



U.S. Military Capabilities and Forces for a Dangerous World

Rethinking the U.S. Approach to Force Planning

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Preface

Research done at the RAND Corporation and elsewhere over the past several years has identified some serious shortcomings in the ability of programmed U.S. forces to meet emerging challenges. Prominent among these challenges are those posed by the growth of advanced anti-access/area denial threats in the arsenals of U.S. adversaries, Russia's use of military power against neighboring European states, North Korea's development of nuclear weapons, and the spread of violent Salafist-jihadi ideology with the emergence of the quasi-state Islamic State in Iraq and Syria (ISIS). Individually, each of these developments places stress on U.S. and allied military capabilities. Collectively, they represent the major elements of an international security environment that is more complex and more dangerous than that to which Americans have been accustomed since the end of the Cold War.

These developments should be important factors in the Trump administration's review of National Defense Strategy. They should also prompt a reconsideration of the Budget Control Act of 2011, which became law before some of these threats became manifest. Clearly, the Trump administration will need to reassess the nation's defense strategy, posture, and program with an eye toward finding a better balance than exists today between the ambitions embodied in the strategy and the resources devoted to it. This report is offered as a contribution to that effort.

This report should be of interest to defense policymakers, practitioners in the executive and legislative branches, analysts, the media, experts in nongovernmental organizations, and those concerned with defense planning and the role of the United States in international security affairs.

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Summary

The state of the U.S. armed forces today is not so much debated as it is debatable.¹ A range of beliefs is held, and these beliefs are articulated with greater or lesser degrees of authority. However, the arguments never seem to converge toward resolution. As recently as March 2014, then–Secretary of Defense Chuck Hagel asserted that, provided U.S. forces were funded at the levels called for by the administration’s pending budget request, those forces would be “capable of simultaneously defending the homeland; conducting sustained, distributed counterterrorist operations; and in multiple regions, deterring aggression and assuring allies through forward presence and engagement.” He went on to state that if deterrence should fail, “U.S. forces could defeat a regional adversary in a large-scale multiphased campaign, and deny the objectives of—or impose unacceptable costs on—another aggressor in another region.”² At the same time, then–Gen. Martin Dempsey, the chairman of the Joint Chiefs of Staff, stated that, notwithstanding planned investments in U.S. military capabilities, he expected “the risk of interstate conflict in East Asia to rise, the vulnerability of our platforms and basing to increase, our technology edge to erode, instability to persist in the Middle East, and threats posed by extremist organizations to endure.”³ Within Congress, some elected officials decry the poor state of readiness of U.S. forces and point with alarm to growing threats from China, Russia, North Korea, Islamic State in Iraq and Syria (ISIS), and elsewhere. At the same time, other voices in Congress insist that the U.S. Department of Defense (DoD) budget should be reduced substantially.

Many reasons can be cited for the poor quality of this “debate” about the state of the U.S. armed forces, but one reason surely is that Americans no longer have a credible and widely agreed-on standard against which to measure the adequacy of forces. During the Cold War, Americans always had the forces (both conventional and nuclear) of the Soviet Union and scenarios depicting Soviet aggression against NATO or an attack on the United States itself as standards. And following the collapse of the Soviet Union in 1991, U.S. general purpose forces were evaluated against the requirement to be able to fight and win conflicts against two regional adversaries, such as Iraq and North Korea, in overlapping time frames.

DoD has continued to use that Two Regional Wars standard, although it now bears little relationship to what the administration and the nation expect the force to be ready and able to do. Consider the following:

¹ By *state of the armed forces*, we refer to the extent to which the force, today and in the future, would be able to carry out the missions for which it is directed to prepare or which it might reasonably be called upon to undertake.

² Chuck Hagel, *Quadrennial Defense Review*, U.S. Department of Defense, March 4, 2014, p. 22.

³ Hagel, 2014, p. 61.

- Important national interests today are being challenged by two major powers—Russia and China—that pose operational and strategic challenges that far outstrip those posed by the regional adversaries that animate DoD’s current force planning construct.
- With its growing arsenal of nuclear weapons and ballistic missiles, North Korea today presents threats for which U.S. and allied forces lack satisfactory answers.
- Despite the previous administration’s earlier plans and expectations, U.S. forces are deployed in significant numbers in both Afghanistan and Iraq, striving to help the governments of those countries re-establish control over large areas of their own territories.
- Although the United States and its allies and partners have made considerable headway in blunting the threat posed by al Qa’ida and its affiliates, U.S. forces must expect to be engaged in the struggle with Salafist-jihadi groups, such as ISIS, globally for many years to come.

In short, the actual security environment in which U.S. forces are operating and for which they must prepare is, in important ways, more complex and more demanding than the one that heretofore has been used for developing and evaluating them. **This disjuncture is partly to blame for the fact that the United States now fields forces that are, at once, larger than needed to fight a single major war, failing to keep pace with the modernizing forces of great power adversaries, poorly postured to meet key challenges in Europe and East Asia, and insufficiently trained and ready to get the most operational utility from many of its active component units.** Put more starkly, assessments in this report will show that U.S. forces could, under plausible assumptions, lose the next war they are called upon to fight, despite the United States outspending China on military forces by a ratio of 2.7:1 and Russia by 6:1. The nation needs to do better than this.

Adopting a force planning construct that better reflects the realities facing U.S. forces and stands some chance of gaining broad acceptance by stakeholders in the defense community cannot, by itself, remedy all that ails today’s forces. However, it can help. An agreed standard of performance for the forces as a whole is a necessary predicate for any meaningful debate about the adequacy of any defense program. And DoD’s continued adherence to the two-war criterion has hamstrung its own planning and its articulation of priority needs by placing something of a floor under its force structure, crowding out investments in important modernization projects.

DoD should consider adopting a force planning construct that more clearly reflects the primary security challenges facing the United States today. We recommend any of the following three, all of which were developed from assessments of the demands of scenarios that involve one of five adversaries: China, Russia, North Korea, Iran, and Salafist-jihadi groups. We recommend the following force planning constructs for consideration:

- **One Major War: Defeat the forces of any single adversary, including either of the major powers (China or Russia), in a localized conflict.** The joint force that we judge to be appropriate for this force planning construct is developed by sizing and equipping each major force element—Army combat brigades, U.S. Air Force (USAF) and U.S. Marine Corps (USMC) fighter squadrons, U.S. Navy (USN) carriers, and so forth—so that it can meet the demands posed by the most stressing scenario within the portfolio for that force element. As examples, the Army’s brigade combat teams (BCTs) in our One Major War force are sized to meet the demands of a Korea scenario but equipped

to successfully combat Russian ground forces; USAF fighter squadrons are sized by the demands of a fight against Russian forces in Europe and equipped to successfully fight Chinese forces. The resulting force would be smaller than today's and would cost marginally less, but should be capable of defeating aggression by any adversary under plausible conditions.

- **One Major and One Regional War: Defeat the forces of one major and one regional adversary (i.e., North Korea or Iran).** We develop this force by providing the capabilities and capacity called for by the most-demanding scenario (as above) and the third most-stressing scenario for each force element. Some elements of this force would be larger than today's.
- **Two Major Wars: Defeat the forces of any two adversaries.** We develop this force by providing the capabilities and capacity called for by the two most demanding scenarios for each force element. Most elements of this force would be larger than today's, and it would cost considerably more than today's defense budget to sustain it.

Table S.1 shows the size of each of the major force elements called for by each of these three force planning constructs, comparing them with the forces called for in the fiscal year (FY) 2016 future years defense plan (FYDP).⁴ In addition to meeting the demands of potential future conflicts, **each force is sized to provide a sustained level of forward presence in key regions, to conduct a campaign of indefinite duration against Salafist-jihadi groups worldwide, and to defend the U.S. homeland.**

In FY 2017, DoD was authorized to spend \$591 billion, which included a base budget of \$532 billion, plus funds budgeted under the Overseas Contingency Operations account. This amounted to approximately 3.2 percent of the 2016 GDP. We estimate that the force depicted earlier under the One Major War force planning construct, enhanced with a wide range of modernized systems, improved base infrastructure, and upgrades to readiness, could be fielded and sustained for an average annual cost, in FY 2017 dollars, of \$583 billion, or 3.2 percent of the estimated GDP in 2024—figures roughly comparable to the cost of today's force. These cost estimates include costs for modernizing U.S. strategic nuclear forces and increasing the size of the U.S. special operations forces (SOF). Our One Major War force represents a deliberate trade of force capacity for improved capabilities. Such a force should ensure that U.S. forces could prevail over the force of any future adversary, albeit at the cost of reduced capacity for long-term stability operations and, potentially, reduced ability to deter aggression by a second adversary when the force was committed to a large-scale operation.

If the nation decided that it wished to have more insurance against aggression by multiple adversaries, it could opt for either of the forces depicted under the One Major War Plus One Regional War or the Two Major Wars criteria. We estimate that the smaller of these two forces could be fielded and sustained for an average annual cost of \$610 billion, or roughly 3.3 percent of GDP in 2024. The Two Major Wars force could be fielded and sustained for an average annual base budget of around \$628 billion, or 3.4 percent of GDP in 2024.

⁴ Because of limitations on the scenario data and analytical tools available to this project, we have not attempted to size important elements of the force, such as navy surface combatants, airlift and aerial refueling aircraft, combat aviation brigades, maritime patrol aircraft, and other ISR assets. For the purposes of estimating the cost of each force, we have assumed that these remain generally as programmed in the current DoD plan.

Table S.1
Force Structures for Three Alternative Force Planning Constructs

	Force Element Type	Program (FY 2019)	One Major War	One Major War + One Regional	Two Major Wars
USAF	Fighter squadrons	51	48	64	69
	Heavy bomber squadrons	9	9	14*	16*
	Intelligence, surveillance, and reconnaissance (ISR) orbits-high end	?	8	12	12
Navy	Aircraft carriers	11	7	10	11
	Carrier wings	10	6	9	10
	Amphibious ships	33	33	45**	48**
USMC	Infantry battalions	24	21	24	27
	Fighter squadrons	22	18	20	23
Army	BCTs (active component)	30	27	30	31
Cost***		\$591B	\$583B	\$610B	\$628B
% of gross domestic product (GDP)		3.2%	3.2%	3.3%	3.4%

NOTES: These numbers are based on the authors' estimates using internal analyses and unclassified sources. The numbers that DoD would use are undoubtedly somewhat different. Our purpose in presenting them is not to attempt to provide definitive estimates of need, but rather to show a concrete example of how the approach we recommend would be applied and to provide a basis for first-order comparisons of the size and cost of the resulting forces.

* = No practical options exist to field a new bomber prior to the B-21 in the late 2020s. Therefore, we assume therefore that five to seven squadrons "swing" from the first to the second conflict.

** = Because of their cost, these forces do not build amphibious ships above the level of 33. We assume that 12 to 15 ships "swing" from the first to the second conflict.

*** = Annual cost in FY 2017 dollars, including \$60B per year in spending for overseas contingency operations.

As important as force size is, the qualitative dimension—the capabilities of the force—merits equal consideration. In most respects, addressing the challenges posed by the most-capable adversaries calls not for a larger U.S. force but rather for a force equipped with appropriate modern weapons and support assets that is also postured for responsive and resilient operations in theaters of potential conflict. Table S.2 summarizes the most-important force enhancement initiatives that we included in all three of our alternative forces. These are all over and above the modernization and posture efforts programmed in today's future years defense program.

The approach advocated in this report stems from the conviction that force planning and resource allocation in DoD have placed too little emphasis on modernizing the capabilities, posture, and operating concepts of U.S. forces for power projection. The result—a force that is insufficiently robust to face the challenges posed by the most-capable adversaries—poses growing risks to the viability of the United States' most-important security relationships. Adopting the nested, "start small" approach to force planning suggested in this report would certainly not guarantee that the nation would field forces better suited to the demanding security envi-

Table S.2
Priority Enhancements to U.S. Forces and Posture

China
<ul style="list-style-type: none"> Accelerated development and fielding of a longer-range, fast-flying radar-homing air-to-surface missile* and a longer-range air-to-air missile* Forward-based stocks of air-delivered munitions, including cruise missiles (e.g., joint air-to-surface standoff missile and joint air-to-surface standoff missile-extended range, long-range anti-ship missile)*, surface-to-air missile suppression missiles (e.g., homing anti-radiation missile, miniature air launched decoy)*, air-to-air missiles (e.g., AIM-9X and AIM-120)* Prepositioned equipment and sustainment for ten to 15 platoons of modern short-range air defense systems (SHORADS) for cruise missile defense Additional base resiliency investments, including airfield damage repair assets and expedient aircraft shelters, and personnel and equipment to support highly dispersed operations Accelerated development of the Next-Generation Jammer* A high-altitude, low-observable unmanned aerial vehicle system* More resilient space-based capabilities (achieved by dispersing functions across increased numbers of satellites and increasing the maneuverability, stealth, and “hardness” of selected assets)* Counter-space systems, including kinetic and non-kinetic weapons (e.g., lasers, jammers)*
Russia
<ul style="list-style-type: none"> * = Items listed under “China” that are marked with an asterisk Three heavy brigade combat teams and their sustainment and support elements forward based or rotationally deployed in or near the Baltic states One Army fires brigade permanently stationed in Poland, with 30-day stock of artillery rounds; one additional fires brigade equipment set prepositioned Forward-based stocks of artillery and multiple launch rocket system rounds; anti-tank guided missiles Forward-based stocks of air-delivered anti-armor munitions (e.g., SFW/P3I) Station or rotationally deploy eight to 12 platoons of SHORADS forces in NATO Europe Increased readiness and employability of mechanized ground forces of key NATO allies
Iran
<ul style="list-style-type: none"> Improved, forward-deployed mine countermeasures High-capacity close-in defenses for surface vessels
North Korea
<ul style="list-style-type: none"> Improved ISR systems for tracking nuclear weapons and delivery systems Exploratory development of boost-phase ballistic missile intercept systems Continued investments to improve the reliability and effectiveness of the GBI system to protect the United States
Salafist-Jihadi Groups
<ul style="list-style-type: none"> Improved intelligence collection and analysis capabilities and capacity Acquire next-generation vertical takeoff and landing aircraft Acquire light reconnaissance and attack aircraft Develop powered exoskeleton (also known as the Talon Project) Develop swarming and autonomous unmanned vehicles

ronment we are in, but it could help to prompt a more fruitful and substantive debate regarding the appropriate level and allocation of resources to the nation's defense. Specifically, it could help by

- better aligning force planning with a post-post–Cold War security environment in which the United States faces not only regional adversaries but also great power and non-state adversaries
- spelling out more clearly the relationship between inputs to the defense program (dollars, manpower) and outputs (fielded military capabilities and reduced strategic and operational risks)
- highlighting the investment needs of highest priority for specific scenarios and mission areas
- providing a vehicle for generating concrete alternative defense programs at different budget levels, rather than a single, “take it or leave it” planning criterion and associated program.

What differentiates the three forces developed in this report from one another, other than their cost, is the degree of insurance that each provides against the possibility of multiple, simultaneous wars or other demands that cannot yet be foreseen. In a world as turbulent as today's, a sense of humility about one's ability to foresee future challenges and demands looks like the beginning of wisdom. This argues strongly in favor of either the Two Major Wars or the One Major and One Regional War force described earlier as the more-prudent options for the United States. Given the added robustness and deterrent value of these two forces in comparison to the One Major War force, and the comparatively modest additional cost (0.1 to 0.2 percent of GDP), the choice seems obvious.

Acknowledgments

The authors would like to thank a host of RAND colleagues for their roles in helping this work reach fruition. Andy Hoehn, senior vice president for research and analysis at RAND, merits first mention because he first suggested that a study be done assessing what the U.S. defense program would look like if the nation's defense strategy altered its prescription that U.S. forces in aggregate be capable of fighting and winning two wars against regional adversaries in overlapping time frames. Dick Neu, Howard Shatz, and Susan Marquis reviewed our proposal to RAND for corporate funding to support such a study, and they found that it had merit. RAND President Michael Rich approved the funding. We thank them for the confidence that they expressed in us and hope that the resulting report meets their expectations.

Once we began our research, Seth Jones, director of RAND's International Security and Defense Policy Center, was charged with overseeing our progress and shepherding the effort through the peer review and quality assurance processes. In addition to reviewing the draft himself, Jones did an admirable job of choosing reviewers, adjudicating our responses to their suggestions, and keeping the process moving. The wide-ranging nature of the research called for a team approach to the peer review, with subject matter experts providing in-depth reviews of each of the regional chapters and an overarching review of the draft in its entirety. Michael O'Hanlon, senior fellow and co-director to the Center for 21st Century Security and Intelligence at The Brookings Institution, performed that latter function and did so with his accustomed expertise and aplomb. Our other formal reviewers, all RAND colleagues, were Cortez Cooper, Michael Johnson, Bruce Bennett, Heather Williams, Andrew Liepmann, and Steven Berner. Caitlin Lee also reviewed the draft and provided assistance with some of the graphics. We are grateful to all of them for their careful attention to our work.

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Abbreviations

A2/AD	anti-access/area denial
ABCT	Armored Brigade Combat Team
AFB	Air Force Base
AFSO	Air Force Special Operations
AFSOC	Air Force Special Operations Command
AFV	armored fighting vehicle
AMRAAM	advanced medium-range air-to-air missile
ARSOF	U.S. Army special operations forces
ASCM	anti-ship cruise missile
ASEAN	Association of Southeast Asian Nations
ASuW	anti-surface warfare
ASW	anti-submarine warfare
ATACMS	Army Tactical Missile System
ATGM	anti-tank guided missile
AWACS	Airborne Warning and Control System
BACN	Battlefield Airborne Communications Node
BCT	brigade combat team
BSRF	Black Sea Rotational Force
CAB	combat aviation brigade
CAR	Central African Republic
CAS	close air support
CBRN	chemical, biological, radiological, and nuclear
CCP	Chinese Communist Party

CEB	combined effects bomblets
CNO	computer network operations
CONUS	Continental United States
COP	common operating picture
CSG	carrier strike group
CVBG	carrier battle group
DARPA	Defense Advanced Research Projects Agency
DEW	directed energy weapon
DMZ	demilitarized zone
DoD	U.S. Department of Defense
DPICM	dual-purpose improved conventional munitions
DPRK	Democratic People's Republic of Korea
EB	Expeditionary Base
EDCA	Enhanced Defense Cooperation Agreement
EO	electro-optical
ERI	European Reassurance Initiative
EW	electronic warfare
FARC	Revolutionary Armed Forces of Colombia—People's Army
FID	foreign internal defense
FOL	forward operating location
FONOP	Freedom of Navigation Operation
FY	fiscal year
GBI	ground-based intercept
GCC	Gulf Cooperation Council
GDP	gross domestic product
GNA	Government of National Accord
GPS	Global Positioning System
HALO	high-altitude/low-opening
HARM	homing anti-radiation missile

HEMP	high-altitude electro-magnetic pulse
HET	heavy equipment transporter
IBCT	Infantry Brigade Combat Team
IC	Intelligence Community
ICBM	intercontinental ballistic missile
IFPC 2	Indirect Fire Protection Capability Increment 2
INF	Intermediate Nuclear Forces
IO	information operations
IRBM	intermediate-range ballistic missile
IRGC	Islamic Revolutionary Guard Corps
IRGCN	Islamic Revolutionary Guard Corps Navy
IRI	Islamic Republic of Iran
IRIN	Iranian Navy
ISF	Iraqi Security Forces
ISIS	Islamic State in Iraq and Syria
ISR	intelligence, surveillance, and reconnaissance
JASSM	joint air-to-surface standoff missiles
JASSM-ER	joint air-to-surface standoff missile-extended range
JCPOA	Joint Comprehensive Plan of Action
JFVL	Joint Future Vertical Lift
KRG	Kurdistan Regional Government
LACM	land-attack cruise missiles
LCAC	Landing Craft Air Cushion
LNA	Libyan National Army
LNG	liquefied natural gas
LO	low observable
LSRO	long-range standoff weapon
LRASM	long-range anti-ship missile
MALD	Miniature Air Launched Decoy

MANPADS	Man-Portable Air Defense Systems
MARSOC	Marine Corps Special Operations Command
MCM	mine countermeasures
MENA	Middle East and North Africa
MIRV	Multiple Independently Targeted Re-entry
MISG	Military Information Support Group
MLRS	Multiple Launch Rocket System
MPA	Maritime Patrol Aircraft
MPF	Maritime Prepositioned Force
NATO	North Atlantic Treaty Organization
NRO	National Reconnaissance Office
NSS	National Security Space
NSWC	Naval Special Warfare Command
O&M	Operations and Maintenance
OCO	Overseas Contingency Operations
OBOR	One Belt, One Road
ODIN	Observe, Detect, Identify, and Neutralize
OEF-P	Operation Enduring Freedom–Philippines
OIF	Operation Iraqi Freedom
ONR	Office of Naval Research
OPTEMPO	operational tempo
OSD	Office of the Secretary of Defense
P5+1	U.N. Security Council’s five permanent members, plus Germany
PFG	Petroleum Facilities Guards
PGMs	precision-guided munitions
PKK	Kurdistan Workers Party
PLA	People’s Liberation Army
PLAAF	People’s Liberation Army Air Force
PLAN	People’s Liberation Army Navy

PNT	positioning-navigation-timing
R&D	research and development
RAF	Royal Air Force
RFAF	Russian Federation Air Force
ROK	Republic of Korea
S&T	scientific and technical
SAM	surface-to-air missile
SCO	Strategic Capabilities Office
SCS	South China Sea
SEA	Southeast Asia
SEAL	Sea-Air-Land; a member of Naval Special Forces trained in unconventional warfare operations
SHORADS	Short-Range Air Defense System
SLBM	submarine-launched ballistic missile
SLV	space launch vehicle
SOAR	Special Operations Aviation Regiment
SOF	special operations forces
SOW	Special Operations Wing
SPMAGTF	Special Purpose Marine Air-Ground Task Force
SRBM	short-range ballistic missile
SSBN	nuclear-powered fleet ballistic missile submarine
SSGN	Ohio-class guided-missile submarine
SSN	nuclear-powered attack submarine
SWCC	Special Warfare Combatant-Craft Crewmen
SWORDS	Special Weapons Observation Reconnaissance Detection System
TALOS	Tactical Assault Light Operator Suit
TBM _s	tactical ballistic missile
TEL	transporter erector launcher
TERN	tactically exploited reconnaissance node
THAAD	Terminal High-Altitude Area Defense

TMD	theater missile defense
TOW	tube-launched, optically-tracked, wire-guided
TSOC	Theater Special Operations Command
UAE	United Arab Emirates
UAV	unmanned aerial vehicle
UCAS-D	Unmanned Combat Air System Demonstration
USAF	U.S. Air Force
USASOC	U.S. Army Special Operations Command
USMC	U.S. Marine Corps
USN	U.S. Navy
USSOCOM	U.S. Special Forces Command
UUVs	unmanned underwater vehicles
VLS	Vertical Launch System
VTOL	vertical takeoff and landing
WMD	weapon of mass destruction
YPG	People's Defense Units (Syria)

The Need for a New Approach to Force Planning

As long as I am president, we will maintain the finest fighting force that the world has ever known. (President Barack Obama, August 31, 2010)¹

America today has the finest [military] the world has ever seen. And . . . I am committed to ensuring that we have the finest [military] tomorrow and every day thereafter. (President George W. Bush, May 25, 2001)²

The Challenge Facing U.S. Forces and Their Capability to Respond

Presidents Obama and Bush (like many of their predecessors) were both correct in their observations that the United States fields the most capable armed forces in the world. And both have made good on their promise to keep U.S. forces number one. But lest such assertions create an unwarranted sense of complacency, we should be clear that many parts of the force are under considerable stress from a prolonged high tempo of deployments; readiness levels generally fall well below historical standards; and modernization in some key capability areas is lagging.

