analysis of launch patterns, satellite cueing, Joint Surveillance Target Attack Radar System ground moving target indicator radar, and AWACS. The trouble is the resources that the mission demands, demands that the presence of decoy missile launchers increases. The successful attacks and the UAE reaction have made missile-hunting

a priority, but this takes away from operations directly focused on the strait and prolongs the fight.

Iran also has operational success with proxy forces. Quds Force operatives, evidently equipped and in place before the outbreak of hostilities, mount attacks on both Al Dhafra and Al Udeid with guided mortars on D+3. At Al Udeid, a dining facility for U.S. service members is hit, causing dozens of casualties. Aircraft belonging to both Qatari and UAE air forces are destroyed.

Of the chief U.S. operating locations, Iran can mount proxy attacks against only King Abdulaziz airport. Thumrait and Prince Sultan are fairly isolated, but King Abdulaziz airport is in the outskirts of Jeddah: There is plenty of cover for indirect fires. On D+6, a coordinated mortar attack hits both the main civilian terminal and a parking apron. Four F-15s are destroyed. Despite redoubled Saudi security presence, a second attack occurs on D+8, this time destroying a Rivet Joint and two Global Hawks. Sunni militants aligned with Hamas are implicated.

An irregular navy of sorts both contributes direct support to more-conventional Iranian operations (this support is covered in our discussion of surface ships) and makes independent attacks. A small freighter rockets two UAE oil platforms on D+2, setting both on fire. Drift mines are spotted in most of the major harbors in the southern Persian Gulf, as well as near the Ras Tanura terminal. A barge strikes a mine in Abu Dhabi harbor and blocks access to several piers. Ships pile up west of UAE, trying to stay far from the Iranian coast.

Iranian Anti-Access and Area Denial Versus U.S. Surface Ships: Setup

Although the United States hopes to compel Iran to cease hostilities as soon as possible, it must carry on as though the battle for the Strait of Hormuz will not be won until it has established sea control. Iran threatens all shipping, and the U.S. Navy in particular, with mines, ASCMs, submarines, and fast-attack craft. These capabilities form a layered defense that is not simple to overcome, particularly if Iran conducts coordinated attacks involving all aspects.

Iran's ASCMs are now the centerpiece of its maritime capabilities. As demonstrated on D-day, it has made significant upgrades. It has

about 500 ASCMs, 150 of which are advanced C-803s. They can be fired from at least 100 mobile shore batteries or any of about 60 ships. The C-803 has a range of about 300 km, enough to cover all of the Persian Gulf, the UAE ports, and most of the Gulf of Oman from the Iranian mainland. This range can also provide more room for the launchers to hide.

Target acquisition continues to be the limiting factor for ASCMs, cutting their effective range to well below what they could notionally reach. Iran has developed some UASs that can pass sufficient data to ASCM batteries, but these aircraft are not survivable and are few in number. Iran has also cultivated some unconventional capabilities, placing target-acquisition equipment on civilian ships, relying on sightings from small fishing boats and providing the information to operatives in the Persian Gulf states. Exact target locations are not necessary because these weapons have terminal-seeking capabilities.

Iran has at least 2,000 mines, approximately the same inventory as a decade earlier.⁴² Iran has focused not on enhanced capability but on extending its network of unconventional minelayers. Iran can lay mines from submarines and navy surface vessels but has drilled with civilian-like craft and dispersed mine stockpiles to support them. The object is not to lay a dense mine field but to seed and reseed the strait unobserved with nuisance mines and command continued attention from minesweepers.

The United States understands Iran's mine CONOPS and will be on the lookout with air assets to prevent them from being laid.

Iranian naval vessels, including small boats, also represent a risk for commercial traffic and U.S. ships. The missile boats are most dangerous. Close-in swarming tactics that small boats could employ are less likely to be effective when a state of open war exists. Iran's larger conventional ships are antiquated and easy targets. Packs of missile boats equipped with capable ASCMs, however, are a distinct problem. With their low radar signatures and high speed, they can suddenly extend the ASCM threat range.

⁴² Talmadge, 2008, p. 90.

Iran now operates a handful of AIP diesel submarines, in addition to the Kilos. They are built in Iran but styled on Russian Amur 950 design. These boats can range deep into the Indian Ocean from their base on the Gulf of Oman. When operational, they are formidable, but Iran has struggled to keep them crewed and at sea. Iran also has about 35 midget submarines, intended for picket-type operations in and around the strait. At least some of these submarines are equipped with wake-homing torpedoes.

This capability portfolio has altered Iranian CONOPS somewhat. Although ASCMs, mines, small boats, and submarines provide complementary capability, the ASCMs have replaced the mines as a linchpin. Iran judges its ASCM inventory and capability to be sufficient to use them as the primary means to hit commercial, as well as naval, ships. ASCMs give greater control over targets and thus over strategic effect—the more discriminating Iran appears to be, the greater its chances of avoiding international opprobrium and of peeling Persian Gulf states away from the United States. Mines usefully draw U.S. Navy targets into the strait but will not be used liberally unless Iran feels that it is out of other options. The midget submarines and small boats can function like ASCMs, insofar as they can pick their targets. The more-capable submarines serve the purpose of encouraging U.S. CSGs to keep their distance.

Against these A2AD threats, the U.S. Navy has an ESG in the Persian Gulf, two SSGNs in the Arabian Sea, and three CSGs in the Arabian Sea. The ESG has two extra BMD-capable destroyers and two MCM-equipped littoral combat ships (LCSs). The threat of ASCMs keeps the CSGs in the Arabian Sea at least 500 km from Iranian territory. There are four LCSs with MCM modules installed. More sea room also complicates Iran's submarine efforts (against which the U.S. Navy has deployed two additional SSNs). In addition to the aforementioned airpower, this force can provide more than 600 LACMs and substantial BMD capability.⁴³ The U.S. Navy has four old MCM ships stationed in the Persian Gulf along with four LCSs with MCM mod-

⁴³ This assumes that 25 percent of the combined vertical-launch system capacity of the assembled surface fleet is loaded with LACMs.

ules. The Royal Navy minesweeping flotilla was a victim of budget cuts in 2021. Saudi Arabia and UAE both have some minesweepers, but neither country seems willing to put them to sea. Table 5.7 lists Iranian naval assets for this scenario, and Table 5.8 lists the ASCMs.

Table 5.7
Iranian Naval Assets, 2025

Type	Number
Frigate	3
Corvette	2
Patrol boat, missile	60
Patrol boat, other	50
Kilo-class submarine	3
AIP diesel submarine	5
Midget submarine	35

SOURCE: Cordesman, Wilner, et al., 2013.

NOTE: Combines IRGCN and regular navy. We have decremented the total inventory a little to capture just forces around the Strait of Hormuz.

Table 5.8
Iranian Antiship Cruise Missiles, 2025

Type	Number	Range, in Kilometers
C-802	250	120
C-801	100	40
C-803	150	300

Iranian Anti-Access and Area Denial Versus U.S. Surface Ships: Outcome

The operational center for the war at sea is once again the air above it. As soon as Iran made good on its threat to take hostile action in the strait, a deliberate campaign of bombing and missile strikes was begun. Although Iranian air defenses around the strait are not yet entirely suppressed, the risk associated with deliberate strikes is manageable compared to that required of hunting for pop-up targets. The U.S. Air Force and Navy can take out most of Iran's conventional navy in port, including half of its diesel submarines, by D+1. At least 30 fast missile boats disperse, however. The aircraft have less luck with ASCMs. Known emplacements are hit, but, given the presence of decoys, BDA is uncertain, and the great majority of C-802 and C-803 missiles are believed to survive.

As open war set in in the strait, the ambient traffic dropped precipitously, especially in the main shipping lanes.

Although it is well aware of the advantage of posing a continuing threat, Iran moves to use a large number of its ASCMs on D+1 and D+2. U.S. command of the air is set to increase and, with it, the threat to the cruise missiles. Also, at this early point in the conflict, the missiles can have maximum strategic effects, signaling to the Persian Gulf states that the outcome is not inevitable and to the United States that this campaign will be costly.

Iran hits two target sets: commercial ships of Persian Gulf states it hopes to sway and U.S. Navy forces. On D+1, ASCMs target three tankers, a bulk carrier, and a freighter. Four of the ships are in the strait, but one tanker, hit from a missile boat, is well out into the Gulf of Oman, a clear demonstration of the range of Iran's capabilities. The tankers survive the encounter and limp east toward Muscat, but the bulk carrier loses power and drifts aground near Qeshm, and the freighter sinks. Also on D+1, another freighter and a nearby dhow strike mines southeast of the so-called knee, sinking both.

The U.S. Navy has already absorbed the loss of the LPD, taken under tow back to Bahrain on the morning of D+1. On the evening of D+1, the remainder of the ESG is rediscovered, probably from a report from a passing dhow acting as an Iranian ISR asset. In the early morn-

ing hours of D+2, eight missile boats in two packs launch a salvo of missiles from a range of 20 km. The multipurpose amphibious assault ship, the largest ship in the group, is hit four times. One LCS is hit as well. The LCS sinks within 30 minutes. Uncontrolled fires break out on board the landing helicopter dock amphibious assault ship, and the order is given later in the day to abandon ship. The ensuing rescue mission stymies the ESG. The U.S. Air Force is forced to divert fighter aircraft to provide overwatch to improve defense against further attacks (there is no sanctuary for the ships) and a tanker orbit to support the fighters. This detracts from efforts to find the missile boats and shore-based ASCMs.

Five Iranian diesel boats are somewhere in the Gulf of Oman or the Arabian Sea. SSNs had a good track on three of them even before D-day. These are sunk on D+1. Two, however, remain at large.