More to the point, for the United States, having the finest force in the world does not, in and of itself, guarantee that those forces will be able to meet all of the demands being placed on them. Since the United States' entry into World War II, this nation has espoused and largely practiced a uniquely ambitious national security strategy. Today, that strategy calls on U.S. military forces to, among other things, deter aggression and coercion by adversary states in several parts of Eurasia; if deterrence fails, to defeat such aggression; to carry out a long-term campaign aimed at containing and, ultimately, defeating Salafist-jihadi groups abroad; and to protect the U.S. homeland. In light of these requirements, **having the world's most capable armed forces can be thought of as a necessary, but not necessarily sufficient, condition for enabling the United States to play the international role it has defined for itself.**

¹ Barack Obama, "President Obama's Address on the End of the Combat Mission in Iraq," The White House, Washington, D.C., August 31, 2010.

² George W. Bush, "Strengthening our Military, Supporting our Veterans," The White House, Washington, D.C., May 25, 2001.

Consider the following realities—some enduring and some new—that bear on the question of the adequacy of U.S. forces today:

- The United States rarely has the luxury of fighting adversaries on the ground of its choosing. Indeed, the reality is quite the opposite: Whether the adversary is a nation-state or a non-state actor, U.S. forces nearly always find themselves fighting far from home and on or close to the adversary’s “home turf,” with all of the associated logistical and cultural disadvantages that entails.
- The United States has interests and allies worth fighting for in multiple parts of the world, and multiple adversaries that pose challenges to those interests. Therefore, U.S. force planners cannot count on being able to fight only one war at a time. Indeed, U.S. forces were conducting two large-scale expeditionary operations from 2003 until very recently. And U.S. forces must plan on having to provide a sizable deterrent presence in key regions, even when conducting a large-scale operation elsewhere.
- As technologies and systems relating to remote sensing, data processing and transmission, precision guidance, autonomy, and a host of other functions proliferate, U.S. forces are finding themselves confronted by adversaries that are gaining mastery over military capabilities analogous to those that enabled U.S. forces to win swift and lopsided victories in the 1990s and early 2000s. North Korea’s development of nuclear weapons adds to this trend.
- With China’s emergence as a major international player and Russia’s recently demonstrated ability and will to use military might in pursuit of a revisionist policy agenda, the United States now faces the challenge of dealing with two great power adversaries.

In short, providing the military power called for by the United States’ ambitious national security strategy, which has never been easy, has recently become considerably more challenging. The coincidence of this new reality with a period of constrained defense budgets has led to a situation in which it is now far from clear that our military forces are adequate for the tasks being placed before them. The significance of this reaches well beyond issues of military planning. This nation’s approach to safeguarding and advancing its security and well-being internationally centers on maintaining strong ties of influence and partnership with its treaty allies. The United States’ unique ability to project large-scale military power into the Eurasian periphery in the defense of common interests provides the foundation for these relationships. It follows that if adversaries perceive U.S. military capabilities as inadequate to the task of deterring and defeating coercion or aggression, the viability of this nation’s entire national security strategy and, indeed, the rules-based liberal order that it has promoted for more than 70 years, will be called into question.

This Report

The purpose of this report is to contribute to a fundamental review of U.S. defense strategy, capabilities, capacity, and resources that is overdue and bound to occur in the wake of the 2016 national elections. The report’s particular focus is to provide and apply a set of force planning constructs that should be used as the overarching criteria for determining the military capabili-

ties, forces, and posture most appropriate for the United States in this new post-post–Cold War security environment. This focus is predicated on three beliefs:

- The force planning construct used by the U.S. Department of Defense (DoD) since the end of the Cold War—essentially, that U.S. forces are to be prepared to fight and win conflicts against two regional adversaries in overlapping time frames—is ill-suited for today’s more-challenging strategic circumstances.
- DoD’s continued adherence to the two-war planning construct has been partly to blame for the erosion of U.S. military readiness and the capabilities needed for keeping abreast of the challenges posed by the nation’s most capable adversaries.
- That ambiguities arising from continued adherence to that construct have contributed to widespread confusion regarding the standards against which U.S. forces are and should be measured. This, in turn, is partly to blame for the muddled state of discourse about defense in the United States today and our less-than satisfactory defense program.

The authors do not presume to judge what the “right” force planning construct is for the United States today. That answer will depend on one’s assessment of the severity and immediacy of the security challenges facing the nation, the ability of the U.S. economy to support various levels of public expenditure, the relative priority that should be accorded to meeting domestic compared with international needs, and a host of other factors. Instead, we posit three alternative force planning constructs (each of which differs from the current one), describe a set of forces that would be appropriate for supporting each construct, and provide estimates of the annual cost for each of these forces. Our alternative force planning constructs call for forces that could (in ascending order of ambition)

- defeat the forces of any single adversary, including either of the major powers (China or Russia), in a localized conflict
- defeat the forces of one major and one regional adversary (i.e., North Korea or Iran)
- defeat the forces of any two adversaries.

In addition to meeting these criteria, each planning construct calls for forces that can deter large-scale nuclear attacks, sustain for an indefinite period a campaign against violent Salafist-jihadi terrorist groups, maintain a reasonable deterrent posture in key regions, and defend the U.S. homeland.

Approach in This Report

To flesh out each alternative planning construct with its associated capabilities, forces, and posture, and to explain the basis for the choices we made regarding these, it is necessary to explore and understand the nature of each major source of demand for future U.S. military capabilities. To do this, we examine scenarios similar to those used by DoD: conflicts involving China, Russia, North Korea, Iran, and Salafist-jihadi groups.³ The following five chapters examine the

³ In testimony before the Senate Armed Services Committee on March 17, 2016, Secretary of Defense Ashton Carter “listed Russia, China, North Korea, Iran, and terrorism as the five evolving strategic challenges that are driving the DoD’s

nature of the challenges posed by each of these adversaries, both today and in the coming five years or so. In four of those chapters, we posit one or more scenarios depicting a representative conflict that could arise between that adversary and the United States, assess the dynamics and outcome of each conflict, and offer insights about the military capabilities, capacity, and posture that seem appropriate for prevailing in these conflict. These assessments draw upon war games and related analyses done at RAND and elsewhere, as well as on published analyses of the capabilities and strategies employed by these five adversaries. Each chapter concludes with a summary of the types of military capabilities that we believe merit increased investment over the coming five to ten years and the size and types of each major force element—the force “building blocks”—called for in each scenario.

As we conceptually build a joint force from these building blocks, we begin with the first of the three force planning constructs described earlier, and we size and equip each type of force element within it to meet the most stressing demand that it faces. So the One Major War force that emerges from our analysis has, as examples, the following features:

- U.S. Air Force (USAF) fighter squadrons are sized and equipped primarily according to the demands of a conflict with Russia—the largest and most challenging threat they would face across our five scenarios.
- The U.S. Navy’s (USN’s) aircraft carrier fleet, by contrast, is sized around meeting the demands of a conflict with China.
- Army brigade combat teams (BCTs) are sized to meet the demands of a conflict against North Korea but equipped to meet those of a conflict with Russia.

Adopting this approach can help to ensure that important “demand signals” for military capacity and capabilities are not lost by choosing a single scenario or pair of scenarios as the basis for sizing and shaping the overall force. Chapter Seven of this volume provides an exemplar force for each of the three force planning constructs described earlier, along with estimates of the annual cost associated with fielding and maintaining each force.

We do not claim that the size of the force building blocks—the U.S. Army and U.S. Marine Corps (USMC) brigades, fighter squadrons, carrier strike groups (CSGs), and other force elements—that emerge from our evaluations of each scenario match those called for in official DoD assessments; in fact, they almost certainly do not. However, we do believe that they represent reasonable estimates of the types and numbers of forces appropriate for the campaigns we envisage in each scenario.⁴ As such, they provide a useful basis for estimating the cost of the forces that each of our three planning constructs might call for. Only when one has a sense of the strategic value of alternative defense postures, the urgency of investing in the sorts of capabilities needed to meet emergent challenges, and the approximate cost of these alternatives can one get beyond vague generalities when debating the appropriateness of one defense posture over another. Our goal is to help those who will engage in the upcoming debate to do just that.

planning and budgeting.” Lisa Ferdinando, “Carter Outlines Security Challenges, Warns Against Sequestration,” *DoD News*, March 17, 2016.

⁴ In any case, there can be no single, “right” force for accomplishing any particular mission. Within limits, trade-offs can be made across capability areas (e.g., precision versus mass; air versus ground) and different operational concepts can be formulated for the conduct of any operation.

Chapter Five differs from the other four in that it is not scenario driven. Rather, it focuses on an adversary—Salafi-jihadists—that takes a range of forms and a unique set of forces that operate against them: those that carry out special operations. That role will continue, and special operations forces (SOF) will play, if anything, an even larger role. Of course, in many instances conventional forces will complement special operations, particularly USAF, when SOF need to bring conventional firepower to bear. Thus, our discussion of SOF focuses on their unique capabilities and the likely cost of those forces.

Organization of This Report

As mentioned earlier, Chapters Two through Five address the demands that the United States' four primary adversaries place on U.S. military forces and capabilities. Chapter Six assesses the demands that could be placed on U.S. forces by ongoing and potential future operations against the most violent Salafist-jihadi organizations, focusing on implications for U.S. Special Operations Command (USSCOM). Chapter Seven then draws together the findings of the preceding chapters by applying our three alternative force planning constructs to the demands and opportunities identified therein. For purposes of comparison, both with today's force and budget and across each of the three alternative forces, we offer the broad outlines of illustrative joint forces and modernization priorities that would be appropriate for each planning construct, along with an estimate of the annual cost for each. Finally, the appendixes provide additional information that has an important effect on the force planning process. Appendix A looks across the range of current and future challenges, as well as opportunities emerging from U.S. research and development (R&D) efforts, to identify potential priorities for DoD's Third Offset Initiative. Appendix B provides an overview of U.S. plans for modernizing its nuclear forces. Finally, Appendixes C and D provide information on the assumptions used to develop our cost estimates and the derivation of the force building blocks for each major force element.

China: Ensuring Access to the Air and Sea Commons and Sustaining Capabilities for Effective Power Projection Operations

Background and Purpose

Recognizing that “important U.S. economic and security interests are inextricably linked to developments in . . . the Western Pacific and East Asia,” the Obama administration announced in 2011 a major foreign and security policy initiative to “rebalance” toward the Asia-Pacific region.¹ By shifting U.S. attention and resources toward the region, the rebalance initiative is intended to strengthen security and stability and to help ensure that the United States remains an important factor in regional affairs. This initiative has directly affected U.S. defense planning. A prominent theme in the Obama administration’s rollout of the rebalance was a determination to “modernize” and enhance the U.S. military posture in the region and to increase efforts aimed at ensuring that U.S. forces will be able to effectively project power into the region well into the future.

The United States has taken steps to strengthen and adapt its security ties with treaty allies Japan, South Korea, Australia, and the Philippines, and is exploring new avenues for security cooperation with India. Washington has also worked to expand its military-to-military ties with Singapore, Indonesia, and, more recently, Vietnam.² Given the enduring importance of the region and the breadth of challenges posed by China’s growing power and aspirations, there is little doubt that future administrations will seek the same general objective.

This chapter charts trends in Chinese defense policies, activities, and defense capabilities and the ways in which they intersect with U.S. interests. It also describes a plausible scenario that highlights the use of Chinese forces against a U.S. partner state as a way of defining what threats the United States might have to face. It concludes with a discussion of what preparing for conflict with China might imply for force planning.

¹ DoD, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, Washington, D.C.: U.S. Department of Defense, January 2012, p. 2; The White House, Office of the Press Secretary, “Remarks by President Obama to the Australian Parliament,” November 17, 2011.

² For an summary of the Australian government’s view of these trends and its 20-year response, see Commonwealth of Australia, *2016 Defence White Paper*, Department of Defence, 2016; for a critical view of this white paper, see Hugh White, “It’s Time We Talked About War With China,” Lowy Institute, March 4, 2016.

High Stakes and Unfavorable Trends

As noted in Chapter One, in an increasingly interdependent world, U.S. security and prosperity depend on the ability to influence actors and shape events beyond our borders. Arguably, no region is more significant for global prosperity and stability than the Asia Pacific. The region plays increasingly important roles in the global economy. The Asia-Pacific region now accounts for more than 40 percent of global gross domestic product (GDP).³ More than 50 percent of U.S. imports come from Asia, and the region takes more than 60 percent of U.S. exports.⁴ And this is not just a story about inexpensive labor occupying the low-end of the value chain. Today, China is, by a wide margin, the world's leading exporter of high-technology manufactured goods.⁵

The rebalance initiative sprang from recognition of the region's growing importance and from deep-seated concerns—in Washington, as well as in allied capitals—that the ability of the United States to underwrite its security commitments in the Asia-Pacific region was eroding in the face of the relentless growth of China's military capabilities. These concerns were (and are) warranted. Since its economy took off in the mid-1990s, China has been pouring resources into its military forces. According to the Stockholm International Peace Research Institute, China's military spending grew by double digits every year from 2000 to 2014, for a total increase of more than 480 percent in real terms over that period.⁶ That spending has been well-focused on the full range of capabilities appropriate for an “active defense” strategy aimed at “winning local wars under informationized conditions”—a strategy that has been interpreted as intended to deter or prevent the United States from effectively defending its interests and allies in the East Asian littoral.⁷

China's military leaders have articulated the objective of gaining sea control over the First Island Chain that encompasses all of its East Asian neighbors, including the littoral states of the South China Sea (SCS). Simultaneously, the Chinese are developing and fielding an array of air, naval, and missile forces to put at risk U.S. and allied military capabilities out as far as the Second Island Chain, which includes the home islands of Japan, the U.S. territory of Guam and the Mariana Islands, and the rest of the Philippine archipelago (see Figure 2.1). China has launched the very ambitious One Belt, One Road (OBOR) trade initiative that is designed to transform trade links between China and its Asian neighbors. These land and sea links are designed to also dramatically increase trade between China and Europe. Although Beijing's strategic motives are primarily economic and political, these enhanced communication links are not without military consequence. Over the next decade or so, China's capacity to project

³ Asian Development Bank, *Key Indicators for Asia and the Pacific 2015*, Manila, Philippines, October 2015.

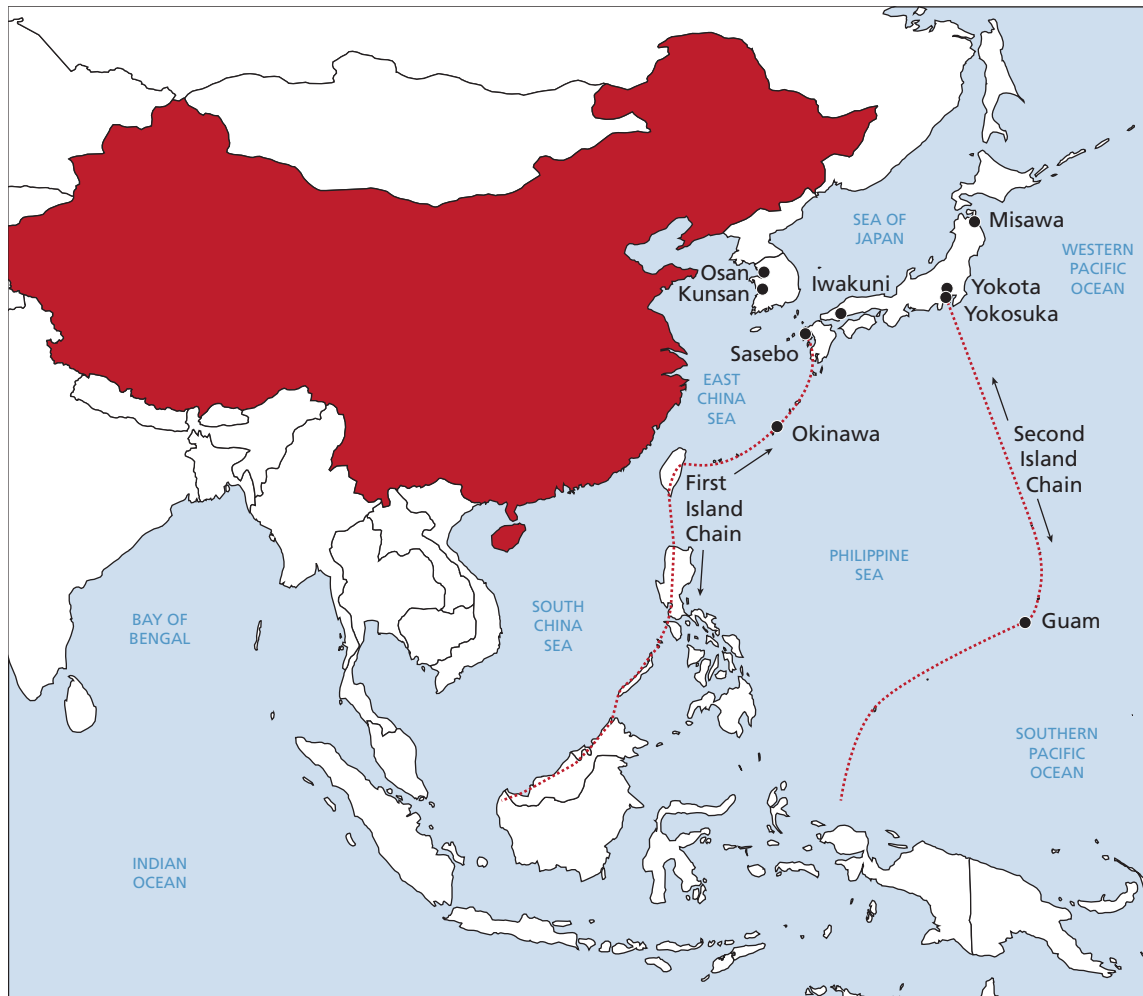
⁴ World Trade Organization, *International Trade Statistics 2015*, Table II.26, Geneva, Switzerland, 2015, p. 89; and John Ward, “United States, Asia-Pacific Partners Look At Ways of Fostering Trade and Economic Growth,” International Trade Administration, U.S. Department of Commerce, 2011.

⁵ China exported \$560 billion in high-technology goods in 2013. Germany was second at \$193 billion; the United States was third at \$148 billion. Russia exported \$8.6 billion worth of high-tech goods in that year. *High-tech goods* are defined as “products with high R&D density, such as aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.” See World Bank Group, “Data, High-Technology Exports,” 2014.

⁶ China's defense spending has continued to grow since 2014, albeit at a somewhat slower rate. See Stockholm International Peace Research Institute, “SIPRI Military Expenditure Database,” spreadsheet, undated, updated as of 2015.

⁷ Xinhua, “China's Military Strategy,” *ChinaDaily.com*, May 26, 2015.

Figure 2.1
The People's Liberation Army (PLA) Demarcation of the First and Second Island Chains



RAND RR1782-2.1

military power through these modernized lines of communication will become an increasingly important national security planning factor, especially for the nations of Southeast Asia (SEA).⁸

China's pursuit of military capabilities suited to countering U.S. power projection operations has been greatly facilitated by the proliferation of many of the sorts of technologies and systems that have given U.S. forces such dominance over those of its regional adversaries in the post-Cold War era: systems for real-time reconnaissance, data transmission and processing, precision guidance, robotics, propulsion, and even stealth technology. As China has mastered these capabilities, it has been able to pose growing challenges to the ability of U.S. forces to

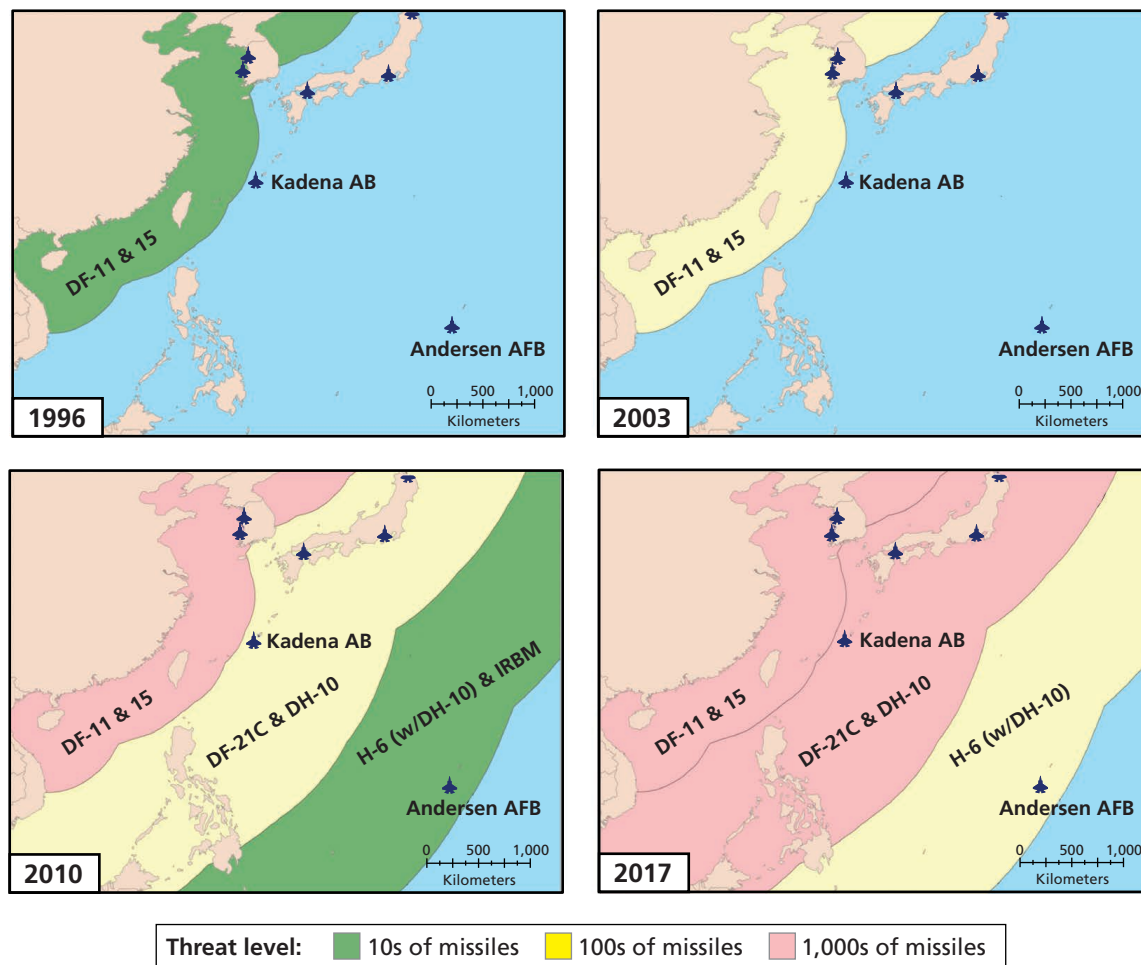
⁸ For a summary and analysis of the strategic and economic implications of Beijing's OBOR initiative, see Tim Winter, "One Belt, One Road, One Heritage: Cultural Diplomacy and the Silk Road," *The Diplomat*, March 29, 2016; "China's One Belt, One Road: Will it Reshape Global Trade?" *The McKinsey Podcast*, July 2016; "One Belt, One Road (OBOR): China's Regional Integration Initiative," European Parliament, Briefing, July 2016.

project power into its region. And this, in turn, has raised questions about the credibility of U.S. security guarantees there.⁹

Key Developments in This Military-Technological Contest

Accurate, long-range missiles. China's long-range missile capabilities have mushroomed over the past 20 years. As shown in Figure 2.2, in 1996, China possessed a force of fewer than 100 short-range ballistic missiles (SRBMs) that could reach only as far as Taiwan. Today, China has thousands of missiles—ballistic and cruise—many of which can reach beyond Guam, which lies 1,700 nautical miles off of the Chinese coast.¹⁰ Because most of these missiles are highly

Figure 2.2
China's Land Attack Capacity Has Grown Substantially



RAND RR1782-2.2

⁹ Portions of this section are drawn from David Ochmanek, *Sustaining U.S. Leadership in the Asia-Pacific Region*, Santa Monica, Calif.: RAND Corporation, PE-142-OSD, 2015.

¹⁰ Eric Heginbotham, Michael Nixon, Forrest E. Morgan, Jacob Heim, Jeff Hagen, Sheng Li, Jeffrey Engstrom, Martin C. Libicki, Paul DeLuca, David A. Shlapak, David R. Frelinger, Burgess Laird, Kyle Brady, and Lyle J. Morris, *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996–2017*, Santa Monica, Calif.: RAND Corporation, RR-392-AF, 2015, pp. 47–54.

accurate, they pose serious threats to their targeted sites—runways, aircraft (both in the open and in shelters), fuel and munitions storage sites, command and control facilities, ports, and other fixed infrastructure.

Commensurate with its burgeoning land attack capacity, China has grown its inventory of ballistic and cruise missiles that can engage surface ships. As a result, forward-based forces on land and at sea can now be vulnerable to being damaged or destroyed before they get to the fight. These ballistic and cruise missiles can be launched from a broad spectrum of air, land, and sea platforms. For example, China's fleet of modernized B-6K medium bombers could, in a single raid of 32 aircraft, launch up to 192 land-attack or anti-ship cruise missiles (ASCMs) at targets as far away as Guam.¹¹ Most recently, the Chinese Rocket Force has revealed the DF-26 intermediate-range ballistic missile (IRBM) that has comparable range. The latter, like all of China's most modern land-based ballistic and cruise missiles, are launched from mobile transporter erector launchers (TELs) that greatly enhance their survivability against air attacks.

In response to these emerging threats, U.S. and allied forces are investing in active defense systems, such as Patriot, the Terminal High-Altitude Area Defense (THAAD) system, and sea-based SM-3 missiles, to shoot down ballistic and cruise missiles. However, these defensive systems are expensive, take time to deploy, and have not thus far consistently achieved high probabilities of kill against the most-capable threat systems. As a consequence, these systems can be overwhelmed by large salvo attacks, with their supplies of missiles exhausted or destroyed and taken out of the fight.¹²

Integrated air defenses. Since the late 1990s, China has been investing considerable sums in modern, highly capable surface-to-air missile (SAM) systems that feature powerful tracking and guidance radars equipped with electronic countermeasures and high-performance missiles capable of engaging fighter aircraft at ranges of 125 miles or more. China began this effort by importing state-of-the-art systems from Russia. The Chinese were then able to reverse-engineer Russian systems, incorporating key technologies into their own SAM systems. The radars and missile launchers are mounted on mobile vehicles, making them difficult to locate and target. When such systems are fielded in sufficiently dense arrays and supported by survivable command-and-control facilities, suppressing these modern integrated air defense systems can be difficult, dangerous, and time consuming.

Fighter aircraft. Similar to Russia, China complements its surface-based air defenses with substantial numbers of highly capable fourth-generation fighter aircraft, such as the Russian-made Su-27 and its indigenously produced variant, the J11. Roughly comparable in range, payload, and aerodynamic capabilities to the formidable U.S. F-15C fighter, these aircraft can operate over areas not well covered by SAMs, threatening both combat aircraft (fighters and bombers) and support assets, such as aerial refueling and surveillance aircraft. The PLA Air Force (PLAAF) and PLA Navy (PLAN) have also begun fielding a new generation of Airborne Warning and Control System (AWACS) aircraft.¹³ Equipped with modern air-to-air missiles and backed by robust networks for command and control, Russian and Chinese fighters today

¹¹ Assume each H-6K is carrying six long-range land-attack cruise missiles (LACMs). See Wendell Mimick, "China Puts Guam Within Missile Range," *Defense News*, May 12, 2016; Jordan Wilson, *China's Expanding Ability to Conduct Conventional Missile Strikes on Guam*, Washington, D.C.: U.S.-China Economic and Security Review Commission, May 10, 2016.

¹² Ochmanek, 2015, p. 5.

¹³ For a description of the latest Chinese AWACS design, see Reuben F. Johnson, "PLAAF Claims China's KJ-500 AEW&C Aircraft Is an 'Indigenous' Design," *IHS Jane's Defence Review*, March 23, 2016.

present a far more formidable challenge to air superiority than any adversary the United States has faced since the Cold War.

To date, neither Russia nor China has fielded an operational fifth-generation fighter similar to the U.S. F-22 or F-35. In a direct engagement, assuming aircrews with comparable skills, fifth-generation fighters would be expected to achieve highly favorable exchange ratios against their fourth-generation foes. But only a small portion of the U.S. fighter force to date has been equipped with fifth-generation aircraft, and China is building its own advanced fighters with low-observable features. Moreover, Chinese commanders would strive to limit the flow of U.S. combat aircraft into the theater and into the fight by launching heavy attacks on U.S. forward operating bases. Therefore, it is likely that in a future conflict involving China, U.S. and allied air forces would have to fight outnumbered, at least in the conflict's early phases.¹⁴ These developments will make it much more costly for the United States and its allies to gain the air superiority to which they have grown accustomed.¹⁵

Enhanced naval power projection. The PLAN has made major strides in modernizing its surface and subsurface fleets. As one benchmark of the pace of this modernization, China in 2013 and 2014 launched more naval ships than any other country.¹⁶ As a result of these investments, China's surface fleet features growing numbers of destroyers and frigates with modern combat management systems and sensors, as well as long-range SAMs and surface-to-surface missiles. Similarly, the PLAN is modernizing its submarine fleet with growing numbers of nuclear-powered vessels and more capable ASCMs. Furthermore, the PLAN seems to have embarked upon a long-term effort to develop and deploy several aircraft carriers. After a long period of neglect, the PLAN's amphibious fleet is being expanded and modernized as well.¹⁷

The struggle for information superiority. Adversaries that have studied U.S. military campaigns since Operation Desert Storm in 1991 understand the critical role that information superiority plays in modern military operations. In that conflict and others since then against conventional foes, U.S. forces have been able to develop a common operating picture (COP) of the battlefield, providing commanders and frontline units with current information about the location and status of both enemy and friendly units. The picture is built by fusing information from myriad sources, including airborne and space-based sensors, human intelligence, and reports from friendly units. The picture is not perfectly accurate or entirely comprehensive, of course, but U.S. commanders today have far better situational awareness of a large and complex battle space than commanders have had at any time in history. Importantly, they have also been able to degrade the enemy's COP.

Potential adversaries are striving to develop similar capabilities, fielding sensor systems on satellites, unmanned aerial vehicles (UAVs), and other airborne sensor platforms; building command centers in which to fuse the information from these sensors; and using multiple

¹⁴ David A. Shlapak, David T. Orletsky, Toy I. Reid, Murray Scot Tanner, and Barry Wilson, *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute*, Santa Monica, Calif.: RAND Corporation, MG-888-SRF, 2009, p. 67.

¹⁵ Shlapak et al., 2009, p. 118.

¹⁶ U.S. Navy, Office of Naval Intelligence, *The PLA Navy: New Capabilities and Missions for the 21st Century*, Washington, D.C., 2015, p. 12.

¹⁷ As an example of this modernization program is the PLAN's acquisition and coproduction of the very large Ukrainian Zubr-class Landing Craft Air Cushion (LCAC). See Ridzwan Rahmat, "China Debuts Zubr LCAC in Show of Amphibious Force in South China Sea," *IHS Jane's Navy International*, July 22, 2015.

communication systems to connect these nodes with units in the field. They are also working to degrade the quality, timeliness, and reliability of the COP available to U.S. forces. China, for instance, has fielded large numbers of electronic jamming systems to degrade U.S. theater communications.¹⁸ According to DoD, the PLA is acquiring a range of new space and counter-space capabilities. These include directed energy weapons and satellite jammers, as well as a direct-ascent kinetic kill capability against satellites in low-earth orbit. PLA writings emphasize the necessity of “destroying, damaging, and interfering with the enemy’s reconnaissance . . . and communications satellites.”¹⁹ These efforts are consistent with the Chinese military’s appreciation of the importance of crippling the ability of U.S. forces to locate, identify, track, and target enemy forces.

Numerous adversaries are using cyber operations to attempt to penetrate U.S. military information networks, both to extract information and disrupt operations. As a result, U.S. forces cannot be confident that, in a conflict with capable adversaries such as China, they would have an accurate and timely view of the battlefield or that they could communicate effectively at all times in the theater.

Undersea warfare. The PLAN is building modern submarines, including nuclear-powered vessels, and equipping them with capable weapon systems, including long-range anti-ship missiles (LRASMs) and LACMs. While DoD judges that the PLAN’s deep-water anti-submarine warfare capability “seems to lag behind its air and surface warfare capabilities,” it notes that China “is working to overcome shortcomings in this and other areas.”²⁰ Currently, the Chinese are beginning to modernize the anti-submarine warfare (ASW) capabilities of their surface fleet, as well as the PLAN’s fleet of maritime patrol aircraft (MPA).²¹ Additionally, the PLAN is developing unmanned underwater vehicles (UUVs) that will likely have ASW applications.

Nuclear forces. China is also taking steps to modernize its nuclear forces. The most recent advance in this regard is the successful development of a new generation solid propellant intercontinental ballistic missile (ICBM), the DF-41, which will likely be armed with a multiple, independently targeted re-entry (MIRV) system.²² This new system will supplement and eventually replace China’s silo-based liquid propellant ICBM force. A similar MIRV capability is also likely to appear on the naval variant of the DF-31 submarine-launched ballistic missile (SLBM) that now arms the second generation of PLAN nuclear-powered fleet ballistic missile submarines (SSBNs).²³ China today fields approximately 260 nuclear weapons supporting a

¹⁸ J. Randy Forbes, “Caucus Brief: Chinese Military Capable of Jamming U.S. Communications System,” The Congressional China Caucus, September 20, 2013.

¹⁹ Office of the Secretary of Defense (OSD), *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2014*, Washington, D.C.: U.S. Department of Defense, April 24, 2014.

²⁰ OSD, 2014, pp. 31–32.

²¹ Gareth Jennings, “China Fields New Maritime Patrol and Anti-Submarine Y-8/Y-9 Variant,” *IHS Jane’s Defence Weekly*, June 29, 2015.

²² For an analysis of the prospects of proliferation MIRV capabilities by the Asian nuclear-armed states, see Michael Krepon, Travis Wheeler, and Shane Mason, *The Lure & Pitfalls of MIRVs: From the First to the Second Nuclear Age*, Stimson Center, 2016.

²³ Richard D. Fisher, “China Advances Sea- and Land-Based Nuclear Deterrent,” *IHS Jane’s 360*, December 16, 2015.

doctrine of second strike minimal deterrence.²⁴ This may change with a more robust deployment of new generation ICBMs and SLBMs. In any case, a future major conflict with China in Asia would take place under the shadow of China's modernizing and more diversified nuclear capability.

Organization, training, and doctrine. China's efforts to modernize its military hardware have been accompanied by reforms in the PLA's organization, training, and doctrine. For some years now, the influence of the PLA ground forces, traditionally the dominant element within the PLA, has been on the wane, while air, naval, missile, space, cyber, and electronic attack forces have gained in status and influence. And all branches of the PLA have sought to increase operational proficiency through more rigorous and realistic joint force training and exercises.²⁵ That having been said, the PLA as a whole is judged to suffer from continuing weakness in human capital and training. Its leaders lack experience in planning and orchestrating large-scale, complex combat operations. And its logistics and maintenance practices may not be sufficient to sustain high-tempo operations in wartime.²⁶

Since assuming power as general secretary in 2012, Xi Jinping has launched a wide-scale purge of the PLA leadership as part of a broader anti-corruption campaign aimed at his political enemies in the Chinese Communist Party (CCP) leadership. Xi has used the rhetoric of Mao Zedong to forcibly reassert the primacy of CCP over the military command structure. Thus far, this political consolidation campaign appears not to have disrupted the PLA's drive toward a more professional and technologically adept armed force. On the other hand, the rhetoric of favoring being "Red" over being "expert" may have pernicious effects over the longer term.²⁷

Scenario: An Invasion of Taiwan, Circa 2020

The obvious and most-stressing scenario to use as a test of U.S. power projection capabilities vis-à-vis China is a Chinese invasion of Taiwan. Beijing has been unequivocal in stating that it regards Taiwan as an integral part of China that must one day submit to Beijing's rule, and it has refused to rule out the use of force as a means of achieving this objective.²⁸ For its part, the United States, under the Taiwan Relations Act of 1979, maintains an arms-length defense

²⁴ Hans M. Kristensen and Robert S. Norris, "Status of World Nuclear Forces," Federation of American Scientists, undated.

²⁵ Richard Weitz, "PLA Military Reforms: Defense Power With Chinese Characteristics," *WPR*, March 15, 2016.

²⁶ Michael S. Chase, Jeffrey Engstrom, Tai Ming Cheung, Kristen Gunness, Scott Warren Harold, Susan Puska, and Samuel K. Berkowitz, *China's Incomplete Military Transformation: Assessing the Weaknesses of the People's Liberation Army (PLA)*, Santa Monica, Calif.: RAND Corporation, RR-893-USCC, 2015, pp. x–xii.

²⁷ For a discussion of this phenomenon, see Derek Grossman and Michael S. Chase, "Why Xi is Purging the Chinese Military," *The National Interest*, April 15, 2016.

²⁸ Military tensions between Beijing and Taiwan may return following the more nationalistic DPP's return to power in January 2016. See J. Michael Cole, "Miles Apart: Taiwanese Election Test Chinese Strategy," *IHS Jane's Intelligence Weekly*, Vol. 28, No. 4, April 2016.

relationship with Taiwan and is widely regarded as being committed to defending the island should it be attacked.²⁹

Large-scale amphibious invasions are extremely complex undertakings and many advantages accrue to the defender, not the least of which is that water barriers of significant width compel the attacker to put forces on surface ships or transport aircraft, which can be vulnerable to a wide array of weapons, and limit the rate at which those forces can bring their combat power to bear on the defender. Furthermore, the ports of embarkation of the amphibious invasion force can be subjected to direct attack, as well as a mining campaign.³⁰ Until recently, analyses of a potential conflict over Taiwan concluded that, while Chinese missile attacks could impose serious damage on Taiwan, a successful invasion was beyond Beijing's reach.³¹ However, as China has continued to invest heavily in the sorts of capabilities outlined earlier and to improve the training and readiness of its forces, assessments of the cross-strait balance have begun to shift. Adverse trends in that balance have been accelerated by some less than optimal choices that Taiwan's armed forces have made with respect to their investment priorities, and by the failure of the U.S. forces to keep pace with China's rapidly modernizing conventional capabilities.

Doctrinal writings by Chinese military strategists make it clear that they have studied the military operations undertaken by the United States since Operation Desert Storm and have devised strategies aimed at countering U.S. power projection efforts. Two keys to China's approach are seizing the initiative early in the conflict and preventing U.S. forces from gaining and exploiting information superiority. China's large inventories of conventionally armed ballistic and cruise missiles provide the capability to strike key elements of U.S. expeditionary forces: airfields, ports, logistics hubs, and CSGs. They could also attack U.S. information systems—reconnaissance, communications, and positioning satellites; airborne intelligence platforms; undersea communication lines; and military command and control systems—using a combination of weapons, including electronic jammers, anti-satellite interceptors, SAMs and air-to-air missiles, and cyber weapons.³²

²⁹ The Taiwan Relations Act states that “any effort to determine the future of Taiwan by other than peaceful means, including by boycotts or embargoes is considered a threat to the peace and security of the Western Pacific area and of grave concern to the United States.” It goes on to state that “the United States shall provide Taiwan with arms of a defensive character and shall maintain the capacity of the United States to resist any resort to force or other forms of coercion that would jeopardize the security, or social or economic system, of the people of Taiwan.” See Public Law 96-8, Taiwan Relations Act, April 10, 1979.

³⁰ One of the emerging innovations in large UUVs is the prospect of unmanned submarines acting as either a mother ship to deliver self-propelled mines or the UUV acting as a long-range self-propelled mine. This option provides Taiwan with a capacity to conduct a mining campaign along the Chinese mainland coast by remote and long-range delivery of undersea mines.

³¹ A RAND analysis of this scenario set in the year 2005, for example, concluded that, given “baseline” assumptions about the forces and capabilities of both sides, Taiwan's forces defeated the invasion in roughly 90 percent of model runs, even without direct U.S. military support to Taiwan. Trends were not favorable, however, and cases that assumed more modern Chinese forces showed them prevailing far more frequently. See David Shlapak, David T. Orletsky, and Barry Wilson, *Dire Strait? Military Implications of the China-Taiwan Confrontation and Options for U.S. Policy*, Santa Monica, Calif.: RAND Corporation, MR-1217-SRF, 2000, pp. 25–38.

³² For a thorough assessment of China's anti-access capabilities and strategies, see Roger Cliff, Mark Burles, Michael S. Chase, Derek Eaton and Kevin L. Pollpeter, *Entering the Dragon's Lair: Chinese Antiaccess Strategies and Their Implications for the United States*, Santa Monica, Calif.: RAND Corporation, MG-524-AF, 2007, pp. 28–41.

Even if U.S. and Taiwan forces can partially blunt their effects, large-scale and sustained attacks of this nature would, to say the least, severely complicate the job of the defending forces. The goal of such a strategy is to create a window of opportunity during which the defenders are so preoccupied with coping with these multidimensional attacks and limiting the damage from them that they are unable to effectively counter the main effort of the offensive (in this case, the invasion of Taiwan). Updated assessments of China's ability to implement this strategy raise troubling questions about the emerging military balance in the region. As we noted earlier, China's ability to strike U.S. and Taiwanese airbases, coupled with its heavy investments in modern fighter aircraft and air-to-air missiles, could impose heavy losses on the allies' air forces in-theater and allow Chinese forces to contest for air superiority around Taiwan for an extended period. Combined with China's capabilities for disrupting U.S. reconnaissance operations and information systems, this could, absent additional efforts by the United States and Taiwan to counter these capabilities, create conditions in which a successful invasion of Taiwan might be possible.³³

If U.S., allied, and partner forces are to retain credible capabilities to deter and defeat an adversary with advanced military capabilities, such as China, new investments in platforms, weapons, infrastructure, and support systems will be called for. But meeting the challenge will require more than simply buying and fielding new and better weapon systems. The scope of the anti-access/area denial (A2/AD) challenge that the most-capable adversaries pose also calls for new concepts for the conduct of power-projection operations in a much more hostile military environment. Therefore, money, time, and talent must be allocated not only to the development and procurement of new equipment and infrastructure but also to concept development, gaming and analysis, field experimentation, and exploratory joint force exercises.

The following key capability areas merit priority attention to counter threats that China's forces could pose in a Taiwan scenario or other large-scale conventional conflict.

Enhanced capabilities to strike the enemy's attacking forces early in a conflict.

Adversaries intend to use their A2/AD capabilities to create a window of opportunity during which they can achieve their operational objectives. In response, the United States and its allies must find more ways to engage and strike the adversary's attacking forces and their key supporting assets—operational centers of gravity—from the outset of a conflict, that is, prior to gaining information, air, and maritime superiority in proximity to adversary territory and forces. This is a key to military success. Because U.S. forces have been confident for so long in their ability to dominate these domains in conflicts against less-capable adversaries, they have not, for the most part, invested in capabilities for intelligence, surveillance, and reconnaissance (ISR) and striking in contested environments. "Smart," long-range standoff weapons with the ability to detect and identify specified target types will likely play important roles in this new approach, as will new approaches to remote sensing (see section on sustaining situational awareness below).