Iran makes an effort to find the carriers. Through a network of merchant ships, it can get a rough idea of where one strike group is on D+1, 450 km from southeasternmost Iranian territory. Three missile boats travel far out to sea and launch six C-803 missiles at extreme range on the correct bearing. Five of the missiles fail to pick up any target and crash harmlessly. A DDG intercepts the sixth.

U.S. airpower struggles to devote significant weight of effort to the cruise missiles and small boats. The counternuclear effort and the strait-focused SEAD effort, combined with the actual impact of the D+3 attacks on the airbases, limit the available combat power. Further, until the HQ-9 threat was deemed to be reduced on D+13, patrol of the littoral by manned aircraft was sharply limited.

The United States enjoys increased operational success after D+12 as the number of available aircraft increases. Several irregular minelayers are caught in action and destroyed. U.S. aircraft destroy ASCM launchers used in two D+13 ASCM attacks on commercial shipping (now all but gone from the strait) along with their radars. Overwater air patrols get several more from standoff range, and stealthy UASs operating over Iranian territory strike others at hide sites identified by prewar intelligence. Between missiles expended and launchers, radars, and missiles destroyed, Iran's ASCM capabilities are about 55 percent of their prewar state by the end of D+17. Remaining missile boats are

at about 40 percent but have had to scatter to such a degree that Iran no longer has effective C2 over most of them.

Iranian activity in the north and central Persian Gulf somewhat clouds this success. U.S. assets are stretched too thin to effectively patrol in the entirety of the Persian Gulf. Iran has its own reasons for concentrating on the strait, but it does its best to force the United States to try to be everywhere at once. In the early morning of D+13, a flotilla of fast-attack craft approaches the thickening traffic near Kuwait City and lets loose a barrage of rockets and missiles. Two tankers end up abandoned and adrift, and a freighter is sunk. A shore-based ASCM hits a merchant vessel on D+16 due north of Qatar. Drift mines are also reported.

Continued ballistic-missile attacks and roiling economic markets leave the U.S. command feeling compelled to force action in the strait and convince Iran that its position is hopeless. With its minesweepers inside the Persian Gulf and the battered ESG unable to provide sufficient protection while still keeping station for BMD, the resources must come from the Arabian Sea. On D+18, two LCSs with MCM modules and two DDGs steam into the strait with heavy air cover. An LCS finds and detonates a single drift mine; the trip is otherwise slow and uneventful. On D+19, mine clearance begins in earnest in the western strait. On D+20, ASCMs strike two tankers far to the north, near Kharg.

Conclusion of the War

From D+20 to D+25, Iran makes clear that it intends to continue hostilities. An ASCM is launched at a U.S. minesweeper on D+21 but shot down by its DDG escort. A small freighter hits a mine on D+22. Also on D+22, three CSS-5s are launched at Riyadh. One fails in flight, and one is intercepted by THAAD, but the last scores a direct hit on the ministry of defense and aviation.

The United States is in a difficult position. It cannot eliminate the cruise-missile or ballistic-missile threat. It cannot cover threats for the full breadth of the Persian Gulf and strait. It is working to address the lack of assets to prosecute all aspects of the campaign by calling forward more squadrons, but its strike aircraft are under constant, if mod-

erate, threat from those air defenses that Iran has conserved. The strait might not be technically closed, but Iran clearly maintains the ability and intent to threaten shipping and its neighbors, which significantly curtails traffic. Hopes are fading that Tehran will quickly bow to its inevitable military defeat, while fear rises that the Iranian regime is prepared to tolerate a lengthy standoff. U.S. leaders are surprised that Iran persists; no country's economy is being so badly damaged as Iran's, and the fight is clearly a lost cause. But the status quo—continued operations under a diminished but still significant threat—is not appealing to Washington. International pressure is fierce, especially from the Saudis. Planners prepare options for escalation.

Option 1 is a renewed bombing campaign against regime targets. The chief risk is that it might stiffen Iranian resistance, perhaps pushing it toward widespread acts of terror, from which it has thus far refrained. Further, it might not end the threat. Option 2 is to introduce ground forces to secure lodgments and root out missiles.⁴⁴ Although different in execution and immediate effect, both are fundamentally about threatening regime survival, the credibility of which depends on Iran's belief that the United States would bear the enormous cost of doing so.

The United States puts option 1 in motion on D+25 and readies option 2. In the early morning hours, cruise missiles destroy several government offices in Tehran, primarily those of the internal security services. A single bomb hits the oil export complex at Kharg, a warning shot of sorts. Western news channels show major U.S. ground forces readying for embarkation and report on the extensive mobilization of reserve-component units.

The Iranian regime faces the following circumstances. It is in a position to extend the conflict in the strait—it has enough surviving ballistic missiles, ASCMs, and irregular forces to compel the United States to continue an air and naval war and likely to induce a ground

⁴⁴ This would be a challenging mission. Israeli armed forces struggled to abate the missile threat from Lebanon in 2006 despite a high concentration of effort and a much smaller geographic area. See David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza*, Santa Monica, Calif.: RAND Corporation, MG-1085-A/AF, 2011.

invasion. The regime can sustain its grip on power even in the face of the refocused air attack that the United States is now signaling, although not if a ground invasion is launched. Yet victory in the conventional sense is clearly out of reach. It is losing forces daily. This extended period of hostility will have a continuing effect on the world economy and on Iran's own economy, although the regime believes that this can be managed.

There are three possible avenues for a positive strategic outcome. The first is that the United States decides that the current trend, although positive to it in relative terms, is cost-prohibitive to continue and somehow backs away. Iran could hasten this along by engaging in proxy attacks against the West on a global scale. The second is that the Persian Gulf states find the current trend unsustainable and sharply change their policies, evicting U.S. forces and seeking accommodation with Iran, after which the United States cedes the issue. The third also starts with the proposition that the United States finds the current trend unsustainable, but, rather than back away, it decides to invade, an action that could be devastating and almost certainly fatal for the Iranian regime but that also would diminish America's relative military advantage and expose the United States to the possibility of a long and exhausting occupation should it decide to stay and try to rebuild Iran (which is not certain given its experiences two decades earlier in Iraq).

Seeing that the United States is willing to escalate the conflict, and particularly that it seems to be preparing for an invasion, Iran folds. On the morning of D+30, Iran announces that it has struck a blow for the sovereignty of all states. It recognizes, though, that its struggle against the aggressors is causing others pain. It states that it has elected to yield to a Chinese appeal and cease hostilities.

At this point, the United States has accomplished all it could hope to accomplish with a counternuclear campaign and significantly reduced Iran's military capability to threaten the Persian Gulf. It announces a bombing pause, although it promises to respond immediately to any Iranian attacks.

Net Assessment

Like in 2015, the United States ultimately overmatches Iran's military capabilities, but Iran can contest and significantly complicate U.S. force projection and prevent the United States from achieving a decisive victory. The principal difference is in the way Iran is able to frustrate the application of U.S. strike power. This is due to several mutually supporting factors.

The primary difference-makers are the SRBMs and MRBMs—their improved range and accuracy enable Iran to hit military targets across the Persian Gulf. This deters the United States from even attempting to use airbases along the coast and limits support from Persian Gulf allies. Because America's path to victory depends on achieving air superiority and sustaining a high sortie-generation rate, the loss of these facilities is important.

The targets that U.S. strike assets have to hit are also more numerous and survivable. Iran's ballistic missiles, ASCMs, and air defenses are all mobile. Iran's CONOPS are designed to present a lingering threat.

Last, Iranian air defenses are simply better than in 2015. More and more-capable (longer-range, better tracking radars, more-mobile) SAMs present a direct and continuing threat to U.S. aircraft. SEAD consumes sorties through the full period of hostility.

Iran also makes important advances in ASCMs. The systems are more capable not just because of greater range and accuracy but also because Iran has devised means to conduct some limited OTH targeting and thus expand the danger zone for the United States. Because of a large inventory of missiles and launchers, their mobility, prepared hide sites, and decoys, the capability is also relatively survivable, and being able to present a lingering threat is an important asset.

Note that, like in 2015, the conditions are especially favorable to the United States: It is prepared for likely Iranian actions and is willing to conduct a major campaign. Nevertheless, it is a difficult fight. The U.S. Navy suffers its worst days in 85 years. America's military capability to prevail eventually is never in serious doubt, but the outcome—the fact that the conflict concludes in a month—hinges on both Iran's

and the Persian Gulf states' political will, two relatively unpredictable factors.