Resilient basing. Forward-deployed forces and bases (including surface ships) need to be made more survivable in the face of attacks by ballistic and cruise missiles.³⁴ Making greater use of long-range platforms, such as heavy bombers, and survivable platforms, such as submarines, will be part of the solution. But as China and other adversaries field greater numbers

³³ Shlapak et al., 2009, pp. 139–140.

³⁴ For an historical and forward-looking overview of the issue of defending air bases, see Alan Vick, *Air Base Attacks and Defense Counters: Historical Lessons and Future Challenges*, Santa Monica, Calif.: RAND Corporation, RR-968-AF, 2015.

of long-range strike systems, simply operating from farther away will no longer be sufficient. Analysis suggests that scattering forward-deployed aircraft across a larger number of bases and dispersing them on the ground can substantially improve survivability while they are on the ground and increase the number of sorties generated by the force. Already, the USAF is planning to widen its wartime basing options in the Western Pacific. Additional measures that show promise in this regard include hardening of selected facilities at forward operating bases, forward deployment of airfield repair assets, greater use of decoys and deception measures, and mobile land-based defenses against cruise missiles.

Rapid suppression or destruction of enemy air defenses. Fear of U.S. airpower has led China, like Russia, to invest huge sums in integrated air defenses. No adversary welcomes the prospect of trying to conduct military operations in the face of un-degraded U.S. airborne sensor and strike systems. Therefore, demonstrating the ability to rapidly neutralize their air defenses should contribute greatly to strengthened deterrence of aggression. This will involve jamming, damaging, and destroying air surveillance and SAM tracking and guidance radars; disrupting command and control; and neutralizing large formations of fighter aircraft. Options for enhancing capabilities in this mission area include a new, longer-range radar-homing missile; improved air-to-air missiles; more effective systems for electronic attack; and continued modernization of U.S. combat aircraft with an emphasis on low observability.

Sustaining situational awareness. This will involve fielding more-survivable sensor platforms (both airborne and space-based), while improving U.S. capabilities to degrade those of the adversary. Fielding large numbers of expendable, “swarming” UAVs, spreading sensors across a large number of small, inexpensive satellites, or exploiting commercial space assets might prove to be attractive options.

Cyber and space defense and offense. Future U.S. commanders will require more-resilient information networks (including more jam-resistant communications) and improved tools for degrading the networks of adversary forces. If solutions to the vulnerability of U.S. satellite constellations prove infeasible, U.S. forces may be compelled to invest in substitute capabilities that could be deployed on long-endurance UAVs operating independently of U.S. space assets, including the Global Positioning System (GPS) satellite constellation. Fielding improved capabilities to disrupt adversaries’ satellites can improve prospects for U.S. power projection operations and, perhaps, help to deter adversaries from attacking U.S. satellites.³⁵ U.S. forces might also be well advised to develop operational doctrine and procedures that can allow the joint force to remain militarily effective even in the face of badly degraded C4ISR capabilities. Put simply, U.S. and allied forces will have to train to operate in a low-bandwidth communications environment.

Enhancing the defensive capabilities of China’s littoral neighbors. Of course, as mentioned earlier, countering the threats that potential adversary states pose is not solely a problem for the United States. It would be unwise and infeasible for the United States to attempt to address these challenges unilaterally. Allies and partners, particularly those directly or indirectly threatened by adversary activities or in the same region, have a strong interest in ensuring that their forces can impose a high price on an aggressor and contribute effectively to combined regional operations that the United States might lead.

³⁵ For an assessment of the potential value of more resilient space-based capabilities and offensive space weapons, see Forrest E. Morgan, *Deterrence and First-Strike Stability in Space: A Preliminary Assessment*, Santa Monica, Calif.: RAND Corporation, MG-916-AF, 2010.

With these goals in mind, the proliferation of the systems and technologies that are causing U.S. planners such concerns can be turned into advantages for the United States. If allies and partners invest wisely, they can impose smaller-scale A2/AD challenges on the states seeking to employ A2/AD technologies against them.³⁶ For example, Taiwan has both the economic means and the technical and operational savvy to develop, deploy, and operate such systems as short-range unmanned aircraft systems, ASCMs, shallow water mines, rocket artillery, mobile short-range air defense systems (SHORADSs), and communications jamming gear, all of which, properly employed, could contribute mightily to an effective defense against invasion.³⁷ Similar capabilities could also help such states as the Philippines and Vietnam, which have faced coercive threats from China over control of disputed territories in the SCS, to better monitor and protect areas close to their shores.

All of the enhancements described earlier are intended to support an overall strategy of direct defense: That is, defeating aggression at the point of contact, by preventing the attacking force from achieving its operational objectives. This is in contrast to strategies of cost-imposition or escalation, which seek to persuade the adversary to halt aggression through actual or threatened coercive actions. Provided the defender has the military wherewithal to prevail at the point of contact, direct defense has the advantage of being a more credible basis for deterrence, while carrying less potential for escalation, should deterrence fail.³⁸

Achieving a credible direct defense capability against China (or, for that matter, Russia) will require a subtle but important shift in key operational concepts that have worked so well for U.S. forces since Operation Desert Storm. Against regional adversaries, such as Iraq and Serbia, U.S. and allied forces could be assured to securing relative freedom to operate in the air, sea, land, space, and cyberspace within the theater of conflict virtually from the outset of hostilities. In conflicts with the more-capable forces of China or Russia, this will not likely be the case, and the time lines associated with the enemy's offensive in many cases will not permit U.S. forces to spend many days or weeks suppressing enemy defenses and strike systems to gain and then exploit dominance in key domains. Therefore, U.S. forces will have to find ways to locate and strike the enemy's attacking forces in contested environments from the outset of the conflict. A host of new systems and ideas are being developed to enable this new approach but fielding them will take money, time, and attention.

In conclusion, our assessment of a future clash of arms with China suggests that U.S. forces are losing their near-monopoly over a wide range of key capabilities, with potentially profound effects on their ability to project power and defend U.S. interests, allies, and partners. In the 2020 time frame and beyond, U.S. and allied forces would have to fight for advantages that, until now, they have taken almost for granted. The specifics of the scenario—a prospective invasion of Taiwan—are less important than the trends revealed through an examination of the scenario. Those trends are starkly clear: Without very substantial investments in new capabilities and concepts for power projection, U.S. and allied decisionmakers could lose

³⁶ James Dobbins, David C. Gompert, David A. Shlapak, Andrew Scobell, *Conflict with China: Prospects, Consequences, and Strategies for Deterrence*, Santa Monica, Calif.: RAND Corporation, OP-344-A, 2011.

³⁷ Michael J. Lostumbo, "A New Taiwan Strategy to Adapt to PLA Precision Strike Capabilities," in Roger Cliff, Phillip C. Saunders, and Scott Warren Harold, eds., *New Opportunities and Challenges for Taiwan's Security*, Santa Monica, Calif.: RAND Corporation, CF-279-OSD, 2011, pp. 127–136.

³⁸ For a fuller description of the direct defense approach and its applicability to deterring aggression by China, see Ochmanek, 2015.

confidence in the ability of U.S. forces to defeat aggression. Potential adversaries could be correspondingly emboldened to resort to coercion or aggression to up-end the status quo in East Asia and SEA.

Additional Regional Challenges in Northeast and Southeast Asia

Potential military conflict between Japan and China. Aside from the long-term challenge of deterring China from taking Taiwan by military force, there are the emerging and likely enduring political military tensions between Japan and China. The major potential flashpoint is over the status of the Senkaku/Diaoyu Islands in the East China Sea, where both states have overlapping territorial claims (see Figure 2.3). Over the course of the last several years, tensions between Beijing and Tokyo have been sufficient to prompt the latter to reorient its national security strategy away from its northern islands to the south, to include the Ryukyu Islands and Okinawa.³⁹ This reorientation has led Japan to increase its forces' ability to react to any use of force by China in this region.

As a demand signal for U.S. forces oriented toward the Western Pacific, a conflict scenario between Japan and China over the Senkaku/Diaoyu Islands is largely a lesser included case of the Taiwan scenario. Fighting between Japan and China over the Senkaku/Diaoyu Islands might be short and violent. On the other hand, such a limited conflict might widen geographically, especially if China chose to attack Japanese military assets on Okinawa or Honshu. Depending on the course of the conflict, and whether the Japanese Self Defense Force inflicted a humiliating local defeat on the PLAN, Beijing might choose to escalate and undertake attacks on against Japan's critical infrastructures via cyberspace and long-range precision attack.⁴⁰

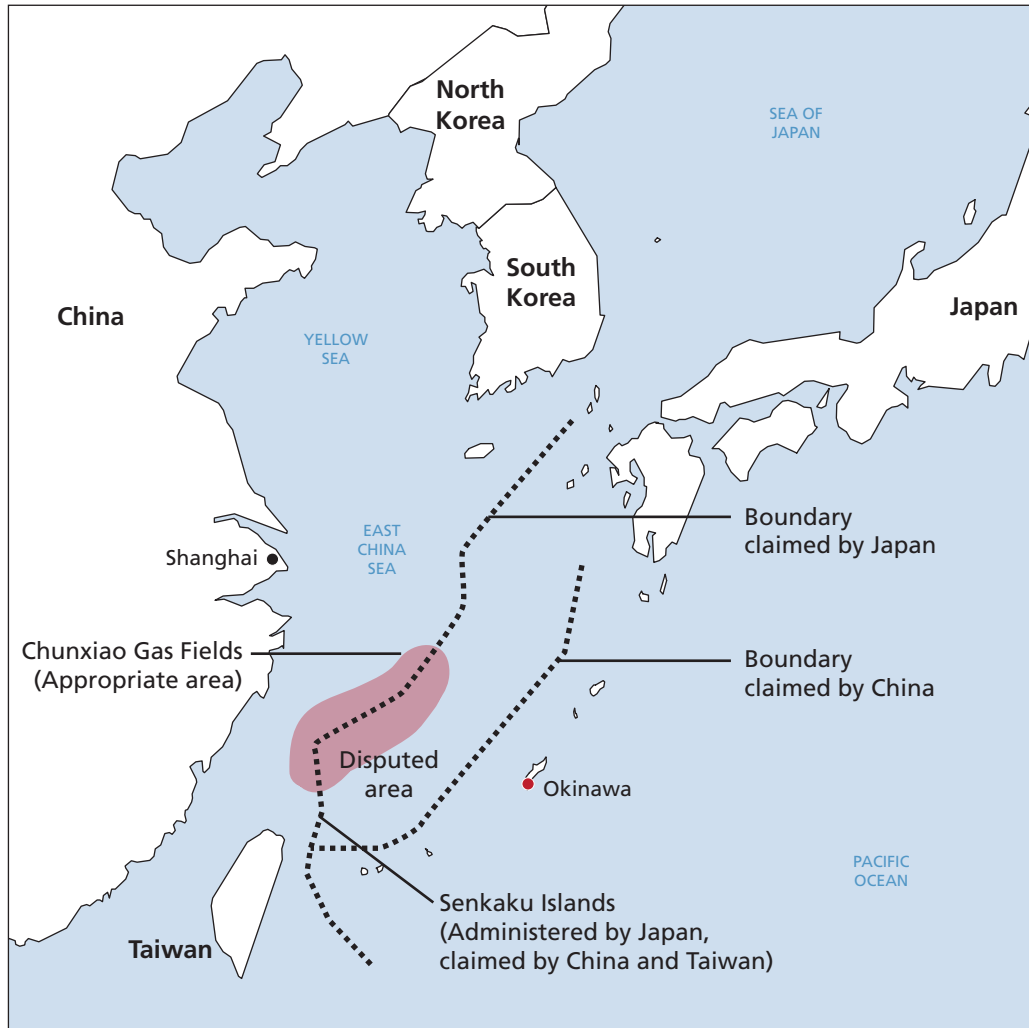
In the event of conflict, U.S. forces in the Western Pacific could be called upon to provide Japan with direct military assistance in the ECS and to supplement air and missile defenses of the Japanese home islands. From a force-sizing perspective, the forces allocated to any Taiwan contingency should satisfy the U.S. joint force requirement. The one important exception may be the requirement to provide Japan with a much more robust missile defense capacity.

China's strategy of "Boiling the Frog Slowly" in SCS. No more than six years ago, SEA was a relative strategic backwater for the United States. Before 2010, the major source of concern for the U.S. government in this region was the prospect that Salafist-jihadism would flourish in either the southern Philippines or Indonesia. The most noteworthy operation was the long-term employment of U.S. military personnel to train and advise Philippine security forces in their efforts to counter terrorist groups operating in the southern parts of their country. Since that time, several factors have altered the security environment, including the following four major developments:

³⁹ For a description of the major national security shift to the southeast of Japan with an investment focus on air, naval, aerospace defense, and space reconnaissance at the expense of the ground forces, see Japanese Ministry of Defense, *Japan's National Security White Paper 2015: Part I, Security Environment Surrounding Japan; Part I, Section 3 China; and Part II, Section 3, Outline of the Medium Term Defense Program*, 2015.

⁴⁰ After a period of quiescence, this territorial conflict heated up during the summer 2016. See Kiyoshi Takenaka and Eric Beech, "Japan Warns China of Deteriorating Ties on East China Sea Dispute," *Reuters*, August 9, 2016.

Figure 2.3
Disputed Claims in the ECS



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- China's strategy for enhancing its influence in SEA has shifted from one centered on "soft power" (with an emphasis on economic, diplomatic, and cultural instruments) to an increasing emphasis on "hard power." This more militarized and coercive approach has been especially manifest in the SCS and ECS.
- Myanmar (formerly Burma) has gone through a dramatic evolution toward a more democratic state with a foreign policy much less beholden to Beijing. This has accelerated the dynamic of a competition involving China, India, and the United States over the future strategic orientation of Myanmar.
- These factors have placed increased stress on the cohesion of Association of Southeast Asian Nations (ASEAN), a regional organization for collective political and economic cooperation especially after Beijing initiated a "divide and conquer" approach since 2011.⁴¹

⁴¹ "ASEAN Splits on South China Sea Dispute," *The Global Review*, January 5, 2015.

- Three large outside powers—Japan, Australia, and India—have become much more deeply engaged in the region.⁴²

The most significant of these developments is the first: China's turning toward a much more aggressive and assertive approach in the SCS. The backdrop to this, as described previously, is China's massive and sustained investments in its armed forces. One result of these investments is that China's leaders now seem to believe that they have at their disposal the military wherewithal to impose their will in the region, at least through assertive, if not overtly bellicose initiatives.

Specifically, the Beijing leadership has committed itself to assert China's near-total sovereignty over its territorial claims on the SCS as symbolized by the now-famous Nine Dash Line (see Figure 2.4).⁴³

In 2012, China took a significant step in this campaign by coercing the Philippines out of Scarborough Shoal as part of its expansive territorial claims to the northeast of the Philippine's Palawan Islands. Then, in 2014, Beijing asserted itself against Vietnam by deploying a mobile hydrocarbon exploration rig to the southwest of the Parcel Islands, clearly inside the zone claimed by Vietnam. While PLAN mainline naval forces stayed in the background, the Chinese employed a large fleet of coast guard and fishing vessels to protect the mobile exploration rig from any naval response by the Vietnamese. In response, the Vietnamese chose to deploy their own coast guard ships and large fishing vessels to the area. The confrontation resulted in a series of incidents that included the ramming and sinking of a Vietnamese fishing vessel by a larger Chinese vessel. After a several months, the Chinese called their exploration effort a success and withdrew their platform.⁴⁴ Simultaneously, China has continued its air-naval facility expansion on Hainan Island.⁴⁵ During the spring of 2016, the Chinese again deployed the mobile hydrocarbon exploration platform to the zone of the prior confrontation.⁴⁶

During 2015 Beijing launched a massive civil engineering effort to create "facts in the sea"—a new string of artificial islands that are selectively being converted into substantial air and naval facilities.⁴⁷ The first major facility on these islands became operational on Woody Island in the Paracel Islands chain during the first quarter of 2016 (see Figure 2.5).⁴⁸ A similar facility on Fiery Cross Reef in the Spratly Islands is likely to become operational by the end of

⁴² Japan deployed a naval battle group to visit the Philippines in the spring 2016, while India articulated an "Act East" policy under the Modi government. The latter initiative includes the willingness to conduct oil and gas exploration off of Vietnam in waters claimed by China. Japan, India, and Australia have recently signed military sales programs, albeit modest ones, with Vietnam. See Prashanth Parameswaran, "Japan Eyes Bigger South China Sea Presence," *The Diplomat*, January 12, 2016.

⁴³ For a description of China's naval buildup, see Christopher H. Sharman, *China Moves Out Stepping Stones Toward a New Maritime Strategy*, Washington, D.C.: Center for the Study of Chinese Military Affairs, Institute for National Strategic Studies, National Defense University, April 2015.

⁴⁴ International Crisis Group, "Stirring up the South China Sea (IV): Oil in Troubled Waters," Asia Report No. 27, January 26, 2016a.

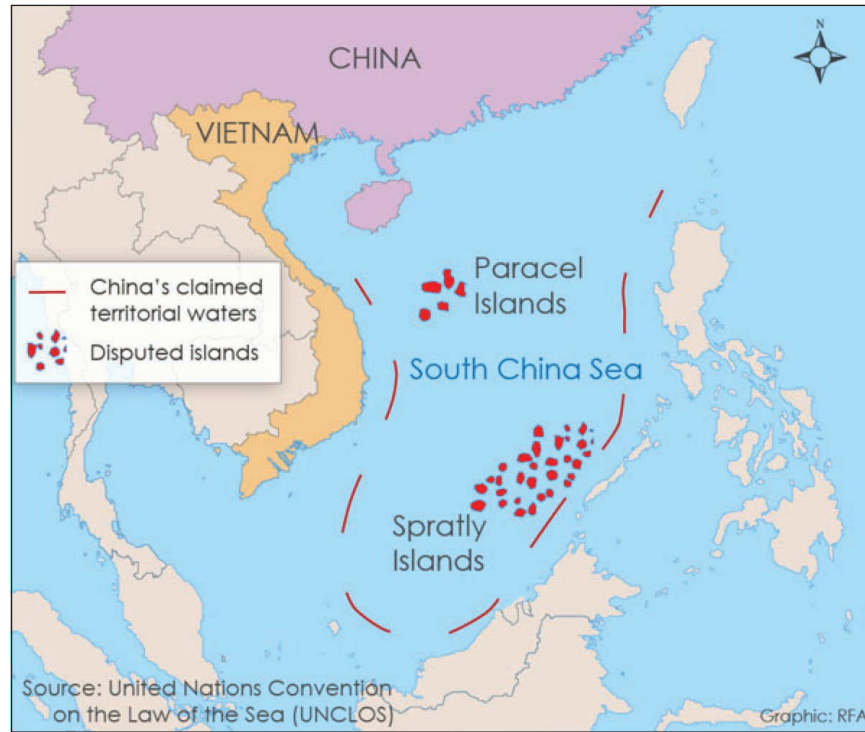
⁴⁵ Tuan Pham, "A South China Sea Game Changer?" *Proceedings*, April 2016.

⁴⁶ Shannon Tiezzi, "Vietnam to China: Move Your Oil Rig Out of the South China Sea," *The Diplomat*, April 9, 2016.

⁴⁷ For a description of this Chinese strategy of coercion, see International Crisis Group, 2016a, and "Fish: The Overlooked Destabilizer in the South China Sea," *STRATFOR*, February 12, 2016.

⁴⁸ Michael Forsythe and Jane Perlez, "South China Sea Buildup Brings Beijing Closer to Realizing Control," *New York Times*, March 8, 2016.

Figure 2.4
China's Nine Dash Line



SOURCE: Wei Pu, "How the Eleven-Dash Line Became a Nine-Dash Line, and Other Stories," Radio Free Asia, July 16, 2016. Used with permission.

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2016. These bases will allow the Chinese navy and air force to operate both surveillance and combat aircraft in the region. Jet fighters, long-range SAMs, and long-range surveillance radars have already been deployed to Woody Island. It is highly likely that sites in the Spratly Islands, such as Fiery Cross Reef and Swallow Reef, when completed by the end of 2016 will follow a similar path of militarization. Once fully operational, Beijing may decide that it is in a position to more actively enforce controls on the activities of other nations inside the Nine Dash Line.⁴⁹

On July 12, 2016, the international court at The Hague, prompted by a case brought forward by the government of the Philippines, strongly rejected China's historical claims of territory in the SCS inside the Nine Dash Line.⁵⁰ How Beijing reacts to this diplomatic setback remains to be seen. If the response is highly assertive and militarized, the stage would be set for a period of push and shove in both the maritime and air domains in the SCS between China, the SCS littoral states, the United States, and possibly other Asian powers, such as Australia, Japan, and India.⁵¹

⁴⁹ Reinforced hangers for large aircraft were under construction at Fiery Cross, Subi, and Mischief Reefs as of late summer 2016. See David E. Sanger and Rick Gladstone, "New Photos Cast Doubt on China's Vow Not to Militarize Disputed Islands," *New York Times*, August 8, 2016.

⁵⁰ Jane Perlez, "Tribunal Rejects China's Claims in South China Sea," *New York Times*, July 12, 2016.

⁵¹ For a comparison between the Chinese use of "little blue men" with the Russian use of "little green men" in Crimea, see Gordon G. Chang, "China Takes a Page From Putin's Playbook," *The Daily Beast*, March 4, 2016.

Figure 2.5
Woody Island as a Military Base



NOTE: Woody Island is a substantial base on an artificial island containing an airfield with a length of more than 3,000 meters. The close-up image shows the deployment of a long-range SAM battery.

RAND RR1782-2.5

The SCS—A Source of Chronic Tension and Possible Conflict?

In light of these events, as well as the broader trend of China's emergence as a regional heavy-weight, the United States will wish to consider measures designed to deter Beijing from escalating pressure on U.S. allies and partners in the region and to allow for more-effective responses if these deterrent efforts fail. Given the stakes involved in the SCS and elsewhere, the DoD will need to adopt a strategy and posture that can be sustained over the long term without placing undue demands on its limited expeditionary forces. The United States' long-standing security ties with Australia, the Philippines, and Singapore and their shared interests in ensuring free access to international airspace and waters in and around the SCS mean that Washington can count on having access to military infrastructures needed to support a higher-profile military presence in the region.

More uncertain will be the evolution of Washington's military relations with Jakarta and Hanoi. Until recently, Indonesia has sought to maintain a somewhat equidistant relationship between China and the United States. That appears to be changing as China's aggressive assertion of sovereignty in the southern SCS has directly impinged on Indonesian territorial interests. Now the Indonesian political and military leadership appears to be willing to make a major investment to modernize Indonesia's air and naval forces as a hedge against Beijing's assertiveness.⁵² Washington's security relations with Hanoi have similarly warmed. Given Vietnam's long and sometimes violent regional rivalry with Beijing, the Vietnamese public and elites have been wary of China's new assertiveness. This has prompted Vietnam to engage in a major military buildup, primarily through the acquisition of advanced Russian air and naval

⁵² See Vibhanshu Shekhar and Joseph Chinyong Liow, *Indonesia as a Maritime Power: Jokowi's Vision, Strategies, and Obstacles Ahead*, Washington, D.C.: Brookings Institute, November 2014.

weapon systems.⁵³ Furthermore, there is clear evidence that Hanoi is sufficiently alarmed about Beijing's strategic intentions in the SCS region to expand its security ties with the United States.

For Washington, the question is whether and how to exploit this opportunity to solidify a coalition of the SCS littoral states as part of a long-term strategy to constrain China's freedom of action in the SCS. A closer military-to-military relationship with Vietnam could result in U.S. forces gaining access to naval and air base facilities there as part of its peacetime presence. As a dramatic example of these improving security ties, President Obama announced the end of the U.S. arms embargo of Vietnam and has offered the sale of a variety of defense articles during a May 2016 summit in Hanoi.⁵⁴ On the other hand, there is the major question as to whether Washington is prepared to make any meaningful extended deterrent commitment to Hanoi as part of a regional containment strategy aimed at Beijing. As discussed in the previous section, the answer to this question will be informed by the overall state of U.S.–Chinese relations, which, in turn, will be shaped by the disposition of the China-Taiwan problem, the evolution of China-Japan relations, and the regional consequences of an unreformed Democratic People's Republic of Korea (DPRK) acquiring an ever-larger nuclear arsenal.

The near-term U.S. diplomatic and military response. The United States has conducted a vigorous diplomatic campaign to counter China's territorial claims in the SCS. In 2015, Washington renewed its overt freedom of navigation operations (FONOPs) exercises when a U.S. Navy destroyer, sailed within 12 nautical miles of a Chinese installation on Subi Reef. This and subsequent naval and air sorties have been designed to make clear to Beijing and the international community that Washington and its allies and partners in East Asia do not recognize China's claims.⁵⁵ In short, a new demand signal for U.S. naval and air forces has emerged. It is plausible to believe that this demand signal might fluctuate in a fashion similar to the chronic crises over the status of Berlin during the Cold War. But if the United States and others wish to take the initiative away from Beijing in this region, there will be no substitute for a continuous, albeit modest-sized naval and air presence there. Accordingly, episodic FONOP exercises may over time be supplemented by a semipermanent forward deployed naval and air presence supported by facilities in Australia, Singapore, and the Philippines. All three countries could support rotational deployments of long-range manned and unmanned ISR aircraft to provide coverage both in the Indian Ocean and over the SCS.

Recently, this includes the ratification of the Enhanced Defense Cooperation Agreement (EDCA), a mutual agreement by which the Philippines makes available five "bases" that could provide the United States with forward operating locations (FOLs) during a future regional political military crisis (see Figure 2.6).⁵⁶

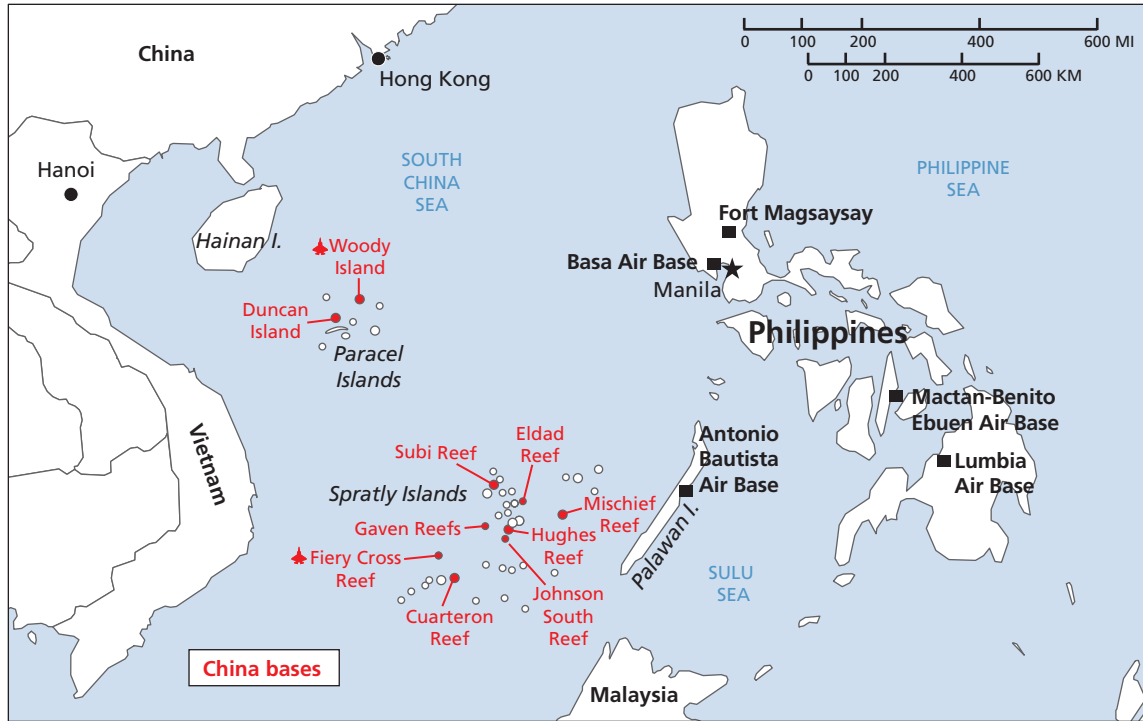
⁵³ "Vietnam's Russian Restocking: Subs, Ships, Sukhois, and More," *Defense Industry Daily*, January 5, 2016.

⁵⁴ Gardiner Harris, "Vietnam Arms Embargo to Be Fully Lifted, Obama Says in Hanoi," *New York Times*, May 23, 2016.

⁵⁵ Yegheth Toubati and Ben Blanchard, "U.S. Defense Secretary Visits Carrier in Disputed South China Sea," *Reuters*, April 15, 2016.

⁵⁶ Jose Katigbak, "U.S., Philippines Agree on 5 Base Locations Under EDCA," *The Philippine Star (Washington Bureau)*, March 20, 2016; Dan Lamothe, "These Are the New U.S. Military Bases Near the South China Sea—China Isn't Impressed," *Washington Post*, March 21, 2016. The current hardline nationalist stance of Philippine President Rodrigo Duterte raises doubts about the longevity of this new basing agreement. See Steve Mollman, "Philippines President Rodrigo Duterte Is Threatening to Kick the U.S. off His Nation's Military Bases," *Quartz*, October 3, 2016.

Figure 2.6
FOLs in the Philippines



RAND RR1782-2.6

As a peacetime economy of force measure, many of these air and naval assets could be a mix of black-hulled logistic support vessels, small combatants such as the LCS patrol frigate class, and a range of manned and unmanned maritime reconnaissance aircraft, such as the RQ-4 Triton, MQ-9 Reaper, and P-8 MPA.⁵⁷ Their large size (30,000 to 50,000 tons displacement) makes the Navy's black-hulled logistic ships attractive candidates for FONOPs, as they are not very vulnerable to Chinese vessel-to-vessel bumping tactics (unlike the smaller 3,000-ton LCS).⁵⁸ One of the additional attractive features of this 21st-century variant of the pre-World War II Asiatic Fleet is that it could help to support USSOCOM operations in the SEA littoral region, as well as rapid response capabilities to support humanitarian assistance and disaster response operations.⁵⁹ Aside from acting as mother ships for a broad spectrum of ship-to-shore connectors and fast combatants, the black-hulled fleet could provide a mobile basing capacity for a future fleet of UUVs.

During periods of heightened tensions between China and the United States in the SCS region, USN capital warships in the form of either a CSG or an expeditionary surface strike group could reinforce the U.S. forward presence. Rapid aerial reinforcement is possible with

⁵⁷ For a description of an at sea logistics off-loading exercise with a new generation black-hulled logistic ship, see Matthew M. Burke, "Navy, Marines to Test Seabasing Concepts at Korean Exercise," *Stars and Stripes*, February 29, 2016.

⁵⁸ The new black-hulled ships recently acquired by the USN include the expeditionary transfer dock, the expeditionary mobile base, and the expeditionary fast transport. These new logistic vessels provide the joint force with a capacity to support a broad spectrum of enduring operations from a sea base. See Megan Eckstein, "Navy Renames Three Ship Classes, Creates 'Expeditionary' Description in Naming System," *USNI News*, September 4, 2016c.

⁵⁹ See Chapter Six of this report for a description of recent and potential future USSOCOM operations in this region.

the deployment of additional reconnaissance and combat aircraft in the region.⁶⁰ Armed with LRASMs, such aircraft could maintain situational awareness over large portions of the SCS and help to deter Chinese aggression. Forward operation bases used by U.S. forces in the Philippines could be protected from cruise missile attacks by terminal air defense units equipped with the new Indirect Fire Protection Capability Increment 2 (IFPC 2) short-range air defense system (SHORADS).⁶¹ Much more potent offensive firepower is also available. Heavy bombers, such as B-1Bs and B-52s armed with LRASMs⁶² or sea mines, can conduct operations from Guam and Australia.⁶³

India and Burma: A future U.S. theater of operations? An additional new demand signal may well appear on the other side of the SEA peninsula. This is the emergence of Myanmar as a state that is attempting to find neutral ground between China, India, and the United States. The political transformation of Burma has led to the precipitous decline of China's influence there, especially with the Burmese military elite. Although China was successful in persuading the Burmese leadership to allow the construction of a natural gas and a petroleum pipeline from the Burmese southwestern coast to serve the energy needs of China's Kunming region, progress in other major infrastructure projects has come nearly to a halt.⁶⁴ At the present time, China still remains a major supplier of arms to the Burmese armed forces. That could change dramatically if the democratic revolution in Burma takes hold. Currently, India is actively attempting to expand its military-to-military ties through the sale of light helicopters. India is making major investments in the Burmese economy, with the main target being the large natural gas fields along the southwest coastline of Burma. Over time, the Burmese government and military may wish to diversify their foreign weapon supplier base. In turn, Beijing will use a variety of levers to curb Burma's enthusiasm for national autonomy. One such lever is sustained military support to the Wa Nation, a powerful tribal movement in northeastern Burma along the Chinese border.⁶⁵

The competition with India for influence over Burma is part of a larger series of unsettled territorial issues in Arunachal Pradesh near the Burmese border and Aksai Chin on the northeast border of Indian-controlled Kashmir. This regional rivalry might intensify as China takes an increasing forward-leaning posture in the Indian Ocean littoral, as part of its OBOR initiative. This effort is designed to expand trade ties between China and its Asian neighbors by upgrading transportation links. Over the next decade or so, as these projects are implemented, China's capacity to project military power, especially toward SEA, will also be enhanced.⁶⁶

⁶⁰ Katigbak, 2016; Lamothe, 2016.

⁶¹ Jen Judson, "US Army's Multi-Mission Launcher Defeats Cruise, UAV Threat," *Defense News*, April 7, 2016b.

⁶² The B-1B will be one of the first combat aircraft qualified to carry the anti-ship variant of the extend range version of the joint air-to-surface standoff missile (JASSM), the LRASM. See "AGM-158 JASSM: Lockheed's Family of Stealthy Cruise Missiles," *Defense Industrial Daily*, March 7, 2016.

⁶³ The United States has developed a modernized variant of the Quickstrike mine that can be dropped from medium altitude with precision. See Michael W. Pietrucha, USAF, "Essay: Navy, Air Force Riving Offensive Mining with New Quickstrikes," *USNI News*, April 26, 2016.

⁶⁴ Ben Blanchard, "China to Push Myanmar's New Government on Stalled Dam," *Reuters*, March 17, 2016.

⁶⁵ C.S. Kuppuswamy, "Myanmar: United Wa State Army," *South Asia Analysis Group*, November 27, 2013.

⁶⁶ For a summary and analysis of the economic and military implications of Beijing's OBOR initiative, see Winter, 2016; "China's One Belt, One Road: Will it Reshape Global Trade?" 2016; and "One Belt, One Road (OBOR): China's Regional Integration Initiative," 2016.

A further source of tension is a decision by New Delhi to take sides with the Vietnamese in their territorial disputes in the SCS. India's actions include joint exploration for offshore petroleum and natural gas in zones jointly claimed by Vietnam and China. More recently, India has offered to sell to Vietnam its supersonic ASCM, the Brahmos, co-developed with Russia and therefore readily useable by the Vietnamese Air Force, which is equipped with Russian strike aircraft.⁶⁷

The question at hand is how deeply the United States should develop its security ties with India in an effort to develop a grand coalition, including Australia and Japan, to address China's assertiveness in the SCS region. If these ties greatly expand, what are the limits of the U.S. extended security commitment to India? Given India's history and desire to remain a major emerging global power with considerable military autonomy, it is very unlikely that the United States and India will enter into a formal military alliance. On the other hand, the United States is on the verge of becoming the largest supplier of military hardware to India, displacing the Russian Federation's long-held position in this regard.⁶⁸ Will these closer military-to-military ties between New Delhi and Washington result in an ever-closer security relationship? In the event of a major crisis between India and China, perhaps over the orientation and status of a future Burmese government, what role might the United States play? Other than providing additional armaments during a regional conflict, would the United States provide regional and global intelligence support and technical assistance to help India respond to potential Chinese aggression?

Implications for Force Planning

Chinese military capabilities have become the pacing threat for the bulk of U.S. air and naval forces. Chinese forces today pose challenges to U.S. power projection operations in all five domains of warfare—air, sea, land, space, and cyberspace. Without substantial and sustained increases in investments in new equipment and operating concepts, the credibility of U.S. security guarantees to allies and partners in East Asia will continue to erode. This makes such investments a high priority for any defense strategy.

As with efforts to deter conflict in other regions, the United States is not in this alone. As noted previously, Taiwan, in particular, could greatly complicate China's deterrent calculus by better focusing its defense resources on affordable, survivable systems for defending its coastlines and airspace. Japan, Australia, Singapore, the Philippines, Vietnam, and other states in the region can likewise make important contributions to combined deterrence and defense efforts. As China has pursued more-assertive policy initiatives in East Asia, it has strengthened the incentives of other states in the region to expand cooperation with the United States and with one another and to improve their own defenses.

The following is a summary of the force elements and development priorities that are most relevant to securing U.S. interests vis-à-vis China. Recommendations for steady-state posture in the region are informed by the demands of deterring large-scale aggression and

⁶⁷ For a description of the expanding U.S.-India security ties, see "U.S., India May Share Assets to Offset China's Reach," *The Maritime Executive*, February 29, 2016.

⁶⁸ Sam LaGrone, "U.S. Edges Out Russia To Become India's Largest Military Equipment Supplier," *USNI News*, August 14, 2014; Richard Weitz, "Russian Arms Sales to India Under Threat," *Second Line of Defense*, December 19, 2011.

thwarting encroachments on the territorial claims of U.S. allies and partners. Development priorities and forces for large-scale conflict are derived from our assessment of a future conflict involving a Chinese invasion of Taiwan. In this chapter and in succeeding chapters, we provide specific numbers of forces that we deem appropriate for meeting the needs of each scenario. As noted in Chapter One, these numbers are offered as a basis for estimating and comparing the approximate costs of the alternative forces provided in the final chapter; they should not be regarded as definitive estimates of force requirements for future campaigns.

Proposed Building Blocks of U.S. Forces for China

Steady State

Force Posture

- CSG home-ported in Japan (in place currently)
- five USAF and USMC fighter squadrons in Japan (in place currently)
- rotational presence of bomber, fighter, tanker aircraft, and nuclear-powered attack submarines SSNs to Guam (in place currently)
- rotational deployments of USMC and USAF units in northern Australia (in place currently)
- increased tempo of training and exercise deployments with naval, marine, and air forces of Japan, Australia, the Philippines, and other regional partners
- measures to enhance the resiliency of air bases, including selective hardening of key facilities and predeployment of airfield damage repair teams and equipment
- regular rotational deployments of land-based aircraft and support assets to a network of dispersal bases in Japan, the Philippines, Micronesia, and elsewhere; ensure that USAF, USMC, and USN units operating land-based aircraft have sufficient maintenance and support capacity to sustain operations at a large number of wartime dispersal bases.
- rotational deployment of USN assets in Singapore and Philippines to maintain “Asiatic Fleet” of gray- and black-hulled ships to provide presence in the SCS.

Development Priorities

- LRASM and other weapons for long-range anti-surface warfare (ASuW) attacks
- precision-guided aerial sea mines
- new, longer-range, high-speed anti-radiation air-to-surface missile
- improved, longer-range air-to-air missiles
- long-range, low-observable ISR and strike platforms, including USAF’s long-range strike bomber, the B-21
- enhanced electronic warfare (jamming) systems for aircraft and surface ships
- mobile, land-based cruise missile defenses (e.g., the Army’s IFPC-2 SHORADS or equivalent)
- continued development and fielding of fifth-generation fighter aircraft
- space resiliency measures and counter-space systems.

Priority Enhancements for Taiwan's Forces

- mobile land-based short- and medium-range ASCMs
- small and medium-sized UAVs for reconnaissance and targeting
- mobile, short-range air defenses
- Multiple Launch Rocket System (MLRS) with area munitions
- shallow-water mines.

Large-Scale Conflict

- 25 squadrons of USAF fighter aircraft (F-22, F-35A, F-15C, F-15E, F-16)
- eight squadrons of USMC fighter aircraft (F/A-18, F-35B)
- seven squadrons of heavy bombers (B-1B, B-2, B-52)
- ten orbits of survivable ISR/C2 aircraft
- additional maintenance and base support manpower in USAF, USMC, and USN aviation squadrons to support dispersed and expeditionary basing. (10,000 total billets)
- 24 attack submarines
- two Ohio-class guided-missile submarines (SSGNs)
- five CSGs
- MPA
- 15 amphibious warfare vessels and their embarked complement of Marines
- three infantry brigade combat teams (IBCTs) and sustainment assets for protection and support of airbases and ports
- SOF teams to provide liaison and assistance to forces on Taiwan
- increased procurement of standoff attack weapons, including LRASM, JASSM, JASSM-Extended Range (JASSM-ER), and Miniature Air Launched Decoy (MALD).

Responding to Russia's Remilitarization of Geopolitics in Europe

Background and Purpose

Russian President Vladimir Putin's decision to annex Crimea and to destabilize eastern Ukraine sparked widespread concern among Western policymakers that Russia has embarked on a more confrontational policy that could have far-reaching implications for Russia's relations with the West and for European security. Russia's actions overturn two basic assumptions on which U.S. policy toward Europe in the post-Cold War era had been based: (1) that Europe is essentially stable and secure, thereby allowing the United States to focus greater attention and resources on other areas, particularly Asia and the Middle East; and (2) that Russia has become more of a partner than an adversary.¹ What has emerged since 2014 is a "Cool War" between Russia and the Atlantic Alliance.² This is a much more complex contest than the more monochromatic struggle of the early Cold War period. Productive diplomatic links between Russia and the West remain, permitting both sides to engage on matters of mutual interest. On the other hand, military relations between North Atlantic Treaty Organization (NATO, also known as the Atlantic Alliance) and Russia are fraught, and the balance of power on NATO's eastern flank is once again cause for concern.

This chapter assesses the trends in Europe that have been shaped by Russian aggression against Ukraine. It then posits these scenarios: How would a Russian military move on the Baltic states play out, how could NATO respond, and what would be the likely outcome? It also considers some of the questions posed by those who regard such a scenario as unlikely. It then considers a campaign that employs less than a direct attack by armored forces—one that employs campaign of coercion, intimidation, and subversion to achieve its ends. It concludes with a discussion of the implications for force planning.

¹ F. Stephen Larrabee, Peter A. Wilson, and John Gordon IV, *The Ukraine Crisis and European Security—Implications for the United States and U.S. Army*, Santa Monica, Calif.: RAND Corporation, RR-903-A, 2015.

² For a description of the possible emergence of a Cool War between the United States and China, see Paul K. Davis and Peter A. Wilson, *Looming Discontinuities in U.S. Military Strategy and Defense Planning—Colliding RMA's Necessitate a New Strategy*, Santa Monica, Calif.: RAND Corporation, OP-326-OSD, 2011.

New Security Trends in Europe

In fact, nowhere is the gap between U.S. security commitments and regional posture more pronounced than in Europe.³ In September 2014, in a high-profile speech in Tallinn, Estonia, President Obama underscored the U.S. commitment to defend the territorial integrity of NATO allies with these words:

[W]e will defend the territorial integrity of every single [NATO] ally . . . Article 5 is crystal clear. An attack on one is an attack on all. So, if . . . you ever ask again, who'll come to help, you'll know the answer: the NATO alliance, including the armed forces of the United States of America . . . You lost your independence once before. With NATO, you will never lose it again.⁴

The President's speech was made the day before the NATO summit in Wales—a meeting that took place while Russian forces were actively prosecuting military operations against Ukraine. It is probably a good bet that, a year earlier, very few of the heads of government who were in attendance at the summit meeting expected to be called upon to consider how the alliance should respond to Russian military aggression in Europe. In the wake of the collapse of the Soviet Union in 1991, most Western policymakers viewed Russia as a state that shared important interests with the West and that had set itself on a path (albeit a bumpy and crooked one) toward political and economic reform and democratization. In any case, the poor state of the Russian economy and public sector finance through the 1990s meant that Russia's armed forces had very little capability to project conventional military power beyond Russia's borders.