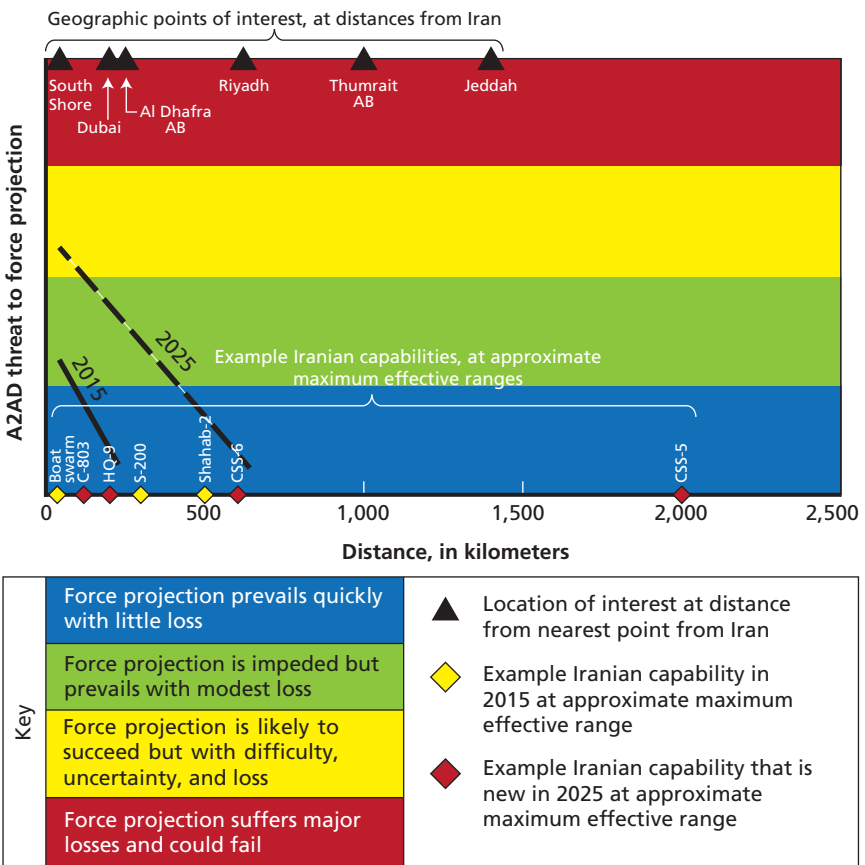
An implication of the decisive U.S. capability advantage is that, like in 2015, it can escalate the fight with Iran, but Iran has fewer options to return the favor. The very act of closing the strait is probably Iran's most damaging avenue for escalation. Iran does, though, demonstrate an improved ability (and a willingness) to punish the Persian Gulf states in addition to U.S. forces. And, as before, it can expand the scope and scale of terrorist attacks or simply resist all U.S. escalatory pressure for an invasion, an option that might be deeply unattractive for U.S. leadership. Figure 5.8 illustrates our net assessment of this scenario, and Figure 5.9 shows our assessment of the Iranian A2AD threat to U.S. force projection for this scenario.

Figure 5.8
Nonnuclear Iran–United States Net Assessment, 2025

Assessment		Color	
The United States prevails in the capability contest quickly with little loss.		Blue	
The United States prevails with some time and loss.		Green	
The United States can succeed but with difficulty, uncertainty, and loss.		Yellow	
The United States suffers major losses and could fail.		Red	

		Iran	
A2AD threat to	By	2015	2025
Surface ships	Submarines	Green	Yellow
	Cruise missiles	Yellow	Yellow with red diagonal stripes
	Ballistic missiles	Blue	Blue with green diagonal stripes
	Aircraft	Blue	Blue
Strike aircraft	Air defense	Green	Yellow
	Aircraft	Blue	Blue
Bases	Ballistic missiles	Blue	Yellow
	Proxy attack	Blue	Green
C4ISR	Cyber	Green	Green
	ASAT	Blue	Blue
	EW	Blue	Blue
Strategic risk		Yellow	Yellow
Overall		Blue	Green

Figure 5.9
Iranian Anti-Access and Area-Denial Threat to U.S. Force Projection, 2025



An Excursion Worth Considering: A Nuclear Iran–United States, 2025

The events described in this scenario, including the CONOPS and outcomes, are not based on classified intelligence or actual plans. We do, however, intend them to be realistic and to form a useful framework for examining key trends in the A2AD dynamic.

The 2025 Strait of Hormuz scenario above could, of course, play out in a variety of ways other than that described in the narrative. What is certain is that it *would* be different if Iran possessed deliverable nuclear weapons. The strategic threat Iran could pose to the United States and its allies would immeasurably bolster Iran's improved A2AD capabilities and enhanced ability to exert force in and around the strait. The United States would have to consider that military action against Iran could invite a retaliatory nuclear strike, thus tempering not just the desire to engage in any sort of conflict but, should a war start, forcing high-stakes choices about which specific operational and tactical options were viable and which were unacceptably risky.

In the following section, we discuss briefly two ways in which a 2025 conflict centered on the strait could unfold if Iran had nuclear weapons. The excursion is worthwhile for two reasons. First, although both cases posit a shooting war, they serve as a reminder that a nuclear deterrent can blunt U.S. force projection. Second, they show how nuclear weapons make new means of countering force projection—Iran's suite of A2AD capabilities—more potent.

Background

In both cases, Iran's and the United States' respective strategic aims and conventional military capabilities—including those capabilities martialled for the ensuing engagement—are generally the same as described in the nonnuclear Iran 2025 scenario, hereafter referred to as the base scenario. We note any exceptions. The path to war and Iran's nuclear capabilities are common across the cases. The U.S. response is the variable.

Path to War

In early 2025, Iran surprises the international community with a successful nuclear test. The morning afterward, it announces that the test was, in fact, a demonstration of an operational warhead rather than part of a development program. It states that it has CSS-5 and Shahab-6 missiles with nuclear warheads with a yield of 20 kilotons (kt) and that other warheads are “assigned to its special forces.”

The Western intelligence community is uncertain about these claims. It judges as plausible the claim that Iran has, in fact, developed and deployed nuclear weapons—the weapon test was real, and it seems that Iran successfully mastered the necessary miniaturization with the aid of computer models and possible foreign assistance. Based on some rapid analysis of the materials potentially at Iran’s disposal, the best guess is that Iran could have between five and ten total operational weapons. About their delivery mechanisms, there is significant doubt. The CSS-5 is a known conventional system with a range of about 2,000 km, far enough to hit Tel Aviv, Riyadh, or possibly Athens. Iran has about 36 of these missiles on mobile launchers. Most are thought to be west of Tehran, but some are closer to the strait; only the locations of a few are known to an actual certainty, although military intelligence has a good idea of where and how they are likely to be deployed. Iran presents the Shahab-6 missile in parades starting in 2021. It claims a range of 5,000 km, enough to cover all of western Europe, and an inventory of 40 missiles but has never demonstrated one in flight. Some analysts believe that the missile is nothing more than an elaborate bluff. As for warheads allegedly provided to special forces, it seems unlikely that Iran would chance such precious commodities outside the country, but it is certainly possible that a warhead could already be in a Western capital or on a ship in some international harbor.

Ultimately, analysts conclude that Iran might have a handful of nuclear-tipped CSS-5 missiles. The Shahab-6, untested as it is, is not likely to have a nuclear warhead. The entire nuclear inventory is unlikely to be on missiles at any one time, but whether a warhead or two could be deployed outside Iran by unconventional means is simply unknown.

While Washington begins the delicate process of extracting a firm stance from the UN Security Council, the United States and the EU announce a redoubling of sanctions against Iran. Iran responds to this act of “economic warfare” with an act of its own: Henceforth, no U.S. naval vessels will be allowed to transit the Strait of Hormuz (except, of course, to leave the Persian Gulf permanently), no U.S. warplanes can overfly Iran or the strait, and commercial shipping of all kinds must seek an Iranian escort.

This affront to the freedom of navigation, particularly in so essential a sea-lane, is unacceptable to the United States, and demands an immediate response. Operationally, the immediate options are limited. There is an ESG in the Persian Gulf and CSG in the Arabian Sea. A second CSG is in the Mediterranean, about five days away. Very few U.S. Air Force assets are to be found in the region—some ISR, lift, and refueling planes and some UASs, but no strike squadrons. Iran’s declaration is belligerent and alarmingly reckless but not itself an act of war, so any U.S. challenge to the transit prohibition will have to come without any proactive strikes to prepare the ground. Strategically, a new pall of nuclear danger hangs over the confrontation. Tehran has drawn a line in the sand that Washington is compelled to cross. If Iran makes good on its threat and shooting starts, controlling escalation will be very challenging, particularly before it ends in a nuclear exchange.

A regularly scheduled flight over the strait by a P-8 is conducted only a few hours after Iran’s announcement. It does not draw a military response, but a military spokesperson for the IRGC blames the United States for inflaming the situation and says that this sort of “menace” will not be tolerated.

One day after Iran’s announcement about the strait and a scant two days after the nuclear demonstration, two U.S. destroyers from the CSG in the Arabian Gulf, accompanied by naval aircraft, enter the Gulf of Oman. The ships are repeatedly illuminated with shore-based radar and subjected to threatening runs by flotillas of small boats, but their ROE are firm: The United States will not fire the first shot. Iran finally attacks just east of Qeshm Island. A contingent of attack boats looses a barrage of C-803 missiles, while other missiles come from shore-based batteries. One DDG is hit by two missiles and loses power

and then is torpedoed by a midget submarine that had been lying in wait. Three missiles hit the other. Both ships are abandoned, and Iranian ships take their surviving crews off. At the same time, Iranian air defenses engage the planes that had been providing air cover, destroying an F-18 over the strait and catching a KC-10 over Omani airspace.

Iran is quick to claim that the U.S. ships were the aggressors—not just in their presence but that they actually fired first. The United States vociferously denies this and vows to punish Iran. The U.S. public is aghast at the sinkings and the U.S. sailors in Iranian custody, reflecting both the circumstances in which the vessels were placed and the punctured aura of invincibility. U.S. forces are mobilized for war, but for what kind?

Nuclear Iran Case 1: Careful Response

Despite the cacophony demanding invasion of Iran and removal of the regime, Washington is simply unwilling to risk nuclear war. In the event that Tehran's very existence were threatened, it would have little incentive not to use those weapons it now seems to possess. The United States could perhaps find and eliminate some of them and trust missile defenses to do the rest, but the probability of failure is too high and the cost too horrible, including the cost the United States might feel compelled to impose on Iran in retaliation.