As one result, the U.S. military presence in Europe declined from a peacetime presence of 340,000 in 1989 to 63,000 in 2014. The military forces and capabilities of most U.S. allies in NATO have declined by a similar magnitude. Most of the U.S. forces that remained in Europe had as their primary mission training with the forces of allied and partner nations for operations “out of area,” which, by 2002, meant principally in Afghanistan. The following few examples suffice to convey the overall picture:

- In 1991, the West German *Bundeswehr* fielded ten armored and armored infantry divisions with more than 5,000 tanks. Today, the German armed forces field three armored and two mechanized brigades with a total of 320 tanks.
- In 1991, the British Army fielded three armored divisions and a mechanized brigade with more than 1,300 tanks. The United Kingdom (UK) today fields two armored and three mechanized brigades with approximately 225 tanks.
- In 1991, the UK fielded 29 operational fighter squadrons, including 11 Royal Air Force (RAF) squadrons for fighter/ground attack and bombing missions. Today, the UK as a whole fields just eight squadrons, including three Tornado and three Typhoon squad-

³ Portions of this chapter are drawn from David Ochmanek, Andrew R. Hoehn, James T. Quinlivan, Seth G. Jones, and Edward L. Warner, *America's Security Deficit*, Santa Monica, Calif.: RAND Corporation, RR-1223-RC, 2015.

⁴ The White House, Office of the Press Secretary, “Remarks by President Obama to the People of Estonia,” September 3, 2014.

rons for fighter/ground attack missions, and two Typhoon squadrons for air dominance operations.⁵

- Average defense spending by non-U.S. NATO countries today accounts for less than 1.5 percent of those nations' GDPs.⁶ By contrast, the United States spends 3.4 percent of its GDP on defense. Russia today spends an estimated 4.5 percent.

Western policymakers' views and expectations of Russia's trajectory were reflected in the approach they took to NATO's enlargement. As the alliance grew from its Cold War core of 16 members to its current 29 by adding states to the east and south of the original treaty area, no real efforts were made to adjust the alliance's military posture or planning to support the new commitments that were being made. The underlying assumption was that the only significant security challenges facing NATO/Europe lay either in the potential for failure of newly democratizing states to reform or outside of NATO from terrorist groups or failing states. The allies therefore focused their training efforts on civil-military reforms, basic tactical skills, and counterinsurgency and stability operations, as highlighted by NATO's operations in Afghanistan under the aegis of the International Security Assistance Force.

Russia's use of covert subversion and, especially, overt military aggression to alter the political and territorial status quo in Europe has dramatically changed the security situation facing the alliance. During Putin's second incumbency as president, Russia has made clear its that its goal is to maintain a "privileged" status on its periphery, using force if necessary to keep states there in its strategic orbit and creating a geographic and political buffer between the Russian Federation and the West.⁷ Contrary to the expectations of Western leaders for the past two decades, Russia under Putin does not seek further integration into global security structures; indeed, Putin has made it clear that he sees such integration as a threat to his regime and, hence, something to be resisted.

And, with the (at least temporarily) improved performance of Russia's economy as support, Moscow since 2008 has been upgrading the readiness of its armed forces, while investing in modern weapon systems and expanding the role of contract (professional) soldiers, as opposed to relying heavily on conscripts. In particular, Russia's armed forces seem to have emphasized improvements in the manning, training, and readiness of conventional land and air forces, and investments in surface-to-air defenses, a new generation of armored fighting vehicles (AFVs), artillery, precision strike systems, and nuclear forces.⁸ Simultaneously, the

⁵ These numbers do not include training and test units. The 1991 numbers do not include a flight of fighters in the Falklands. See International Institute for Strategic Studies, *The Military Balance 1990–1991*, London: Brassey's, 1990; International Institute for Strategic Studies, *The Military Balance 2016*, London: Routledge, February 9, 2016; and personal notes and calculations of Air Commodore Andrew Lambert, RAF.

⁶ For a comprehensive description of NATO Europe's military reductions since the turn of the decade, see F. Steven Larrabee, Stuart E. Johnson, John Gordon, Peter A. Wilson, Caroline Baxter, Deborah Lai and Calin Trenkov-Wermuth, *NATO and the Challenges of Austerity*, Santa Monica, Calif.: RAND Corporation, MG-1196-OSD, 2012.

⁷ For a cogent treatment of Russian foreign policy and objectives since the Crimean annexation, see Olga Oliker, Christopher S. Chivvis, Keith Crane, Olesya Tkacheva and Scott Boston, *Russian Foreign Policy in Historical and Current Context: A Reassessment*, Santa Monica, Calif.: RAND Corporation, PE-144-A, 2015. For Russian views of the "dangers" posed by NATO and other international actors, see Security Council of the Russian Federation, "Military Doctrine of the Russian Federation: Approved by Order of the President of the Russian Federation on December, 26, 2014, Order No. 2976," 2014.

⁸ For a comprehensive overview of the Russian Federation Armed Forces' modernization prospects and challenges, see Jakob Hedenskog and Carolina Pallin, eds., *Russian Military Capability in a Ten-Year Perspective-2013*, Stockholm, Sweden:

Russian armed forces have developed a strategic concept of New Generation Warfare (NGW) that advocates the use of all instruments of state power, including diplomacy, economic-financial instruments, information operations, conventional forces, and nuclear forces.⁹

Furthermore, NATO planners must give due consideration to the presence of a Russian Non-Strategic Nuclear Forces (NSNF). Current public analyses suggest that the Russian armed forces maintain 1,000 to 2,000 operational theater/battlefield nuclear weapons that could be employed in support of Russian combined arms operations. Not unlike NATO's posture during the first decade and a half of the Cold War, the Russian political military leadership has been quite explicit about its reliance on its nuclear arsenal as an "asymmetric" source of military strength in face of what it perceives as the conventional superiority of the Atlantic Alliance.

Formally, the public Russian military doctrine states that nuclear weapons will only be used in response to use of a biological, chemical, or nuclear weapon or against a conventional campaign that is threatening the existence of the Russian state.¹⁰ What has become much more alarming over the course of the past two years of the Ukraine-Russia crisis has been persistent threats by a variety of Russian political leaders that nuclear weapons might come into play if a European conflict broke out between Russia and the Atlantic Alliance. A year ago, a threat by the leader of the Russian Parliament that "Russia had the capacity to turn the United States into radioactive ash" could have been dismissed as irresponsible rhetoric.¹¹ Since that time, there has been a persistent pattern of statements by an array of Russian authorities, including Putin, that highlight Russia's large and diverse nuclear arsenal. Although the concept of using nuclear weapons in a limited and controlled fashion to de-escalate a regional conflict appears not to have formal doctrinal standing, the concept of limited nuclear weapon use has been discussed in a wide range of Russian national security fora.¹² Furthermore, the Russian armed forces have conducted numerous military exercises where nonstrategic and strategic nuclear weapon use has been part of the exercise play.¹³

One of the possible casualties of the emergence of a Cool War between the Atlantic Alliance and Russia is the demise of the Intermediate Nuclear Forces (INF) Treaty. Cur-

Swedish Defense Research Agency (FOI), December 2013.

⁹ For two excellent analyses of the emerging Russian doctrine of the use of state power across domains of deterrence and coercion, see Dmitry Adamsky, *Cross-Domain Coercion: The Current Russian Art of Strategy*, IFRI Security Studies Center, Proliferation Papers 54, November 2015; and Kristin Ven Bruusgaard, "Russian Strategic Deterrence," *Survival*, August–September 2016.

¹⁰ The public operative statement is as follows:

"The Russian Federation reserves the right to use nuclear weapons in response to use against it and (or) its allies of nuclear and other weapons of mass destruction, as well as in the case of aggression against the Russian Federation with the use of conventional weapons, when under threat the very existence of the state. The decision to use nuclear weapons is taken President of the Russian Federation."

See Security Council of the Russian Federation, 2014; Roger N. McDermott, *Russia's Conventional Military Weakness and Substrategic Nuclear Policy*, Fort Leavenworth, Kan.: Foreign Military Studies Office, 2012.

¹¹ For a description of this threat made by a noted Russian media commentator, see Olikier et al., 2015.

¹² For a detailed analysis of Russian nuclear forces and their doctrine of use, see Hedenskog and Pallin, 2013. For another survey of Russian thinking on regional nuclear deterrence options, see Dmitry Adamsky, "Nuclear Incoherence: Deterrence Theory and Non-Strategic Nuclear Weapons in Russia," *The Journal of Strategic Studies*, Vol. 37, Routledge, 2014.

¹³ See Hedenskog and Pallin, 2013.

rent public evidence indicates that the Russians are conducting tests of a long-range ground-launched LACM in a clear violation of the INF agreement that bans this class of weapon. The weapon in question appears to be the Iskander M, SSC-X-8, with a range well beyond the 500-kilometer range limits specified by the INF. One worry is that if the INF Treaty is repudiated by Moscow, the Putin regime may develop and deploy a new nuclear-armed transcontinental range ballistic missile similar to the SS-20.¹⁴ More plausible is that Russia's motivation is driven by the need to radically upgrade its long-range conventional precision strike capability. A large-scale deployment of GLCMs or ballistic missiles within the European theater would provide the Russian armed forces with a precision deep strike option able to put key NATO military and civilian infrastructures at risk.

Under these circumstances, decisionmakers in NATO countries must once again ensure that some semblance of a military balance exists along the alliance's eastern flank as part of what could prove to be a long-term competition with Russia. A failure to do so would put the allies in the position of relying on the restraint and forbearance of an adversary that has stated its intention to divide and discredit the alliance. A central theme of this competition should be to demonstrate to Moscow that its aggressive actions would prompt countermeasures that, in the end, leave it less, rather than more, secure. Above all, steps are called for to deny Russia the prospect of a low-cost, low-risk invasion of NATO territory, especially in the militarily vulnerable region of the Baltic Sea.

Since Russia's attacks on Ukraine, the allies have not stood still. Specifically, NATO's member states have

- Deployed four battalion-sized battle groups to the Baltic states
- stepped up the pace of ground force exercises in Eastern Europe, to include periodic deployments of U.S. ground forces, including an armored brigade
- deployed additional tactical aviation assets in Poland and stepped up levels of air policing activity in the Baltics¹⁵
- designated a "very high readiness joint task force"—a brigade-sized, multinational unit that will be prepared to deploy within two days¹⁶
- restocked the Marine prepositioning equipment set in central Norway
- pledged (so far, with varying degrees of follow-through) to increase their defense spending and capabilities.¹⁷

The European Reassurance Initiative (ERI) announced by DoD in early 2016 represents a positive next step. It quadruples, from \$800 million to \$3.4 billion, DoD's spending on military posture and activities in NATO Europe, supporting increased levels of presence, training,

¹⁴ The Russian military leadership might decide to deploy a variable range variant of the SS-27 Topol-family ICBM, thereby obviating the cost of developing a purpose-built IRBM, currently banned by the INF Treaty.

¹⁵ NATO, "Allies Enhance NATO Air-Policing Duties in Baltic States, Poland, Romania," April 30, 2014.

¹⁶ This task force is supposed to be operational in 2016. See Brooks Tigner, "NATO Approves Interim Rapid Response Force for 2015," *IHS Jane's Defence Weekly*, December 1, 2014. These light air transportable brigades have modestly greater combat power and mobility than the U.S. 173rd Airborne BCT based in northeastern Italy.

¹⁷ The United States' ERI proposal for fiscal year (FY) 2017 represents a significant step in this regard. Plans call for prepositioning heavy Army equipment in Europe, upgrading key logistic and transportation infrastructure, and other enhancements.

and prepositioning of equipment and supplies.¹⁸ These and other measures should improve the military balance on the Atlantic Alliance's eastern flank, but considerably more will need to be done, given the size and types of force that Russia can bring to bear. For example, in the summer 2014, as Putin sought to coerce the leaders of Ukraine into accepting a de facto Russian-dominated state carved out of Ukraine's eastern provinces, he was able to muster a force of approximately 90,000 troops, comprising armor, artillery, and mechanized and heliborne infantry, as well as SOF and tactical aviation forces. These forces demonstrated abilities to conduct sustained maneuver operations over a period of months, to employ modern reconnaissance systems for targeting, and to deliver accurate, timely artillery fire against troop formations. These capabilities were employed to shield the Donbas separatists from military defeat.¹⁹ Given the geography and transportation networks in western Russia, forces of this magnitude can be deployed to border regions within days to at most weeks, whereas NATO, even with a full implementation of the 2016 Warsaw summit initiatives, would still need many months to deploy a comparable force to its eastern flank.

Scenario: Defending the Baltic States

To test the adequacy of NATO's defense posture and to develop insights regarding the demands of a defensive campaign, RAND in 2014 developed a scenario depicting Russian military aggression against the Baltic states in the year 2020. Using unclassified data depicting the capabilities, readiness, and geographic disposition of Russian forces, the scenario envisaged Russia moving approximately 25 battalion tactical groups to the borders of Estonia, Latvia, and Lithuania within ten days of an order to deploy. These armored and motorized ground force units would be supported by large formations of artillery, modern long-range SAM systems, and tactical aviation. In response, NATO could send light forces, such as U.S., French, and British airborne units, along with the sole remaining U.S. Army maneuver force in Germany—a Stryker brigade—to the region to reinforce local and forward-deployed allied defense forces.²⁰ NATO could also deploy significant combat air forces—fighter and bomber aircraft, ISR platforms, and aerial tankers—to the region. Figure 3.1 shows how Russian and NATO forces might be arrayed after ten days of deployment by the Russian side and seven days by NATO.

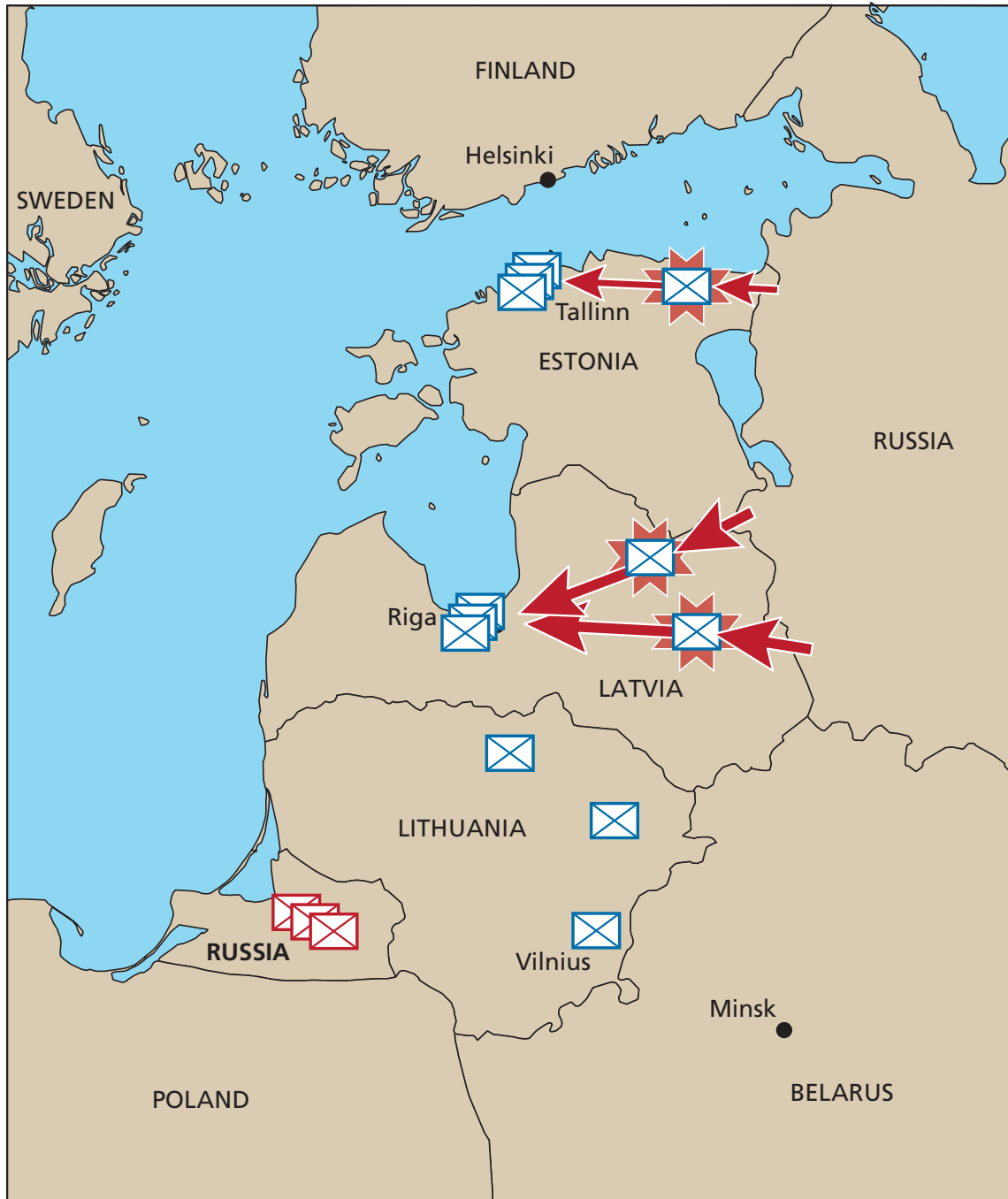
As Figure 3.1 shows, force ratios in our scenario after a few days of Russian mobilization are unfavorable to NATO. Seventeen NATO battalions face a force of 25 Russian battalions. The disparity in actual ground combat power of the two forces is far greater. Because the Rus-

¹⁸ The White House, Office of the Press Secretary, "Fact Sheet: The FY2017 European Reassurance Initiative Budget Request," February 2, 2016.

¹⁹ Igor Sutyagin, *Russian Forces in Ukraine*, London: Royal United Services Institute, March 2015, p. 2. During this military intervention with regular forces, the Russian Army demonstrated its capacity to use a combination of UAVs and electronic intelligence to provide timely targeting of Ukrainian motorized units and subject them to devastating long-range artillery and rocket fire.

²⁰ DoD has announced plans to preposition equipment for U.S. Army ABCTs in Europe. Under those plans, the Army will, by 2020, have an "activity set" for one armored brigade and prepositioned equipment for a second brigade in countries on NATO's eastern flank, to include the Baltic states. Depending on how rapidly forces can marry up with these equipment sets and move them to threatened areas, they have the potential to make a substantial contribution to a defense against armed aggression. See Mark Landler and Helene Cooper, "U.S. Fortifying Europe's East to Deter Putin," *New York Times*, February 2, 2016.

Figure 3.1
Relative Force Dispositions in the Baltic Region in a 2020 Scenario



RAND RR1782-3.1

sian force is made up of armored and motorized units heavily supported with artillery, and the NATO force is mostly composed of light infantry, NATO ground forces are badly “out-gunned.” Moreover, the bulk of the NATO force being nonmotorized infantry, it lacks the tactical mobility that would be needed to maneuver against the attacking force.²¹ The United States and its allies can deploy combat air forces to the threatened region more quickly, and this represents an area of relative advantage for NATO. A key question for our analysis was: Can NATO air power make up for this disparity in ground combat power?

We assessed the balance of forces using a simple tabletop game that allows players to develop courses of action and employ forces at the battalion and squadron levels. Blue and Red teams have free play and the outcomes of their moves, which depict military operations in twelve-hour time steps, are adjudicated by a White Cell. Over a period spanning 12 months in 2014 and 2015, ten different Blue and Red teams played the game, evaluating the ability of NATO forces programmed for 2020 to defend the Baltic states against the sort of attack outlined earlier.²² In no case did we judge that NATO forces would be able to defeat the attack. In all cases, Russian forces were able to reach the outskirts of Riga or Tallinn or both within 48 to 60 hours of the initiation of hostilities.²³ The attacking forces used their superior firepower and mobility to fix in place any defending infantry units they encountered and either bypass or destroy them. Recognizing this reality, most Blue teams elected to deploy the bulk of their ground forces in the capital cities, recognizing that fighting in urban areas improved their chances of avoiding rapid losses. But with no prospect of resupply or reinforcement for Blue forces, the outcome of that fight would not be in doubt. In the words of one U.S. Army member of a Blue team, “We are, at this point, either hostages, prisoners, or casualties.”²⁴

NATO airpower was able to impose significant attrition on the attacking Red forces—destroying on the order of two to three battalion equivalents per day in some games. But without a heavy Blue ground force to compel the Red forces to slow their advance, deploy off-road, and concentrate for battle, Blue air forces did not have sufficient time or lethality to halt the invasion short of its primary objectives. The airpower “hammer,” as it were, needs a heavy armored “anvil” against which to pound the invasion force.²⁵

²¹ The U.S. Army plans to equip its airborne units with unarmored all-terrain vehicles (ATV) and light armored Joint Tactical Light Vehicles (JTLV). These vehicles will provide air landed and/or air dropped light infantry with enhanced mobility and firepower to act either as a counter to Russian Special Forces or as a screening force for heavier NATO units. For a description of the ATV-class vehicle, see Jen Judson, “Polaris Defense Rolling Out Turbo Diesel MRZR,” *Defense News*, May 16, 2016c. Motorized forces will remain vulnerable to mass rocket fires, as shown during the Russian military intervention in the Donbas region during the summer 2014.

²² Blue teams consisted of U.S. military officers, defense civilians, and RAND staff; Red teams were made up of analysts of the Russian military from the U.S. Intelligence Community (IC) and RAND staff, as well as people with expertise in military operations.

²³ For an in-depth description of the operational challenges associated with defending the Baltic states, RAND’s gaming tool, and insights derived from the games, see David A. Shlapak and Michael W. Johnson, *Reinforcing Deterrence on NATO’s Eastern Flank: Wargaming the Defense of the Baltics*, Santa Monica, Calif.: RAND Corporation, RR-1253-A, 2016b.

²⁴ See David A. Shlapak and Michael W. Johnson, “Outnumbered, Outranged, and Outgunned: How Russia Defeats NATO,” *War On the Rocks*, April 21, 2016a.

²⁵ This is not to say that local Baltic forces cannot be upgraded to improve their ability to complicate the operations of an invasion force and impose a somewhat greater level of attrition on it. Improved tactical mobility, ISR, and anti-armor guided weapons, along with engineering preparations to facilitate interdiction of bridges and roads in selected areas can help. But with a combined population that is only four percent of Russia’s, modest-sized economies, and no ability to trade space for time, even upgraded forces can do little on their own to break the momentum of a large-scale armored attack.