Nevertheless, Iran cannot be allowed to “get away with it.” The status quo ante around the strait must be restored and on terms that leave no doubt that the United States was the victor. Washington announces that it will destroy Iran's ability to make war in the Persian Gulf and restore the freedom of navigation. It states, in so many words, that it believes the leadership in Tehran to be madmen and the people of Iran to be their victims as much as anyone. The United States will thus limit its response to military targets in and around the strait and Persian Gulf because it does not want to give Iran an excuse to use nuclear weapons and force the United States to—unfortunately but assuredly—respond in kind, harming the population and destroying the long international nuclear peace. Washington emphasizes that nuclear attacks of any kind—on the United States or on its allies—will be answered with overwhelming force. The intent of this message

is threefold: to signal to Tehran that regime change is not necessarily a war aim, to define for Tehran the rules of the game, insofar as the United States expects to engage in a significant conflict but meet with no Iranian nuclear response, and to reaffirm and extend the U.S. resolve and its nuclear deterrent.

The Iranian regime announces that it will take all necessary steps to protect the revolution from imperialist bullying and prevent the United States from destroying its nascent nuclear capability. Notably, it names “our missile forces near Zanzan [west of Tehran] and Gerash [near the Persian Gulf] and elsewhere” when elaborating on things that the “aggressor” “shall not be allowed to touch.” Its statements released in English copy a favorite phrase of U.S. officials: “All options are on the table.”

Conduct of the War

Over a period of a month, the United States amasses significant air and naval forces in those Persian Gulf states that will host them and at those locations judged safe enough from Iranian conventional ballistic missiles (see the base scenario). The Persian Gulf allies require constant reassurance that the United States has extended its umbrella of nuclear deterrence over them, while Israel must be dissuaded from a preemptive nuclear strike. The United States does not attempt to reinforce the ESG in the Persian Gulf. In the meantime, commercial shipping continues to transit the strait, some after taking on Iranian pilots, some after merely checking with IRGC naval command. World oil and financial markets have nevertheless experienced a shock, and shipping insurance rates are sharply elevated.

The U.S. plan is to achieve military dominance in the strait and hope that a combination of combat losses and economic pain from a virtual blockade compels Iran to capitulate. Capitulation is defined as standing down around the strait; stripping Iran of its newly acquired nukes could *maybe* be achieved over the long term but is not thought a feasible war aim. The path to that dominance, however, will be conditioned by an overriding desire not to cross any Iranian red lines and trigger a nuclear response. Just where those red lines are is uncertain, and Tehran is not about to provide clarity. Washington concludes

that any military actions that would seem designed to overthrow the regime, as well as any strikes against Iran's nuclear infrastructure or fielded weapons, are unacceptably risky.

Eighteen days after Iran sunk the destroyers, the United States launches a wave of bomb and missile strikes in the Persian Gulf littoral (for later reference, this is D-day). Targets are Iranian air defenses, naval facilities, ships, and ASCM batteries. The United States hits nothing further than about 50 km inland—sufficient to cover ASCM firing locations and radars and, of course, anything on or near the water. This leaves untouched the ballistic missiles and SAMs protecting them deployed around Gerash. The United States does not want Iran to think that it is targeting its nuclear strike capability. The United States also leaves Iran's national C2 networks untouched.

The initial attacks have only modest success. The United States has the same assets in the region as in the base scenario, with aircraft bedded down in the same locations, but those planes are focused solely on the Persian Gulf, with no counternuclear campaign to discuss. This alleviates the pressure on sortie generation somewhat and frees up more stealthy planes, but they are still flying long distances from regional bases to the operating area. Further, although the United States has a month to prepare, Iran is afforded the same opportunity. Naval assets have dispersed. Mobile SAMs are either reserved and sheltered or optimally deployed. Mobile ASCMs are, in most cases, hidden. After four days of deliberate bombing, Iran is thoroughly bloodied, but it retains an estimated 65 percent of its ASCMs. More troublesome is the fact that at least two HQ-9 batteries are around Gerash, in the so-called no-go zone for strikes. From that area, they can range the Iranian shoreline as far as Bandar Abbas and over the western reaches of the strait. It is hard to maintain a fix on their exact locations because they are not operated all the time and are mobile. The United States loses three manned aircraft and four UASs in the first four days to these and shorter-range air-defense systems.

Iran responds largely with limited salvos of SRBMs and attacks by proxy forces. The targets and effects are the same as in the base scenario, with a modest increase in ballistic-missile effectiveness caused by the lack of U.S. naval BMD reinforcements in the Persian Gulf.

The chief difference is in the response of the Persian Gulf states. Like in the base scenario, UAE denies access of any kind to U.S. forces. In this case, however, other states waver as well. If the United States will not go after Iranian missiles, they face a continued bombardment. Missile defenses will help, but they are not infallible and they are not everywhere.

The United States and Iran continue what amount to parallel offensives. U.S. aircraft patrol constantly over the strait, hitting those targets that present themselves. On D+8, three U.S. destroyers transit the strait into the Persian Gulf, bolstering the BMD presence. Iran continues to launch SRBMs at Persian Gulf targets, with sometimes one and sometimes a handful of missiles each day. After initial punitive strikes at oil facilities, subsequent attacks focus on military targets. On D+22, Qatar, home of the U.S. combined air operations center, announces that the United States is no longer welcome to conduct hostilities from its territory. Saudi Arabia and Bahrain agitate for U.S. escalation and threaten that otherwise they must consider some kind of accommodation.

Iran's domestic political situation is unsettled. The economy has cratered but not totally collapsed. Vast swathes of the public support the regime in what state media describe as a war in which they are the aggrieved party, while internal security services keep a tight grip on the rest. Two factors bolster Tehran. First, it is not just the organs of the revolution that find their cause sympathetic. No small number of governments and publics around the world see anything inherently wrong with Iran having nuclear weapons. Many accept Iran's claim that the U.S. ships fired first, and even the western European press is apt to lament the war in general terms rather than call Iran to account. Second, and of more-practical use, China announces on D+18 that it will not participate in any trade embargo. The United States is unwilling to seize Chinese-flagged ships. With an economy as large as China's, this is a tremendous gap.

After 30 days of fighting, the situation settles into an uneasy stalemate. Iranian missile attacks dwindle away to nothing, although it is estimated to retain about 25 percent of its prewar SRBM inventory. U.S. warships have completed several passages through the strait with-

out being fired on. Commercial traffic has returned to about 60 percent of normal: Insurance rates are still very high, but, as yet, no commercial ship has been attacked, and there are no known mines in the water. U.S. strike aircraft have nothing left to bomb but the occasional pop-up target. Iranian air-defense missiles intermittently engage them, and several planes are lost between D+20 and D+45.

Conclusion of the War

This stalemate is deeply unsatisfying for the United States. Nominally, Washington has achieved much of what it set out to accomplish: The U.S. Navy is doing much as it pleases, and Iran has been made to pay. Yet the situation feels very like an Iranian victory. The several dozen Iranian ships that have been sunk—a few aging frigates, some more-modern corvettes, tens of attack boats—do not count as much as two of the world's most-advanced warships. Iran might be husbanding its resources, but it is still quite capable of threatening both U.S. forces and the Persian Gulf states. And of no small consequence is the fact that Iran holds the 124 remaining crew from the sunken destroyers, plus two subsequently captured pilots.

The United States has no attractive options to tilt the balance further in its favor. It could escalate vertically by bombing more deeply into Iran. Washington's tolerance for nuclear risk has grown higher but will not support that. It could escalate horizontally, by attacking economic targets around the Persian Gulf; hitting Iran's oil infrastructure might have the devastating impact that sanctions have not had. This, though, would invite retaliation in kind via missile. Because Iran had left off such attacks a month ago, the United States would be vulnerable to charges from the Persian Gulf states that it was doing them far more harm than good. Perhaps the option with the least risk of nuclear retaliation is to launch a national-level cybercampaign.

The view from Tehran is somewhat rosier, but there is a strong sense that it would be best to quit while ahead. The Iranians view the United States as somewhat more likely to escalate, even invade, than to simply walk away. Any use of nuclear weapons would certainly spell the end of the regime. A state of low-grade permanent hostility is

acceptable, perhaps even desirable, but the threat of nuclear war should be tempered.

France ultimately provides a way out for both states, stepping in to adjudicate a cease-fire. The United States receives its sailors and airmen back, along with an Iranian statement that “all ships can transit the strait if they come in peace.” In return, the United States agrees to leave Iranian waters and airspace.

Nuclear Iran Case 2: Overwhelming Force

Washington has long found a nuclear Iran inherently unacceptable, in large part on the grounds that the hostile regime would then be empowered to conduct itself like a hegemon in that sensitive region. In very short order, Tehran has confirmed the validity of those fears and done so with an actual, unambiguous act of war. The strategic situation is dire and seems unlikely to improve over time. Despite the enormous risk, the United States feels it necessary to respond with overwhelming force.

The United States has two objectives. The first is to eliminate the Iranian conventional threat to the strait and restore freedom of access for the U.S. Navy. The second is to quickly destroy Iran’s operational nuclear weapons and create the conditions for the elimination of its entire program. The latter is an independent goal but also enables the former because removing the menace of nuclear retaliation will give U.S. forces free reign in a strait-focused campaign. The United States would like to avoid an invasion and subsequent occupation of Iran and is willing to tolerate the continued existence of the regime so long as it is thoroughly neutered and so long as it does not actually use nuclear weapons. U.S. official pronouncements emphasize the punishment coming Iran’s way but make pointed reference to an end state in which the regime continues to exist.

An air–sea blitz will accomplish these two objectives with the nuclear weapons as the primary target but with all foundations of regime power as candidates. The hope is that Iran is, in so many words, bluffing—that the regime would see that, if it escalates to nuclear weapons, its fate is sealed, and so refrain. Moreover, if Tehran is sufficiently overwhelmed, it will capitulate before it is necessary to reduce the Ira-

nian capabilities around the strait in detail. If Iran is not bluffing, the United States must hope that its missile-defense and missile-hunting capabilities are sufficient to prevent a catastrophe.

The Iranian regime announces that it will take all necessary steps to protect the revolution from imperialist bullying and prevent the United States from destroying its nascent nuclear capability. Notably, it names “our missile forces near Zanzan and Gerash and elsewhere” when elaborating on things that the “aggressor” “shall not be allowed to touch.” Its statements released in English copy a favorite phrase of U.S. officials: “All options are on the table.”

Conduct of the War

Over a period of a month, the United States amasses significant air and naval forces in those Persian Gulf states that will host them and at those locations judged safe enough from Iranian conventional ballistic missiles. The Persian Gulf allies require constant reassurance that the United States has extended its umbrella of nuclear deterrence over them, while Israel must be dissuaded from a preemptive nuclear strike.

There are two important changes from the 2025 scenario. First, two additional squadrons of F-22s and two additional squadrons of F-35s, plus assorted tanker and ISR aircraft, are moved to Akrotiri on Cyprus. Although Turkey prohibits land forces and aircraft from using its territory, it permits overflight rights—absolutely essential if the United States is to conduct countermissile operations near Tehran. Second, the United States brings forward III Corps headquarters, three division headquarters, four BCTs, and a marine expeditionary force to Oman, with two more division headquarters, and six more BCTs in transit and more being readied in CONUS—these forces are intended to give the option to seize a lodgment around the strait and to give leadership the option to undertake a full-scale invasion. The United States does not attempt to reinforce the ESG in the Persian Gulf—a difficult decision because added BMD capability is highly desirable. In the meantime, commercial shipping continues to transit the strait, some after taking on Iranian pilots, some after merely checking with IRGC naval command. World oil and financial markets have never-

theless experienced a shock, and shipping insurance rates are sharply elevated.

Eighteen days after Iran sunk the destroyers, the United States launches a wave of bomb and missile strikes across Iran (for later reference, this is D-day). The attack is consciously modeled on the shock-and-awe assault on Iraq of more than 20 years ago. There are two primary target sets: leadership and C2 nodes, and ballistic missiles.

The counter-ballistic missile effort is hugely challenging. Despite the intervening month to gather intelligence, not very much is known besides what Iran earlier announced—some nuclear-tipped missiles were west of Tehran and some were near the Persian Gulf—and even that cannot be verified. The airspace is denied, and the missiles are mobile. The United States can crater roads and take down bridges to limit where the missiles can travel, but the missiles are still hard to find. The Iranians remain disciplined in the operational security, and, in those cases in which it has lapsed, the United States is challenged to maintain the location of a missile or to tell whether it has a nuclear warhead.

Cruise missiles and strike aircraft focus on creating and maintaining access to the most-likely SRBM and MRBM operating locations. Successful countermissile action will require continued presence over Iranian territory. Iranian air defenses offer a frustratingly flexible resistance—some systems engage with incoming aircraft; others stay silent and hidden. U.S. cyber and EW activities destroy any national or even regional integration of the defenses, but individual systems, and even mutually supporting systems, remain operational. Eight U.S. aircraft are lost in the first two days.

Distance is the other obstacle to success; it is inflexible. With tanker orbits over the Persian Gulf's southern shore, U.S. manned fighter aircraft flying from Prince Sultan and Thumrait can generate maybe two hours of loiter time around Gerash. Fighters from Cyprus, using tankers over Turkey, get approximately the same time on station near Tehran. The United States has only a limited inventory of stealthy, strike-capable UASs. In sum, the aircraft cannot be everywhere they need to be at once, and maintaining presence is hazardous.

Iran's initial military response is conventional, or at least non-nuclear: SRBMs and MRBMs, along with attacks by proxy forces. The U.S. emphasis on suppressing the missiles has some effect, but nearly 30 missiles are successfully launched, and about half make it through defenses. The target set is somewhat different from that in the base scenario. All the same military sites are targeted, but Iran redirects its attacks on oil infrastructure to the cities of those same Persian Gulf states. The message to its neighbors: Imagine if those were nuclear weapons.

The initial verbal response is shrill, warning in the strongest possible terms that Iran will be forced to use nuclear weapons if the United States does not stop its "reckless" attacks. Tehran's appeal to the international community is something along the lines of, "What would you have us do? Sit on our hands while the United States destroys the state?"

U.S. signals intelligence indicates that the Iranian leadership is, in fact, at a loss. Iran is surprised that the United States flouted its nuclear deterrent. Some conflict was inevitable when Iran struck the destroyers, but it was thought that the threat of nuclear war would keep things contained to the strait. Now, Iran believes that the United States will not stop until Iran is unseated. The regime also believes that, if it uses nuclear weapons, the United States will respond in kind and, again, not stop until the regime is toppled. Either way, the regime is finished. If U.S. attacks continue apace, eventually the choice will be made for Iran—its weapons will be destroyed. Although confusion is generally welcome in one's enemies, this intelligence unfortunately confirms that Iran has operational nuclear weapons and is seriously considering using them.

On D+4, while U.S. attacks continue and even increase in intensity, Iran launches a nuclear strike. The target is 5th Fleet headquarters in Bahrain. Several missiles from a salvo of SRBMs make it through missile defenses, and one has a nuclear warhead. The approximately 20-kt blast eliminates U.S. facilities and causes significant civilian casualties in Manama. Iran issues a public statement expressing regret that this step became necessary, emphasizing that it targeted a military facility, and indicated that it would strike again if the United States persists in "its madness."

Now the United States is at a loss. Its counternuclear campaign has failed, and so has its nuclear deterrent. So: to retaliate with nuclear weapons? To perhaps restore the worth of the deterrent at the price of international opprobrium? Is invasion of Iran now necessary? How many nuclear weapons does it have left?

Over 12 tense hours, U.S. leaders determine that a nuclear response is required. For one thing, the Saudi government is demanding either that Iran be flattened, and quickly, or that U.S. forces leave. The remaining question is whether a measured response is best—perhaps just a single target, to achieve parity with Manama—in hope of limiting further nuclear escalation or whether an overwhelming response is needed to fully reassert the nuclear deterrent. Something of a middle ground is chosen: The United States will strike more extensively than Iran just has but avoid population centers as much as possible. Of nearly equal consequence, Washington decides to put plans in motion to invade Iran—even if the regime could be toppled from afar, the thought of the current leadership walking free in some fashion is unacceptable.

On the evening of D+5, submarine-launched nuclear missiles hit Bandar Abbas (chosen to mirror Manama) and nuclear sites at Natanz, Arak, Isfahan, Parchin, Bushehr, and Qom. The Qom site also receives a follow-on strike from a ground-penetrating warhead dropped by a B-2. In a somber public statement, the U.S. president virtually mirrors what the Iranian leadership had said a day earlier: A regrettable tragedy, but the blood is on Tehran's hands, and the United States is resolved to eliminate this threat to international order. Video from Iran shows devastated towns and dead children.

Iran's response is rapid—so fast, in fact, that it is later assumed that launch authority had been delegated to the missileers, to be exercised if they learned of a U.S. nuclear strike. At the stroke of midnight on D+5, eight CSS-5 missiles are launched from west of Tehran, and two are launched from within the city itself. Five missiles head for Tel Aviv. Five head for the main staging base of U.S. ground forces in Oman. Missile defenses attrite eight of the missiles, but one makes it through at each target. The missile that strikes U.S. forces in Oman is conventional. The missile that strikes Tel Aviv has a nuclear war-

head. The airburst kills 55,000 people outright and causes a further 100,000 casualties.

Conclusion of the War

Iran's attack on Israel is an act of nihilism because a massive Israeli nuclear response is assured. Tehran is bombed the following day, Mashhad and Isfahan the day following. Casualties number in the millions. The Iranian government has ceased to exist. One self-proclaimed provisional government announces a surrender, while two others state that the fight will continue to the last person. Iran launches no further nuclear attacks. Evidence later suggests that the D+5 attacks represented its last operational weapons—U.S. bombing had destroyed three, at least one was intercepted, and the others were used.

The United States launches an invasion of Iran on D+12, landing east of the strait. It meets little conventional resistance but, once ashore and inland, begins to take significant casualties from well-armed irregular forces. It seems that U.S. soldiers and marines will have to fight their way into the interior to engage in WMD elimination and a man-hunt for surviving members of the former regime. Massive international support is required, both to manage the humanitarian consequences of nuclear war and to help reestablish some semblance of order in a country of 75 million people, more than twice as populous as Iraq and more than three times the size. It is not clear, however, that that international support will be forthcoming—even America's staunchest allies are not eager to align themselves with the United States and Israel or pour in the blood and treasure that will be required.

Net Assessment

That nuclear weapons make an adversary more formidable is no revelation. These cases illustrate different facets of that problem. In the first case, the United States is careful in its response but, in its caution, forsakes strategic and operational advantages it had enjoyed against a non-nuclear Iran. Strategically, it had the capacity to dominate conventional escalation. Operationally, it was much better positioned to overcome Iran's A2AD complex, particularly its SRBMs and air defenses. In this narrative, the United States eventually achieves local operational supe-

riority, but the outcome looks very like a strategic victory for Iran. If the United States elects not to be deterred in any way by Iran's nuclear weapons, it invites a catastrophic outcome like the one described.

Although deliverable nuclear weapons were the key difference-makers, Iran's conventional A2AD capabilities were also telling. Accurate, solid-fueled, mobile ballistic missiles in large numbers give Iran the capability to threaten U.S. and allied land-based forces anywhere in the region. They also gave Iran a credible second-strike capability despite having only a handful of warheads. When granted sanctuary in the first case, these missiles increased Iran's leverage on America's Persian Gulf allies. Advanced mobile air defenses both guarded the nuclear capability and, when given sanctuary, were a continuing threat to air operations over the strait. When operated from sanctuary, they sharply raised the cost of the air patrols necessary to suppress ASCMs and thus limit the threat to the U.S. Navy in the strait.