The task of the Blue force's air commander was complicated by the presence of dense arrays of modern SAM defenses that Russia brings to the theater. Since the end of the Cold War, the Russians have developed and deployed new generations of SAMs, the likes of which U.S. forces have never encountered in combat. In our games, Blue players found it difficult to quickly suppress these defenses and were compelled to devote substantial numbers of sorties to that task, while constraining the operations of the rest of the force to reduce its exposure to the SAMs. Some Red teams also employed their air forces in aggressive ways to challenge Blue's defensive combat air patrols, further reducing the ability of Blue air to bring the fight to the invading Red ground force.

Red teams also used long-range air- and submarine-launched cruise missiles to attack targets in NATO's rear areas. Common targets were military headquarters, logistics hubs, and airbases playing host to heavy bombers, aerial refueling aircraft, fifth-generation fighters, and other high-value assets.²⁶

In short, we concluded that, as currently postured, NATO cannot defend the Baltic states against a determined, short-warning Russian attack. Until rectified, the capability shortfalls that account for this vulnerability mean that the Baltic states live under the threat of a swift, low-cost *coup de main* by Russian conventional forces. In light of these results, we used the game to explore a range of potential enhancements to NATO forces that might make possible a successful defense. Each of the ten Blue teams that played the game using the programmed force and posture was given the opportunity to replay with enhanced forces. The nature of the enhancements varied over the course of the research, but the initiatives that seemed to make the most difference are summarized next.

Heavy ground forces—ABCTs available from the outset of the conflict—appear to be the *sine qua non* of a successful defense. Without these, Blue forces have no significant ability to challenge the enemy's scheme of maneuver. With them, Blue forces have multiple options to engage an attacking force, even in the limited battle space provided by the terrain of the Baltic states.

The U.S. experience of conflict in the post-Cold War era has been overwhelmingly characterized by expeditionary operations, in which the bulk of the force to conduct an operation deploys temporarily to the region of conflict. This approach has worked well in the tactical and operational sense when confronting militarily weak regional and non-state adversaries, but it is not appropriate against a capable adversary fighting close to its own borders. For these situations, as was the case during the Cold War in Europe, there can be no substitute for forward basing (or at least prepositioning) heavy ground forces and other assets forward. Such a posture can help greatly to preclude the possibility of a sudden *coup de main* offensive.

The prospect of confronting three U.S. or multinational ABCTs fundamentally alters the adversary's campaign plan, compelling them to adopt a more conservative approach. Under these circumstances, Russian forces would be compelled to array forces along multiple axes, to include the Suwalki gap between Belarus and Kaliningrad. If supported by sufficient firepower and sustainment assets, the U.S./NATO ABCTs can engage and disengage the attacking force, compelling it to fight or to seek to avoid battle and thereby disrupting its progress toward the capital cities. This creates more opportunities for U.S./NATO air forces and artillery to attack the enemy's maneuver forces.

²⁶ Russia has already demonstrated its ability to employ a new generation of non-nuclear LACMs by launching these from air and sea platforms against targets in Syria.

Ideally, therefore, NATO would forward deploy three to four heavy brigades, totaling approximately 15,000 to 20,000 troops, to the Baltic region, along with layered air and missile defenses. We judge that this would likely be sufficient to deny Russia the prospect of a swift *coup de main* with a short-warning attack and, as such, would greatly strengthen deterrence and regional security. These forces, in conjunction with the land and air forces employed in the baseline case and the other enhancements listed later in this chapter, can impose substantial delays and attrition on attacking forces and allow NATO commanders to defend the Baltic states' capitals from an initial assault. However, depending on the size, duration, and tactics of a Russian offensive, these forces might not be sufficient for a sustained defense and could not mount a counteroffensive to regain lost territory.

Some combination of forward-based and rotationally deployed ground forces, along with their consumables (e.g., ammunition, fuel, spare parts) and supporting elements (e.g., artillery, engineering, transportation assets, communications gear) is called for to constitute a robust deterrent posture.²⁷ Much of the equipment for these units already exists in Army storage facilities and in Army National Guard units.²⁸ Equipment and supplies for a USMC brigade are already prepositioned in Norway. With sufficient warning time, Marines could marry up with this gear and deploy to threatened areas of Europe.²⁹ Ready, follow-on NATO ground forces would be required to reinforce this initial defending force and to provide a stalwart defense against a mobilized Russian attack.

Other steps to enable effective defensive operations should include

- prepositioning or deploying one or more Army fires brigades armed with the MLRS and improved reconnaissance and targeting systems
- prepositioning large numbers of modern air-delivered antiarmor munitions at bases in Europe
- prepositioning or stationing forward several Army sustainment brigades equipped with armored logistics trucks and heavy equipment transporters (HETs)
- ensuring that NATO air forces have improved capabilities and concepts for rapid suppression of the enemy's integrated air defenses and for cruise missile defense A longer-range, fast-flying radar-homing missile to supplement the AGM-88 high-speed antiradiation missile appears to be a particularly urgent need.
- improving ground-based air defenses (NATO ground units need modern SHORADSs, such as the IFPC 2 system being developed by the U.S. Army, to protect themselves from enemy UAVs, attack helicopters, and fixed-wing aircraft.³⁰ To counter the threat of Russian cruise missiles NATO will want similar air defense systems at important rear area

²⁷ RAND gaming and associated analysis has not exhaustively examined all plausible scenarios and, in particular, has not explored in depth the demands of sustaining the defense and eventually rolling back Russian forces from any territory they might manage to occupy. Ongoing analysis is beginning to address these questions.

²⁸ Shlapak and Johnson, p. 11.

²⁹ During the spring 2016 NATO reinforcement exercise, USMC equipment in the hardened facilities in Trondheim, Norway, were moved by a UK Ro-Ro ship to Riga, Latvia, to marry up with Marines airlifted from Bulgaria. See Megan Eckstein, "U.S. Marines Amass Forces, Prepositioned Gear For Saber Strike 16 With NATO Allies," *USNI News*, June 13, 2016b.

³⁰ "Versatile Air Defense System Being Tested by U.S. Army," *UPI*, April 28, 2016.

bases, headquarters, and logistics and transportation hubs. Some of these facilities might also require hardening to enhance their survivability.)

- providing command and control of joint operations. Since the deactivation of the U.S. V Corps headquarters in 2013, NATO forces in Europe lack a readily available, deployable headquarters to command multinational ground and air operations.

Russia's adoption of an antagonistic security strategy, along with the modernization and increased readiness of key elements of its armed forces, comes as a particularly disquieting development for the U.S. Army. The USAF and USN have been grappling for nearly a decade now with a rapidly growing set of challenges from China's armed forces. However, the Army and, to a degree, the USMC have been viewed as playing less important roles in a potential conflict with China and, hence, they have been more focused on meeting the very considerable demands of protracted counterterrorism, counterinsurgency, and stability operations in Afghanistan and Iraq. For the foreseeable future, large-scale maneuver warfare against Russian forces should constitute the pacing threat for the heavy maneuver, attack aviation, artillery, and air defense forces of the Army.³¹

Beyond the capabilities listed earlier, other developmental priorities for the Army should include:

- armored vehicles that have active protection against modern anti-tank guided missiles
- artillery and ISR systems that can locate and attack long-range rocket artillery pieces, as well as other mobile targets, including SAM radars and launchers
- backup systems to the GPS that can operate in the presence of heavy electronic jamming
- cyber- and jam-resistant secure communications.³²

Finally, as a part of their deterrent against possible Russian aggression, the United States and its allies will want to retain the ability to employ nuclear weapons. France, the UK, and the United States have ample means for striking an adversary with high-yield nuclear warheads—a capability that is most useful for deterring attacks on their homelands. But the allies will also want to have options for a graduated nuclear response should the situation call for it. This will require low-yield weapons that can be targeted flexibly and delivered with high confidence against a range of military targets.

Questioning the Scenario

Some will argue that the force and posture enhancements called for here are excessive, claiming that Putin (and, presumably, his successors) have little interest in reoccupying the Baltic

³¹ Some may argue that, in light of the future prospects for Russian national power, NATO need not take energetic steps to bolster its deterrent. Russia's economy has not been able to generate significant levels of innovation or sustainable growth outside of extractive industries, it faces looming demographic challenges, and Putin's antagonistic policies and authoritarian governance have cut off the country from external investment. None of these realities, however, seem likely to impose near-term constraints on Moscow's ability to project power along its periphery. And Putin or his successors might see foreign adventurism as a means of distracting the populace from its dissatisfaction with its material well-being. For an insightful analysis of Russia's economic prospects under Putin, see Nigel Gould-Davies, *Russia's Sovereign Globalization: Rise, Fall, and Future*, London: Chatham House, January 2016.

³² David E. Johnson, *The Challenges of the "Now" and Their Implications for the U.S. Army*, Santa Monica, Calif.: RAND Corporation, PE-184, 2016, p. 10.

States or other NATO member countries, or that if Moscow does harbor aggressive intent, that NATO's aggregate economic and military power would be sufficient to deter overt aggression. Judgments along these lines might be correct. But it is worth noting that assessments of adversaries' intentions have, in the past, often proved to be poor guides to strategy and policy. For example, few observers—even well-informed ones—expected Saddam Hussein to invade Kuwait in 1990. Because our ability to predict human behavior is so limited, sound force planning relies instead on assessments of the military capabilities and objectives (vice intentions) of other actors. As we have seen, a serious imbalance in military capabilities exists today on NATO's eastern flank. And Moscow, under Putin, has been quite clear regarding its objectives vis-à-vis NATO. For example, Russia's current military doctrine states that the "approach of the military infrastructure of NATO member countries to the borders of the Russian Federation" constitutes one of the "main military dangers" confronting Russia.³³ In addition, Putin has complained that, "NATO and the U.S. wanted a complete victory over the Soviet Union. They wanted to sit on the throne in Europe alone."³⁴ Therefore, it must be assumed that Russia, under its current leadership, will be working to weaken and discredit NATO.

In light of these realities, the force posture and capability initiatives advocated in this report for NATO seem reasonable. As noted earlier, such a posture would not be capable of preventing the loss of any territory to a determined Russian attack. However, it would be able to prevent the rapid seizure of large parts of the Baltics and would surely impose heavy losses on an invading force, thus strengthening deterrence. As for the possibility that moves such as those called for in this report could prompt Russian countermoves, our gaming shows that the enhanced NATO force does a far better job of defending Baltic territory than the current force, even when the attacking force is significantly larger than assumed in the baseline. And there are, in any case, limits to how much more Moscow can spend on its armed forces, given the poor state of its economy.

The Hybrid Threat

Outright, large-scale military aggression is, of course, not the only means available to the Russian leadership to advance its objectives vis-à-vis NATO/Europe. If Moscow seeks to divide NATO and discredit the allies' security commitments to one another, it could pursue a campaign of coercion, intimidation, and subversion against one or more NATO member states. Russia's leaders might hope that such a campaign could destabilize the target state, creating a pretext for external intervention or some negotiated deal leading to a compromise of the target state's sovereignty.³⁵

Estonia and Latvia appear to be the most likely targets of such a campaign because of their proximity to Russia and because both have large, Russian-speaking minorities, many

³³ Security Council of the Russian Federation, 2014.

³⁴ Belfer Center for Science and International Affairs, "Russia in Review," John F. Kennedy School of Government, Harvard University, January 15, 2016.

³⁵ For a discussion of the Russian concept of "New Generation Warfare," which has been labeled hybrid warfare by much of the NATO defense community, see Adamsky, 2015.

members of which have not been granted full citizenship.³⁶ The Russian government funds pro-Russia organizations in the Baltics.³⁷ It also supports broadcasts of propaganda, news, and entertainment programs in Russian, to the extent that, in the view of some analysts, Russian-speaking minorities in the Baltics exist in a “separate information space” from the rest of the population.³⁸ Through the press and official pronouncements, Moscow keeps up a steady drumbeat of criticism of the governments of both countries for alleged mistreatment of their Russian speakers. In 2007, tensions between Estonia and Russia spiked when the government of Estonia moved a statue commemorating the Soviet Union's victory over Nazi Germany from central Tallinn to a military cemetery. Russia responded with strong official condemnations, propaganda, economic sanctions, and waves of cyberattacks against Estonia's government and banking sectors.

Russia used similar hybrid³⁹ tactics (known as “active measures” in its lexicon) as a precursor to its seizure of Crimea in early 2014 and to destabilize eastern Ukraine later that year. While such activities can be used to pressure or threaten target countries and to lay the groundwork for attacks with conventional forces, they are not likely, in and of themselves, to overturn a legitimate and competent government or compel it to cede a portion of its territory to Russian control. In summer 2014, the relatively weak government in Kiev was able to defeat pro-Russian separatists in eastern Ukraine until Moscow intervened directly with military forces. Security officials in Estonia and Latvia express confidence in their ability to control their territories and to respond effectively to Russian-backed provocations.⁴⁰ And, Russian propaganda notwithstanding, the bulk of the evidence suggests that Russian speakers in the Baltics, by and large, are not dissatisfied with their lot. They are economically better off than average Russians across the border and enjoy the advantages that come with living in the European Union.

Actions the Baltic States Can Take to Enhance Security

In short, like other analysts who have studied this problem, we conclude that the greatest security threat facing the Baltic states stems from Russia's local superiority in conventional military forces, which could be employed either at the outset of a campaign of aggression or in the second phase of a hybrid operation that faces resistance. However, to reduce the likelihood of

³⁶ Thirty percent of Latvians identify as Russian-speaking; the figure is 34 percent for Estonia. Through its “Compatriots” policy, the Russian government claims the right to protect the rights of Russian-speaking populations outside of the Russian Federation.

³⁷ Mike Winnerstig, ed., *Tools of Destabilization: Russian Soft Power and Non-Military Influence in the Baltic States*, Stockholm, Sweden: Swedish Defense Research Agency (FOI), December 2014, pp. 22–24.

³⁸ Winnerstig, p. 53.

³⁹ Students of Russian strategy have used the term *hybrid warfare* in a variety of ways. We use it here to refer to the use of nonviolent activities (including deniable or covert violent ones), possibly supported by military forces, to influence and subvert the domestic politics of target countries. See Andrew Radin, *Hybrid Warfare in the Baltics: Threats and Potential Responses*, Santa Monica, Calif.: RAND Corporation, forthcoming; and Pasi Eronen, *Russian Hybrid Warfare: How to Confront a New Challenge to the West*, Center on Sanctions & Illicit Finance, June 2016.

⁴⁰ When asked how his forces would respond if Russia sent “little green men” across the border into his country, the chief of Estonia's defense forces replied simply, “We will shoot them.” See Eric Schmitt and Steven Lee Meyers, “NATO Refocuses on the Kremlin, Its Original Foe,” *New York Times*, June 23, 2015.

miscalculation and bolster stability, there is value in helping to ensure that the Baltic governments and their allies have appropriate capabilities for addressing potential Russian aggression across the spectrum of conflict. To this end, and in addition to the initiatives outlined earlier for deterring large-scale attack, the United States and its allies should consider steps along the following lines.

- They should evaluate the adequacy of the Baltic states' border-monitoring and border-control capabilities. If shortfalls are evident, they should test the contribution that such systems as tethered aerostats, long-dwell UAVs, and other types of sensors could make.
- They should review procedures and practices for rapid sharing of intelligence among NATO allies and between defense and internal security organizations within key allied countries.
- They should continue a robust program of training between U.S. and allied special operations and cyber forces, including operations to counter covert Russian provocateurs.
- They should conduct foreign internal defense (FID) exercises with rotationally deployed battalions in the Baltic states and host-country internal security forces.⁴¹
- Finally, if and as the United States and its allies begin to deploy substantial military assets and forces forward in the Baltic states in peacetime, they should take pains to minimize Moscow's ability to characterize such deployments as offensive or destabilizing. Deploying them in areas removed from concentrations of Russian-speakers and being transparent about the capabilities and missions of these forces can help.⁴²

The Black Sea Region

From a military perspective, the situation along the Black Sea is not as fraught for NATO as the Baltic Sea region. Ukraine stands between the Russian Federation and the NATO allies Romania and Bulgaria. On the other hand, Moscow is further militarizing the Crimea and conducting a military buildup near Ukraine.⁴³ The fate of Moldova, with its quasi-independent Transnistrian region calling for complete independence, remains uncertain. Modest Russian forces deployed there provide a security role for a regime that has gone through a series of domestic crises.

Consistent with the agreement reached at the 2014 Wales Summit, the NATO states have begun to enhance incrementally the alliance's military posture in the southern states of Eastern Europe. Through the ERI, the United States is upgrading military facilities in Romania and Bulgaria. Small contingents of U.S. Army forces have also increased the tempo of their training activities in the region. The USMC has established a company-sized Black Sea Rota-

⁴¹ The decision at the 2016 Warsaw Summit to deploy a NATO ground force battalion in each of the Baltic states materially enhances those states' internal defense capacity against any "little green men" scenario, as well as providing a foundation for a more effective defense against a larger-scale conventional invasion.

⁴² Larrabee, et al., 2015.

⁴³ Crimea saw a buildup of the Russian Federation Air Force (RFAF) during the summer 2016. For a description of the Russian deployment of the S-400 strategic SAM system, see "Ukraine Crimea: Russia Sends New Air Defence Missiles," *BBC News*, August 12, 2016.

tional Force (BSRF) in Bulgaria to conduct combined arms training with the Bulgarian and Romanian armed forces and to provide the nucleus of a larger force if reinforcements would be needed. These Marine reinforcements might arrive in the form of a brigade-size Maritime Prepositioned Force (MPF) squadron that could be forward deployed in the European theater above and beyond the Marine assets deployed from Norway. One option for consideration is to redeploy the MPF squadron from Diego Garcia to a location in Europe—say the Azores, Portugal; Rota, Spain; or Augusta Bay, Italy. The Augusta Bay harbor on the eastern coast of Sicily has particular geographic merit since the MPF squadron could be deployed from there to the Black Sea or along the North African littoral within two and a half days sailing time. A deployment to the Persian Gulf via the Suez Canal would require approximately ten and a half days, a sailing time that would be double the time from its current location in Diego Garcia.⁴⁴

A resumption of major hostilities between Ukraine and Russia could trigger a more substantial buildup in the Black Sea region. The new wild card in these calculations for NATO is the fall-out from the failed military coup against the Erdogan government in Turkey. This has led to at least a temporary warming of relations between Ankara and Moscow. It is now uncertain how the Ankara government would react to a new regional military crisis between Russia and Ukraine.⁴⁵

Implications for Force Planning

The decline of U.S. force presence in Europe and what appears to be an increasingly autocratic Russian leader have raised the stakes for all NATO members. In his actions in the Ukraine and Crimea, Putin has shown himself willing to take advantage of the United States' entanglements in the Middle East and the advantage of geographic proximity. His modernization of Russian forces has made them equal to or in some respects superior to NATO forces, including those of the United States. He also appears willing to use hybrid warfare tactics to intimidate and undermine bordering states.

The gold standard of deterrence and assurance is a defensive posture that confronts the adversary with the prospect of operational failure as the likely consequence of aggression. While in-depth analysis of potential scenarios involving Russian aggression against NATO's eastern flank has only recently begun, it is clear that in many plausible scenarios, NATO forces, as postured today, would be unable to defeat or even meaningfully impede a sizable combined arms invasion aimed at occupying the Baltic capitals. Steps can and should be taken to address major gaps in NATO's defensive posture on its eastern flank. Analysis to date suggests that moving toward the posture and capabilities outlined below would be appropriate.

⁴⁴ This assumes the MPF squadron sails at a speed of 17 knots. The offloading of equipment and the reception process with USMC personnel flown in to a nearby airfield, the Joint Reception, Staging, Onward Movement, and Integration (JROSI) process, would take several additional days. For a more complete description of the USMC preposition program, see Headquarters, U.S. Marine Corps, *Crisis Response, Global Reach, Forward Presence: Headquarters, U.S. Marine Corps Prepositioning Program Handbook*, 2nd ed., Washington, D.C.: U.S. Marine Corps, PCN 50100234000, January 2009; Joint Publication 3-35, *Deployment and Redeployment Operations*, Washington, D.C.: U.S. Joint Chiefs of Staff, January 31, 2016.

⁴⁵ For an analysis of these potential shocks between the European Union, NATO, and Turkey, see Sinan Ulgen, "The Strategic Consequences of Turkey's Failed Coup," *Project Syndicate*, July 18, 2016.

Steady State Presence

Force Posture⁴⁶

- Stryker brigade in Germany (consider converting this unit to an armored BCT or armored cavalry regiment) (in place currently)
- five fighter squadrons (in place currently)
- equipment sets for three ABCTs prepositioned in the Baltic countries, Poland, or Germany, along with sustainment assets (e.g., engineering, logistics) and consumables (ammunition, fuel); some combination of rotationally deployed and forward-stationed forces to man this equipment
- forward stationed corps-level headquarters in Poland, plus augmentation to U.S. Army European Command headquarters to permit it to serve as the combined forces land component command headquarters
- one Army fires brigade permanently stationed in Poland, with 30-day stock of artillery rounds; one additional fires brigade equipment set prepositioned
- modern SHORADSs organic to each forward maneuver brigade and permanently stationed at five USAFE bases (one platoon each)
- theater stocks of advanced air-delivered munitions, including high-speed anti-radiation missiles (HARM), advanced medium-range air-to-air missiles (AMRAAM), JASSM, JASSM-ER, SFW/P3I, and MALD.

Developmental Priorities

- a new longer-range high-speed anti-radiation air-to-surface missile for suppressing modern SAM systems
- mobile short-range air defense system (e.g., IFPC 2 or derivative)
- space resiliency measures and counter-space weapons
- LRASM
- area munitions for MLRS/Army Tactical Missile System (ATACMS) to allow for effective attacks on unarmored and lightly armored vehicles, such as mobile SAM systems and self-propelled artillery
- modernized version of aircraft-delivered tactical nuclear bomb.

Mid-Range Hybrid Contingency

- SOF elements to advise and assist host country forces
- cyber support teams
- intelligence collection and analysis assets; for example, two orbits of Predator/Reaper or tethered aerostats, unattended ground sensors
- one brigade of light infantry.

⁴⁶ Under the FY 2017 ERI and decisions announced at the 2016 Warsaw Summit, one armored brigade set will be prepositioned along the alliance's eastern flank and, beginning in 2017, one U.S. Army battalion will be rotationally deployed in Poland, while Germany, Canada, and the UK will provide rotational battalion battle groups in Lithuania, Latvia, and Estonia, respectively.