Lastly, it should not go unremarked that the nuclear weapons themselves were used in two instances to deny access—the regional seat of U.S. naval power was destroyed, and the staging area for U.S. ground forces was targeted. And if anything, the impact of nuclear weapons on U.S. alliances was underplayed. Washington would have a very difficult time coordinating a response from the EU, NATO, Israel, and the Persian Gulf states. Imbalances in risks run, resources committed, and interests at stake would be cast in sharp relief by the mortal threat and the ambiguity that surrounds blame for the start of the war.

Collective Assessment

Duncan Long

The foregoing narratives describe how important adversaries could threaten America's ability to project force, both now and in the future. They differ in ways large and small. In this chapter, we extract from their outcomes strategically significant lessons that seem common across them, as well as highlight some important dissimilarities. Ultimately, these findings are what can shape discussion of potential alternative U.S. military strategies. As noted in Chapter One, these scenarios are the product of the research team and are not definitive, but they need only be plausible to illustrate the key lessons of this volume—that the A2AD threat in critical regions is formidable and, barring some new technical or operational discovery that alters this trend, will worsen with time.

The chapter begins with a brief summary of each scenario. The summaries are by no means comprehensive but serve to reorient the reader to some of the basic features of each narrative. We then address important differences and three major common elements.

Summaries of the Scenarios

China

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-claimed territory in the SCS.

China–Taiwan, 2015

In response to indications that Taiwan will try to solidify its autonomy, Beijing embarks on a blockade campaign to compel Taiwanese leaders to change their position. This campaign is not just a traditional naval blockade but rather 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 China 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 ALCM attacks against U.S. airbases in Japan and against U.S. ships. The United States suffers significant losses, including mission kills of two carriers, but ultimately the continuing toll that U.S. SSNs exact on Chinese surface ships forces China to lift the blockade and cease hostilities.

China–Taiwan, 2025

The 2025 scenario also addresses a Chinese blockade campaign answered by a U.S. response. China now has more 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. Missiles also prove threatening to other U.S. surface ships, and China has enhanced counterspace capabilities.

The U.S. approach to conflict was much the same, although with some enhanced strike platforms: Strike Chinese C4ISR and other mainland targets early and often. 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, impeded U.S. ability to comprehensively attack Chinese assets.

The conflict escalates when China attacks U.S. satellites and teeters at the brink of nuclear exchange when the United States, in an effort to suppress ongoing conventional ballistic-missile attacks, seems to strike at China's nuclear force. China replies by hitting U.S.

missile-defense sites in Alaska. Sobered, leaders find a way to negotiate a cease-fire.

China–Philippines, 2015

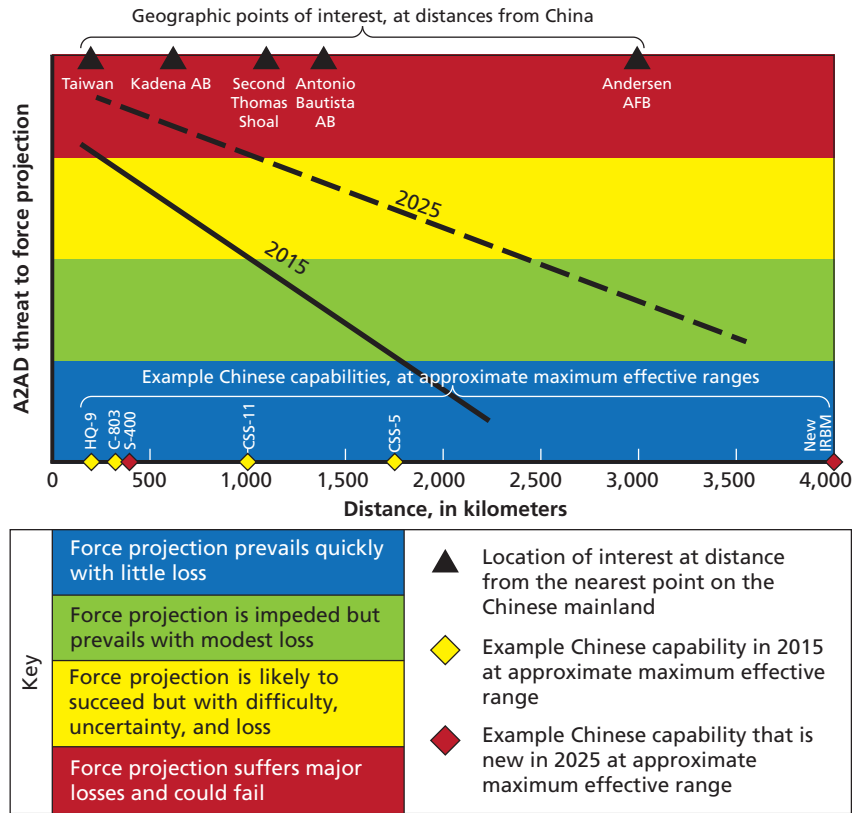
Conflict erupts over control of Second Thomas Shoal, a piece of territory that the Philippines currently controls. The United States comes to the Philippines' aid after China blockades Philippine outposts and shoots down a Philippine Air Force plane. The United States can overcome Chinese efforts principally by making the SCS uninhabitable for the PLAN. Air superiority is comparatively easy to establish and maintain. Chinese forces cannot effectively target U.S. bases in the Philippines or Guam and are 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, it launches attacks against Chinese OTH radar and facilities linked to ASAT capabilities. Like in Taiwan 2015, attrition of PLAN surface ships by U.S. SSNs and aircraft convinces Beijing to negotiate a cease-fire.

China–Philippines, 2025

Like in 2015, China attempts to seize control of Philippine-held islands. China's improved long-range strike and long-range ISR are the difference-makers. China's ability to find and target U.S. ships and to hit U.S. airbases make the conflict significantly more challenging for the United States. The United States has capital ships and two aircraft carriers sunk or put out of action by ASBMs and air- and submarine-launched ASCMs. Chinese success prompts U.S. escalation to mainland attacks, focused on C4ISR networks and assets. Ultimately, each side can deny the other control of the SCS. The United States can prevent China from maintaining control of disputed features with air and cruise-missile strikes, but China retains formidable A2AD capabilities it can use to prevent the Philippines and the United States from reclaiming control of the same features. 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. Figure 6.1 summarizes China’s threat to force projection in these scenarios.

Figure 6.1
Chinese Anti-Access and Area-Denial Threat to Force Projection



NOTE: The 2015 and 2025 threat lines aggregate all capability contests described in this section between China and Taiwan and between China and the Philippines. The lines are broad indications of how the threat to force protection changes over distance and over time—that is, as indicators of trends in relative capability between adversary A2AD and U.S. force projection. CSS-5 is the NATO reporting name for the Dong-Feng 21 medium-range ballistic missile.

Russia

The 2015 and 2025 Russia scenarios both describe Russian invasions of northeastern Estonia that trigger wars with NATO.

Russia–Estonia, 2015

Russia invades Estonia to protect the rights of ethnic Russians. Russian forces overrun their objective—an enclave bordering Russia—before NATO can mount a credible defense. Russia is banking on the fact that a *fait accompli*, backed with significant A2AD capabilities, will lead NATO to accede to this attack and that the limited incursion will fracture the alliance. NATO political will, however, is sufficient to uphold Article 5, and NATO sets about pushing the Russian army out of the Baltics. The chief Russian A2AD barriers to overcome are the modern air-defense network, SRBMs, and GLCMs. Russian IADS, based in Kaliningrad and around St. Petersburg, provide a complete umbrella over the Baltics. The SRBMs and GLCMs can target NATO airbases as far away as England and threaten potential routes of advance.

NATO is superior both in capability and capacity. The crucial question is whether the threat of Russian nuclear retaliation will deter NATO from bringing its full power to bear. Russia might perceive a strategic threat if a NATO SEAD campaign strikes defenses around St. Petersburg and elsewhere in western Russia. Russian nuclear doctrine also allows for first use, as well as the possibility that a significant conventional defeat on the ground in the Baltics could be met with a nuclear response.

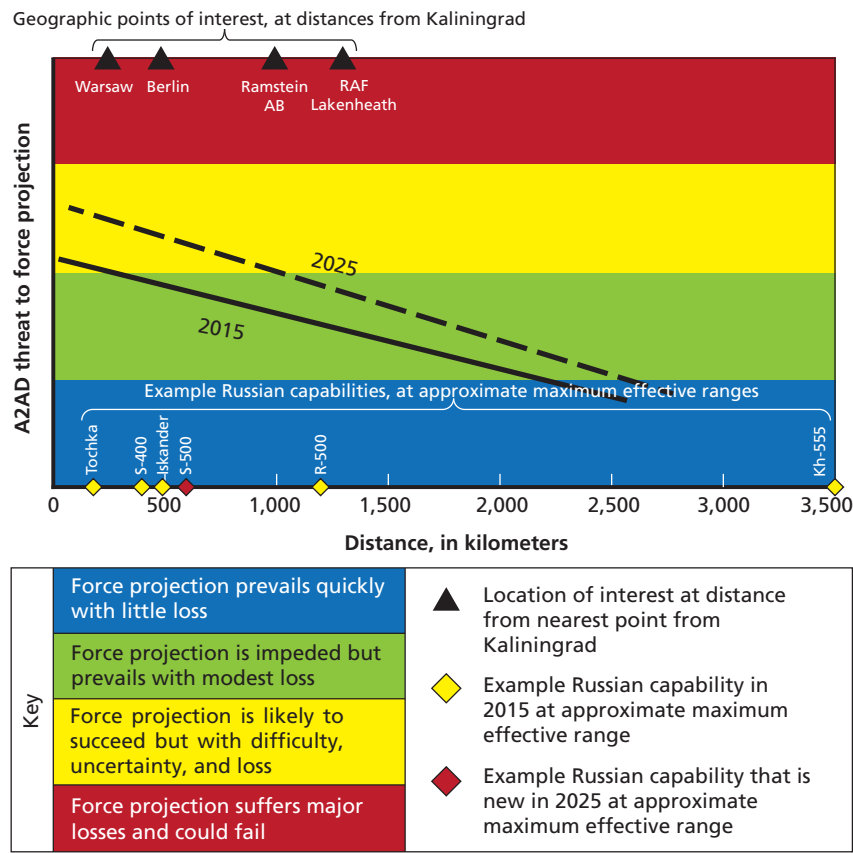
NATO makes the crucial decision not to afford sanctuary to any Russian military assets supporting its forces in the Baltics and, despite the danger that such a campaign could lead to a Russian nuclear response, bombs extensively in Kaliningrad and in Russia proper. When IADSs are sufficiently suppressed, NATO airpower exacts a tremendous toll on Russian ground forces. Russia withdraws before NATO ground forces, including a U.S. corps deploying from CONUS, march on the Baltics.

Russia–Estonia, 2025

Like in 2015, Russia invades Estonia to protect the rights of ethnic Russians. Russian military capabilities have improved by a modest

degree. Air defenses and ground-launched missiles remain the most-threatening capabilities to the NATO relief of the Baltics. New, longer-range SAMs bolster air defenses, and Russia has a deeper inventory of the ballistic and cruise missiles it used to good effect in 2015. The geography is, of course, constant and at least as thorny a problem as any piece of military hardware—Russia can quickly put large numbers of ground forces into Estonia and protect them from its own territory. NATO, however, remains superior in every measure. If political will is intact, and the alliance is willing to run the risk of nuclear war by attacking extensive targets in Russia, the Russian invasion is doomed. Like in 2015, Article 5 obligations are upheld and Russian territory is targeted, and, like in 2015, NATO compels a Russian retreat before a combined arms campaign is required. Figure 6.2 summarizes the Russian A2AD threat to force projection.

Figure 6.2
Russian Anti-Access and Area-Denial Threat to Force Projection



RAND RR1359/1-6.2

Iran

Two Iran scenarios, one set in 2015 and the other in 2025, describe conflicts in which the United States attempts to overcome Iranian efforts to close the Strait of Hormuz. In both of those instances, the war begins when the United States embarks on a bombing campaign to destroy Iran’s nuclear program. A third scenario briefly depicts a similar conflict, also set in 2025, in which Iran has a small number of

missile-deliverable nuclear weapons. In this case, Iran closes the strait in response to announced sanctions rather than a U.S. attack.

Nonnuclear Iran–United States, 2015

In the 2015 case, the United States can compel Iran to stand down in a matter of weeks with few losses. U.S. force projection—particularly, U.S. airpower and the threat of ground invasion—simply overmatches Iran. The United States can operate short-range strike aircraft from basing locations close to the strait, a boon to its ability to target and suppress the ships and missiles that Iran requires to threaten shipping. Iran cannot threaten these sanctuaries in a significant fashion, although it has some success with irregular attacks and aims its inaccurate ballistic missiles at soft targets in an effort to intimidate America’s Persian Gulf–state 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. Road-mobile ballistic missiles, ASCMs, fast-attack craft, and minelayers—all require persistent air patrols to suppress. Iranian air defenses have to be addressed to reduce the threat to patrolling aircraft. Importantly, in this scenario, demonstrated air dominance 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 can sustain a threat to Strait of Hormuz shipping for a considerably longer period; even with air superiority, hunting for fleeting targets from the air is an extremely challenging task. Iran also has some irregular escalation options—such as sponsoring terror attacks against local U.S. allies—that it does not exercise.

Nonnuclear Iran–United States, 2025

The 2025 case shares an outcome with the 2015 case—the United States can compel Iran to stand down. This future campaign, however, is significantly more challenging. It takes twice as long and involves significantly greater air and naval losses, and the United States never fully defeats Iran’s A2AD capabilities. Ultimately, the United States

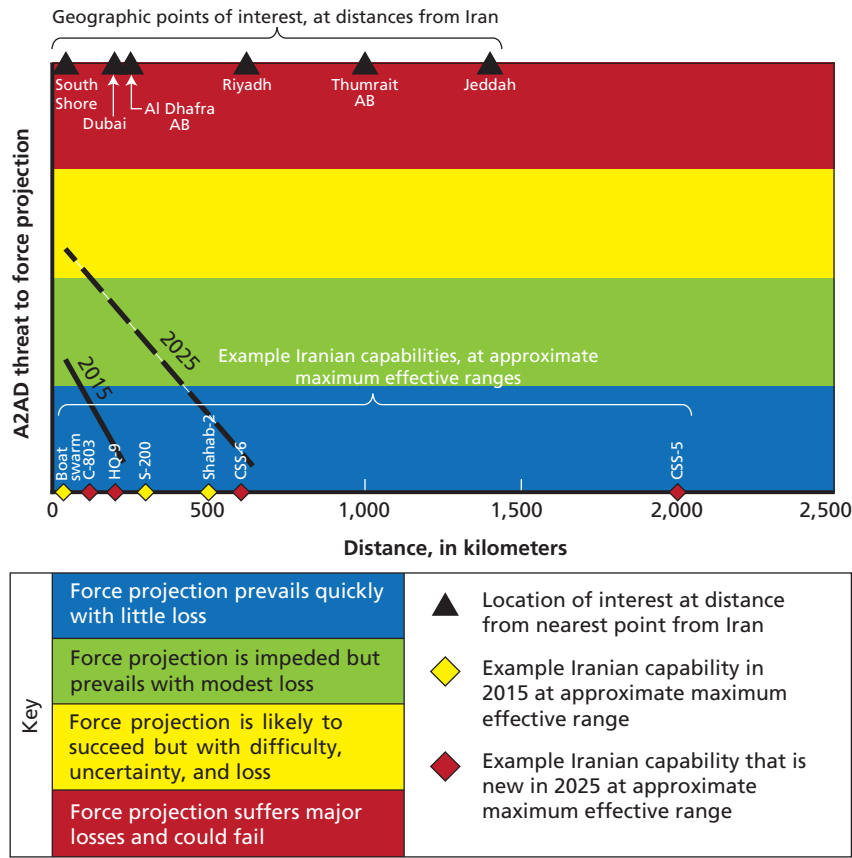
is forced to prepare to escalate to regime change, a move that leads Tehran to cede the fight. The greatest change is the increase in Iran's missile capabilities and capacity, both ballistic and cruise, as well as modest increases in its IAD capabilities. Greater numbers of more-accurate SRBMs and MRBMs enable Iran to pose a potent threat to fixed regional targets, forcing the United States to operate from airbases outside SRBM range and intimidating local U.S. partners. Iran's ISR is still comparatively weak, but its ASCMs are capable, and Iran can find and target U.S. ships with irregular means, exacting a significant toll on U.S. navy ships 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 shelter them.

Nuclear Iran–United States, 2025

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 enjoys escalation dominance over a nonnuclear Iran, a strategic advantage that is ultimately the key to unlocking the operational A2AD challenge at 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 would seem to threaten the Iranian 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. The two sides battle to a stalemate. In the other case, the United States embarks on a comparatively unconstrained effort very similar to the campaign in the nonnuclear 2025 case. The conflict spirals out of control and leads to a nuclear exchange. Figure 6.3 illustrates the Iranian A2AD threat to force projection for all three scenarios.

Figure 6.3
Iranian Anti-Access and Area-Denial Threat to Force Projection



RAND RR1359/1-6.3

Important Differences

These scenarios highlight differences both in adversary capabilities and in the anticipated application of those capabilities.

A glance at the summary figures tells a clear story about differences in the A2AD threat over distance and over time. China presents the gravest danger now and in the future, and both Russian and Chi-

nese capabilities substantially exceed those of Iran in both time frames. Those figures do not, however, capture a perhaps more fundamental capability difference: nuclear weapons. Chinese and Russian possession of nuclear weapons—of a capability for dramatic escalation—has a tremendous influence on the U.S. military approach to those conflicts and, in effect, strengthens the adversaries’ conventional A2AD capabilities. This is not true of the baseline Iran scenarios (2015 and 2025), and the comparatively free hand given to the United States is a boon. The nuclear Iran case (2025) underlines the effect that this threat of nuclear escalation can have.

These adversaries also employ their A2AD capabilities in ways that create fairly distinct operational challenges for the United States. In the most-general terms, China uses A2AD as an umbrella for overwater aggression. Russia uses A2AD as an umbrella for overland aggression. Iran asserts itself from within its own borders. The overwater and overland cases place different premiums on U.S. capabilities, although core elements of the threat—advanced air defenses and long-range strike—are the same. It is the Iranian case that is the outlier. The A2AD network itself is the same instrument—or at least the central instrument—used to perpetrate the aggression in question. And one of the signal instances of actual Iranian force projection was the use of irregular forces launching attacks from within neighboring states.

These differences indicate that, although A2AD is an overarching challenge for the U.S. military, not all potential adversaries that employ it are cast from the same mold, and the differences illustrate the challenge of crafting a cohesive operational and strategic response.

Major Common Elements

Three major common elements are evident in the scenarios:

1. The A2AD capabilities of important potential adversaries are likely to increase in significant ways over time relative to U.S. force-projection capabilities, threatening U.S. strategic inter-

ests. The changes posited in these scenarios are well within the bounds of reasonable developments for these countries.

2. Adversaries' ability to conduct A2AD at distance is likely to increase, to the detriment of U.S. force projection.
3. The U.S. response under current strategy and operational approaches to defeating A2AD could lead to conflict escalation and, in some cases, increased risk of nuclear war. Other approaches are discussed in Volume I.

The Adversaries Matter, and They Are Getting Better

The regions and stakes in these scenarios are strategically significant, and the opponents are plausible. This is no accident—we selected China, Russia, and Iran for this very reason. It is nevertheless worth making the simple observation that these potential conflicts need to be accounted for in defense planning. The stipulated hostilities are and, one hopes, remain unlikely, but, in each instance, the current goals and interests of the United States and its allies are clearly in conflict with the adversaries'. The posited challenges, if unanswered or if successful, would have far-reaching consequences for the United States, not least on the credibility of America's defense commitments to allies, both implied and explicit, both regional and global. Even absent a war, a shift in the perceived military balance and the likely outcome of any conflict could be damaging.

Such a shift is exactly what the 2015 and 2025 scenarios illustrate. The degree and consequence differ from case to case, but, in each instance, the adversaries' capabilities increase relative to U.S. force projection. Each 2025 conflict is longer and more costly to the United States than its 2015 counterpart.

Some of the major drivers of this degraded U.S. position are the same in each case: more and more-capable ballistic and cruise missiles. In both the Taiwan and SCS cases, we see U.S. airbases and surface ships under greater threat in 2025 than in 2015. The same is true for NATO airbases in the Estonia case and for U.S. operating locations around the Persian Gulf in the Iran case. The missiles impose losses, lengthen the conflicts, and compel the United States to target the launchers and the C4ISR that supports them and to operate from

greater distances. Telling improvements are also made in C4ISR and in air defenses, to very similar effect.

It must be emphasized that these and other gains in capability attributed to the adversaries in 2025 are well within the realm of the possible. We invented no new technologies. In fact, simply having more of existing capabilities—such as a larger inventory of MRBMs—was a central difference for China. Russia made modest use in 2025 of systems said to be in current development, while Iran’s capabilities were significantly bolstered with missiles available in 2015 to China.

Anti-Access and Area-Denial Effectiveness Declines over Distance and Increases over Time in Significant Ways

Each scenario, in both 2015 and 2025, shows that adversary ability to threaten U.S. forces diminishes as distance increases from the adversary’s homeland. This ability, however, increases over that decade, to important effect. The A2AD-versus-force projection figures in each section tell this story plainly, but the ability deserves emphasis. In two cases—China–Taiwan and Russia–Estonia—this A2AD umbrella enables aggression in the near abroad. Notably, China is less successful in the SCS, where it lacks such an umbrella 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 the U.S. response.

The consequence of extended-range A2AD is seen in the contrast between the 2015 Taiwan and SCS cases. In the Taiwan scenario, Chinese air defenses and cruise missiles based on the mainland cover the strait and much of Taiwan. Tactical air, also operating from the mainland, extends an umbrella that threatens U.S. strike aircraft and surface ships. These and other elements—Chinese surface ships and submarines—raise costly close-in barriers to U.S. efforts to get at the crux of the Chinese challenge, the ships enforcing the blockade. Importantly, they also shelter China’s means to counter U.S. access to the region. Mainland-based ballistic missiles, cruise missile–carrying bombers, and the C4ISR that supports them allow China to hit at the U.S. ability to roll back the blockade. These assets target U.S. airbases and surface ships, including aircraft carriers.

This mainland-based A2AD umbrella does not meaningfully extend to the SCS, to the extent that the United States can initially forgo attacks on the mainland altogether. Tactical air cannot easily cover Chinese ships, and the main U.S. bases are out of reach of most ballistic missiles. China is significantly less effective as a result.

In both Chinese scenarios, as well as with Russia and Iran, the adversary is more effective at range in 2025 than in 2015 in ways that significantly shape the conflicts' outcomes. To cite one Chinese example, all U.S. regional airbases come under threat in 2025, leading to greater U.S. losses. Iran and Russia can likewise mount deeper, more-sustained attacks on fixed facilities. The relative increase in capability is perhaps most notable in the Iranian case: Airbases and ship operating locations that had once been virtual sanctuaries are now held at risk.

The U.S. Response to Anti-Access and Area Denial Leads to Escalation and Increased Strategic Risk

In each scenario, in order to overcome A2AD, the United States launches extensive conventional strikes against the adversary's homeland. In general terms, this is escalatory: Regional aggression against a U.S. ally or deployed U.S. forces is met with a broad U.S. attack. There are also operational and tactical elements that are escalatory because U.S. target sets (national C2, IADS, and ballistic missiles) either are or enable strategic assets. In those cases in which the adversary has nuclear weapons, the potential consequences of uncontrolled escalation are immense. The United States could, notionally, attempt to defeat A2AD at a local level, but that is not feasible in these cases and becomes even less feasible over time as adversary capabilities improve, unless fundamentally new capabilities are developed.

In the Taiwan scenarios, the United States is compelled to bomb (and use cyberattacks) extensively on the Chinese mainland from the moment hostilities begin. The chief objective is to destroy those elements of the Chinese kill chain that allow China to locate and attack U.S. forces. C4ISR assets—communication networks, OTH radar,

and control of satellites—that will let China wield its forces to the best possible effect are all hit.¹

These targets, however, all have strategic, as well as operational, applications. National C2 links control nuclear, as well as conventional, forces. The air defense that must be struck in order to attack these targets also protects nuclear and leadership targets. U.S. intent is in danger of being misinterpreted and, indeed, in the 2025 case, it is: U.S. strikes inadvertently destroy some of China's nuclear missiles, leading to an especially dangerous situation.

In the SCS scenarios, China is less able to strike U.S. assets from the mainland and so U.S. ROE initially bars mainland attacks. In both 2015 and 2025, however, such strikes eventually take place in response to local Chinese military successes. These attacks never push participants past the nuclear threshold but do induce China to escalate with other means available to it, principally cyber and ASAT attacks.

Russia poses a somewhat different challenge. Here, the chief escalatory risk comes from the perceived need to attack Russia's IADS. Air-defense missiles and radars in Russia, including those in Kaliningrad and some based near St. Petersburg, provide an umbrella over the Baltics. NATO forces must either cede the air or accept the danger associated with bombing around Russia's second city. Despite a Russian nuclear policy that, unlike China's, allows for the possibility of first use, NATO undertakes an extensive SEAD campaign in both 2015 and 2025.

The probability and consequence of escalation in the course of overcoming A2AD is less marked with Iran so long as nuclear weapons are not involved. The discussion of a nuclear Iran in 2025 offers a sharp contrast. In one alternative outcome, the United States is deterred from any steps that might be interpreted as escalatory and thus is severely limited in its ability to prosecute the fight in the strait. In the other alternative, the United States takes the fight to the Iranian regime and triggers a nuclear response.

¹ As it happens in these scenarios, the U.S. efforts in this regard are not wholly successful. China can locate and strike U.S. surface ships despite early attacks on its kill chain.

It is worth noting one escalation dynamic that did not pertain in any of the scenarios, although it could in alternative cases: U.S. preemption. The United States, particularly against an adversary like China, might be highly motivated to strike at the first if hostilities seem likely. This is because the operational benefits of destroying an adversary's kill chain before it can be put into action could be enormous: Remove the adversary's ability to find and hit oneself, and ultimate success is all but assured; fail (or wait), and the strike assets needed to overcome A2AD might not survive. In a crisis, this is a dangerous dynamic.

Conclusion

These major common elements do not exhaust the similarities among the scenarios. Nor do they trivialize the important strategic and operational differences in these contests. They do, however, seem uniquely significant.

The first speaks directly to this volume's central hypothesis: that the A2AD threat to U.S. force projection is growing more severe in critical regions. The second is closely related; it suggests that a change in strategic geography could attend a shift in the force projection/A2AD balance. The last illustrates a further reason that the United States' current military strategy is undesirable with respect to A2AD.

These scenarios suggest the need for a change in the United States' approach to A2AD, lest the military superiority that it has long enjoyed erode. They indicate a growing danger that adversaries will use A2AD as a shield behind which they can commit aggression. However unlikely war with China, Russia, or Iran might be, erosion of the United States' ability to bring forces to bear in their regions and against them could have deleterious geostrategic consequences. U.S. deterrence would be weakened. 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.

Together, Volume I and this report paint an unfavorable picture of the United States' ability to alter this trajectory with more of the same investments. Fortunately, as Volume I makes clear and as is summarized in the introduction to this volume, the United States has the opportunity to pursue a viable alternative strategy, one that exploits U.S. advantages to prevent international aggression.

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This volume describes nine warfighting scenarios, some set in 2015 and some set in 2025. The principal purpose of these scenarios is to test the hypothesis that the anti-access and area-denial (A2AD) threat to U.S. force projection is growing more severe in critical regions. The potential adversaries in the scenarios are China, long recognized for its A2AD capabilities, as well as Russia and Iran. Both the 2015 and 2025 scenarios describe plausible U.S. and adversary military actions based on common understanding of *current* operational capabilities and approaches.

The scenarios show that the A2AD capabilities of important potential adversaries are likely to increase in significant ways over time, threatening U.S. strategic interests. In particular, adversaries' ability to conduct A2AD at distance is likely to increase, to the detriment of U.S. force projection. Further, the U.S. response under current strategy and operational approaches to defeating A2AD could lead to conflict escalation and, in some cases, increased risk of nuclear war.

This volume is a companion to *Smarter Power, Stronger Partners: Exploiting U.S. Advantages to Prevent Aggression* (by Terrence K. Kelly, David C. Gompert, and Duncan Long, Santa Monica, Calif.: RAND Corporation, RR-1359-A, 2016).



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