Large-Scale Conflict⁴⁷

Early-arriving forces (by C+15):

- three ABCTs by C+3 (to be forward-based)
- one Stryker BCT (based in Germany)
- two IBCTs by C+7 (one of which, the 173rd brigade, deploys from Vincenza, Italy)
- SOF teams by C+7
- one ABCT by C+9 (activity set will be in Germany by 2018)
- one Marine Expeditionary Brigade (drawn from the prepositioned equipment set in Norway) plus three Marine fighter squadrons
- 28 USAF fighter squadrons (five of these are already in USAFE)
- seven squadrons of heavy bombers
- five orbits of survivable ISR platforms plus manned C2ISR aircraft (E-3, E-8, RC-135)
- one carrier battle group (CVBG) (in North Sea)
- MPA.

Later-arriving forces:

- one armored division headquarters
- two ABCTs, one combat aviation brigade (CAB), plus engineer and sustainment brigades
- one to two Army fires brigades
- one Marine expeditionary brigade
- 20 attack submarines
- one CVBG.

One final note: In the near term, DoD could bolster NATO's defenses against an armored invasion by making an exception to its policy of planning to retire stocks of most cluster munitions (air- and artillery-delivered) by the end of 2018. Stockpiling large numbers of these weapons at bases in central Europe would be a politically sensitive move, because unexploded cluster weapons have caused injury and death to civilians in past conflicts. But such weapons as the dual-purpose improved conventional munitions (DPICM), used by the Army, and combined effects bomblets (CEB) used by the Air Force, are highly effective against mechanized ground forces, and no fully effective substitutes yet exist.

⁴⁷ This building block reflects the assumption that non-U.S. NATO allies contribute substantial forces to a combined defensive operation in the Baltic states: three to four heavy BCTs, one to two light BCTs, artillery, 15 to 20 squadrons of fighter aircraft, and other assets.

Countering a Nuclear-Armed North Korea

Background and Purpose

Sixty years of uneasy peace on the Korean peninsula can obscure the danger that North Korea still poses to the United States and its allies. Most important, North Korea's acquisition of nuclear weapons means that it has the potential to cause immense damage to South Korea, Japan, and perhaps one day to the United States.¹ North Korea's military—the world's fourth-largest standing armed force—continues to pose a latent threat of invasion to the Republic of Korea (ROK), a longtime treaty ally of the United States.² Another reality makes all of these scenarios particularly combustible: North Korea has engaged in a series of provocative behaviors, including the sinking of a South Korean navy vessel and shelling of a North Korean island in 2010, that suggests that Pyongyang, perhaps especially under the leadership of Kim Jong-un, is aggressive, risk-taking, potentially irrational, and therefore a threat to international security.³ South Korea's determination to respond forcefully to future North Korean armed provocations underscores the possibility of escalation.⁴ Although unprovoked nuclear aggression appears unlikely, there is also the possibility that the North Korean regime could collapse and lead to a situation in which opportunistic generals or nefarious actors attempt to steal and proliferate chemical, biological, or nuclear weapons.⁵

With more than 1 million active-duty personnel, the North Korean armed forces (technically, the Korean People's Army) are formidable, although much of their equipment is outdated.⁶

¹ For an authoritative source on North Korean nuclear weapons, see Mary Beth Nitikin, *North Korea's Nuclear Weapons: Technical Issues*, Congressional Research Service, RL34256, 2013. For a reliable nongovernment source on North Korea's nuclear program, the Nuclear Threat Initiative maintains an informative web page on North Korean nuclear weapons and also its biological and chemical weapons programs. Nuclear Threat Initiative, "North Korea," undated, last updated September 2016.

² International Institute of Strategic Studies, *The Military Balance 2014*, London: Routledge, 2014, p. 254.

³ For a theoretical explanation of the existence of reckless, irrational states that sometimes initiate irrational wars, see John J. Mearsheimer, "Reckless States and Realism," *International Relations*, Vol. 23, No. 2, 2009.

⁴ Jeffrey Lewis, "More Rockets in Kim Jong Un's Pockets: North Korea Tests a New Artillery System," *38 North*, U.S.-Korea Institute at John Hopkins School of Advanced International Studies, March 7, 2016.

⁵ For a discussion of North Korean collapse, see Robert D. Kaplan, "When North Korea Falls," *Atlantic Monthly*, Vol. 298, No. 3, 2006. For an exposition of the danger of loose biological, chemical, and nuclear weapons in an anarchic North Korea, see Timothy Bonds, Eric V. Larson, Derek Eaton, and Richard E. Darilek, *Strategy-Policy Mismatch: How the U.S. Army Can Help Close Gaps in Countering Weapons of Mass Destruction*, Santa Monica, Calif.: RAND Corporation, RR-541-RC, 2014, pp. 24–25.

⁶ Office of the Secretary of Defense, *Report to Congress: Military and Security Developments Involving the Democratic People's Republic of Korea*, Washington, D.C.: U.S. Department of Defense, 2015, p. 10.

Nonetheless, its stock of military hardware includes more than 3,000 tanks, a wide variety of artillery systems, a diverse but dated air defense system, a sizable fleet of submarines, and hundreds of fighter aircraft and helicopters.⁷ Most worryingly, North Korea has deployed an arsenal of perhaps 14,000 total cannon and rocket artillery systems,⁸ many of which threaten Seoul with massive bombardment.⁹ North Korea also possesses more than 800 short- and medium-range ballistic missiles (see Figure 4.1).¹⁰ That North Korea has developed such an extensive array of weaponry can be attributed to its military-first policy (*songun*): North Korean armed forces receive preferential treatment in the distribution of societal resources.¹¹

The disposition of North Korea's conventional forces is also a source of concern: More than 70 percent of North Korea's ground forces are located within 100 kilometers of the demilitarized zone (DMZ), the dividing line between North and South Korea.¹² In addition to maintaining this large conventional force, the North Korean leadership has focused on developing unconventional capabilities: special forces, chemical weapons, biological weapons, and nuclear weapons and delivery systems. In fact, North Korea's special forces are the largest in the world and could greatly complicate any conflict by striking behind South Korean lines in "second front" operations.¹³ North Korea's inventory of chemical weapons, estimated at 2,500 to 5,000 metric tons of chemical agents and including as many as 150 warheads for ballistic missiles, could similarly render a Korean battlefield extremely lethal, especially for unprepared civilian populations.¹⁴ North Korea could employ them early in a conflict as a gambit to slow U.S. and South Korean operations, hoping to achieve quick gains.¹⁵ In testimony before the House Armed Services Committee in June 2017, Defense Secretary James Mattis stated that, "North Korea's continued pursuit of nuclear weapons and the means to deliver them has increased in pace and scope." He added that "the regime's nuclear weapons program is a clear and present danger to all."¹⁶

⁷ International Institute of Strategic Studies, 2014, pp. 254–257.

⁸ Republic of Korea Ministry of National Defense, 2014 *Defense White Paper*, 2014, p. 261.

⁹ Office of the Secretary of Defense, 2015, p. 11.

¹⁰ The Nuclear Threat Initiative, "North Korea," undated, last updated September 2016.

¹¹ Alexander V. Vorontsov, "North Korea's Military-First Policy: A Curse or a Blessing," *North Korean Review*, 2006.

¹² Office of the Secretary of Defense, 2015, p. 10. Similarly, Scobell and Sanford state that 80 percent of North Korea's "aggregate firepower" is within 100 miles of the DMZ. Andrew Scobell and John M. Sanford, *North Korea's Military Threat: Pyongyang's Conventional Forces, Weapons of Mass Destruction, and Ballistic Missiles*, Carlisle, Pa.: U.S. Army War College, 2007, p. xii.

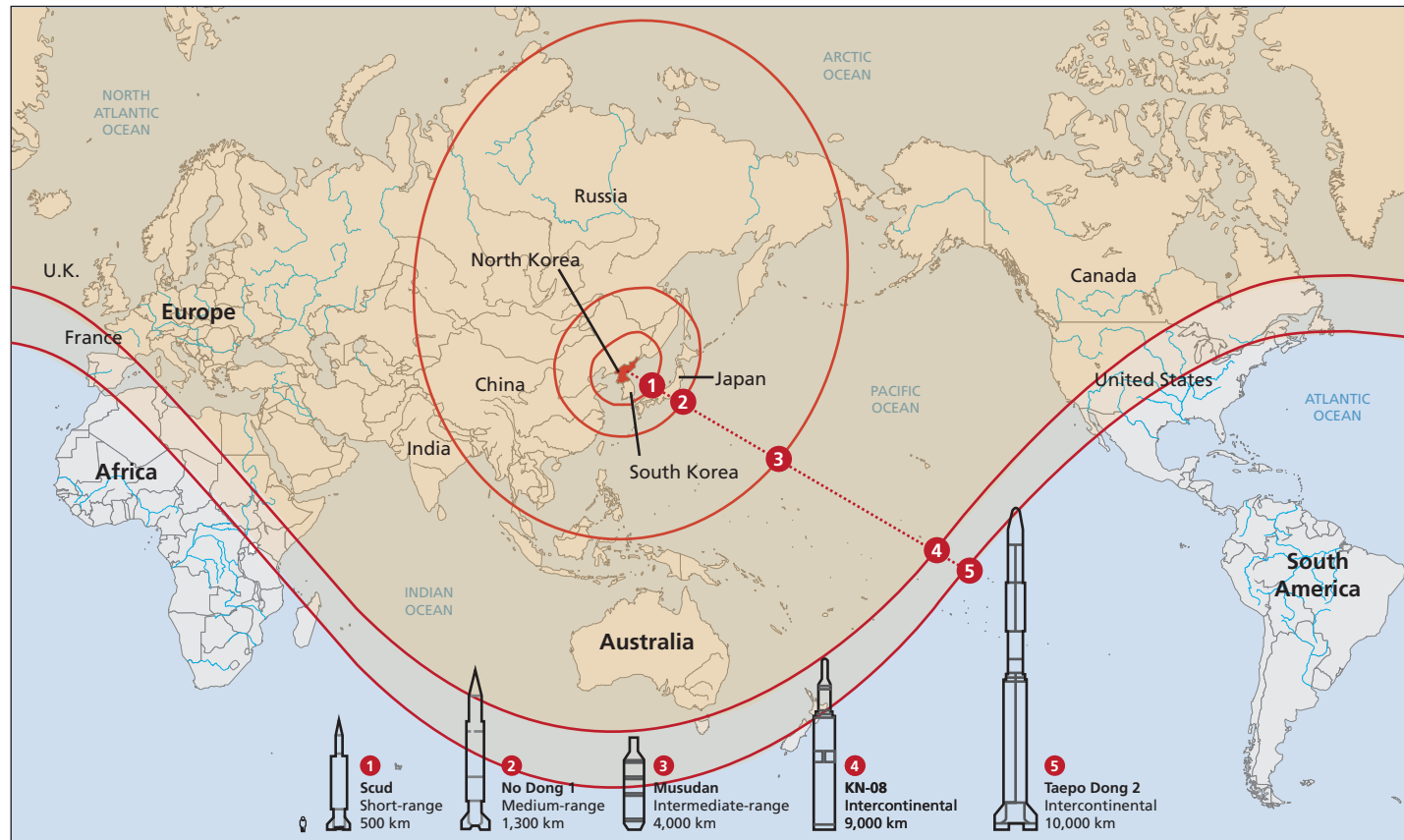
¹³ Scobell and Sanford, 2007, pp. xii, 1. The *Military Balance* estimates nearly 90,000 people are in the North Korean special forces (see International Institute of Strategic Studies, 2014, p. 255). South Korea's 2014 Defense White Paper estimates that North Korea possesses 200,000 special forces (Republic of Korea Ministry of National Defense, 2014, p. 29).

¹⁴ Joseph S. Bermudez, "North Korea's Chemical Warfare Capabilities," 38 *North*, U.S.-Korea Institute at John Hopkins School of Advanced International Studies, October 10, 2013.

¹⁵ Scobell and Sanford, 2007, pp. 102–106. For an estimate that North Korea may have 2,500 to 5,000 tons of chemical weapons, see Republic of Korea Ministry of National Defense, 2008 *Defense White Paper*, 2008, pp. 39–40, as quoted in Bruce W. Bennett, *Preparing for the Possibility of a North Korean Collapse*, Santa Monica, Calif.: RAND Corporation, RR-331-SRF, 2013, p. 4.

¹⁶ Franz-Stefan Grady, "U.S. Defense Secretary: North Korea 'Most Urgent and Dangerous Threat' to U.S. Security," *The Diplomat*, June 13, 2017.

Figure 4.1
Emerging North Korean Ballistic Missile Capacity



SOURCE: Missilethreat.com, "Ballistic Missiles," and Reuters. "North Korea Missiles Could Reach US Says South," NBC News, December 23, 2012, and John Schilling. "Where's That North Korean ICBM Everyone Was Talking About?" 38 North, March 12, 2015. <http://38north.org/2015/03/jschilling031215/> (accessed August 24, 2015).

RAND RR1782-4.1

Preparing for possible conflict on the Korean peninsula will remain an important factor in U.S. force planning because North Korea remains hostile and heavily armed and because a collapsed North Korea could present a major threat of instability and nuclear proliferation. This chapter outlines three distinct sources of North Korea-related demand for U.S. military capabilities, identifies appropriate forces for these scenarios, and suggests additional military capabilities that could help to ensure the success of South Korean and U.S. forces in their peacetime and wartime missions. The first source of demand is steady-state deterrence, underwritten by the continued presence of American forces in and around South Korea. The second and third are scenarios depicting, respectively, a large-scale cross-border attack by North Korea on South Korea and a collapse of authority in North Korea, followed by a large-scale stabilization mission.

The Steady State

The United States' peacetime presence in South Korea both deters a large-scale North Korean attack and facilitates a rapid and effective U.S. military response should war or a collapse of the North Korean state occur. The forward deployment of a heavy BCT, a CAB, artillery and air defense brigades, three squadrons of F-16C/Ds, and one squadron of A-10s could reduce the possibility that a North Korean leader might believe that a rapid attack across the demilitarized zone could succeed.¹⁷ Should deterrence fail, the United States' forward-deployed forces would help to provide indications and warning of an impending attack, facilitate the deployment of large-scale U.S. reinforcements, and assist South Korean forces in halting a North Korean offensive. Critical operational tasks in the opening phase of the conflict would include destroying or slowing the invading force and silencing North Korean artillery aimed at Seoul.

U.S. air forces can deploy to the region in a matter of a few days; however, ground forces based elsewhere would only reach the theater after several weeks to months of mobilization and transport. The potential that an escalating series of tit-for-tat exchanges between North and South Korean forces could lead to a major war makes this forward presence of U.S. forces especially important.¹⁸ A peacetime presence of both forces and headquarters staff also enables planning and liaison activities between U.S. forces and their South Korean counterparts. Finally, the U.S. forward presence signals to North Korean leaders that a conflict on the Korean peninsula would virtually guarantee the involvement of the military forces of the United States, potentially including U.S. nuclear weapons.

The current U.S. peacetime posture in South Korea is fairly robust. Nearly 30,000 U.S. forces are deployed on the peninsula, providing tangible evidence of the U.S. commitment to South Korean security. U.S. forces in Japan, including a forward-deployed aircraft carrier,

¹⁷ Forward-deployed forces reduce the probability of a successful North Korean attack by slowing an attack and by serving as a "tripwire"—a force that, if attacked, will lead the United States to deploy a much larger force. For data on U.S. forces in South Korea, see International Institute of Strategic Studies, 2014, p. 55.

¹⁸ This scenario may become increasingly likely as the leadership in Pyongyang comes to believe that its nuclear arsenal provides a deterrent against a South Korean or U.S. response to a future North Korean military provocation. This sequence of events unfolded during the Kargil crisis between Pakistan and India when Pakistani leaders believed that its newfound nuclear weapons shielded Pakistan from a major Indian military response after encroachments on the line of control. Paul K. Davis, Peter A. Wilson and Jeong Eun Kim, "Deterrence and Stability for the Korean Peninsula," *Korean Journal of Defense Analysis*, Vol. 28, No. 1, 2016.

destroyers, F-16s, F-15s, and a Marine brigade equivalent in Okinawa, provide a further backstop against future North Korean provocations.¹⁹ The United States' credible security guarantee to South Korea also reduces the incentives for South Korea to pursue its own nuclear force, a move that could catalyze further proliferation, raise the specter of preemptive conflict, and increase the odds of accidental nuclear use.²⁰

Potential Changes to the Steady State

The danger of North Korean nuclear weapons and ballistic missiles, especially if North Korea has indeed "miniaturized" its nuclear weapons, justifies some changes to the United States' peacetime posture in South Korea.²¹ More forward-stationed Patriot batteries and THAAD missile defenses, whether South Korean- or U.S.-operated, could help blunt the threat posed by North Korean nuclear weapons while reducing the wartime burden on scarce U.S. strategic airlift assets. The operational deployment of a THAAD system in South Korea is currently planned for 2017.²² It is also worth considering whether the current set of ISR assets deployed in and around Korea can be enhanced to enable better monitoring and tracking of North Korean nuclear weapons and their delivery systems. Military planners should also examine the technological and doctrinal demands of a potential non-nuclear counterforce campaign that aims to quickly neutralize North Korean nuclear weapons and their associated delivery systems. The South Korean military has already begun investing in this option.²³ The United States should also consider a wide range of conventional strike capabilities for this mission.

Some South Korean officials and commentators, in addition to a few American analysts, have called for the United States to redeploy tactical nuclear weapons to South Korea.²⁴ While these advocates support sensible objectives—moderating or reversing the North Korean nuclear buildup, deterring war, and deterring nuclear use should war occur—those advocat-

¹⁹ International Institute of Strategic Studies, 2014, p. 55.

²⁰ For two articles that demonstrate the connection between American security guarantees and the decision of U.S. allies to not develop nuclear weapons, see Philipp C. Bleek and Eric B. Lorber, "Security Guarantees and Allied Nuclear Proliferation," *Journal of Conflict Resolution*, Vol. 58, No. 3, April 1, 2014; and Nuno P. Monteiro and Alexandre Debs, "The Strategic Logic of Nuclear Proliferation," *International Security*, Vol. 39, No. 2, October 1, 2014. A comparative historical study by Lyle Goldstein demonstrates the preemptive pressures unleashed by nuclear proliferation. Lyle Goldstein, *Preventive Attack and Weapons of Mass Destruction: A Comparative Historical Analysis*, Stanford, Calif.: Stanford University Press, 2006. For an analysis that emphasizes the dangers of accidents involving nuclear weapons, especially for new nuclear weapon states, see S.D. Sagan, *Limits of Safety: Organizations, Accidents, and Nuclear Weapons*, Princeton, N.J.: Princeton University Press, 1995. We should note that there are some South Korean voices in support of nuclear weapons. See the speech of M.J. Chung, a seven-term member of South Korea's National Assembly (M.J. Chung, "Thinking the Unthinkable on the Korean Peninsula: Nuclear North Korea & Reunification," *Pacific Forum CSIS: Issues & Insights*, Vol. 14, No. 2, April 29, 2014).

²¹ Barbara Starr and Ryan Browne, "Intel Officials: North Korea 'Probably' Has Miniaturized Nuke," *CNN*, March 25, 2016; and David E. Sanger and Choe Sang-Hun, "As North Korea's Nuclear Program Advances, U.S. Strategy Is Tested," *New York Times*, May 6, 2016.

²² Jack Kim, "South Korea, U.S. to Deploy THAAD Missile Defense, Drawing China Rebuke," *Reuters*, July 8, 2016.

²³ Zachary Keck, "With North Korean Nukes, More May Be Better," *The Diplomat*, October 4, 2013.

²⁴ Choe Sang-Hun, "After Tests in the North, Conservatives in South Korea Call for a Nuclear Program," *New York Times*, 2016. and "Project Atom: A Competitive Strategies Approach to Defining U.S. Nuclear Strategy and Posture for 2025–2050," The Center for Strategic and International Studies, May 2015, p. vii.

ing the return of U.S. tactical nuclear weapons to South Korea understate the downsides of deploying nuclear weapons at bases now within range of North Korean missiles. U.S. bomber forces can strike North Korea promptly and at will from bases on U.S. territory.²⁵ Whatever added deterrent value that nuclear weapons deployed on-peninsula might have, their benefits would have to be weighed against the risks that would result from deploying these weapons within range of North Korean short- and medium-range ballistic missiles. If policymakers wish to further shore up deterrence and defense against North Korea's growing nuclear capabilities, investments in improved ISR, active defenses, and conventional counterforce capabilities seem more appropriate.²⁶ Should the South Korean and Japanese governments nonetheless press Washington for additional reassurance, the United States might consider stationing air-delivered nuclear weapons on Guam.

Scenario: North Korea Invades South Korea

Needless to say, any large-scale attack on South Korea would be fraught with enormous, even existential, risks for Pyongyang. Nevertheless, defeating an all-out invasion remains the ultimate test of the military balance on the peninsula and of the adequacy of South Korean and U.S. capabilities.

A cross-border invasion could begin with a fierce artillery bombardment of the territory from the border to Seoul and an attempt to cross the DMZ.²⁷ Attacks by North Korean special forces on targets in the rear areas of South Korea and U.S. forces would likely accompany an offensive. The heavy concentration of North Korean forces near the DMZ allows Pyongyang to mass infantry and armored forces quickly, leaving South Korea and the United States little time to prepare.²⁸ North Korean forces would likely attempt to overrun Seoul, forcing South Korean capitulation before U.S. reinforcements could turn the tide of battle.

The probable U.S. and South Korean response can be divided into three phases: halt, "build and pound," and then counterattack.²⁹ South Korea's roughly 520,000 active-duty Army soldiers and Marines would necessarily shoulder the lion's share of the burden of halting the North Korean ground offensive.³⁰ Meanwhile, USAF, USMC, and USN aviation forces would focus their attention on silencing North Korean artillery and delaying, disrupting, and

²⁵ The United States has and will have the option of deploying a portion of its B61 family of nuclear bombs to be delivered by strategic bombers operating from Guam as part of an enhanced deterrent and defense posture.

²⁶ Van Jackson makes related arguments in "The U.S. Doesn't Need Tactical Nuclear Weapons in Asia," *The Diplomat*, July 2, 2015.

²⁷ A key unknown is whether the North Koreans might use biological and chemical weapons as part of this mass bombardment of Seoul. Such mass use of WMDs raises the policy question of whether the United States would use nuclear weapons in response.

²⁸ Not to be discounted are the extensive fortifications north of Seoul that South Korea has erected over the past several decades that would slow down a North Korean offensive.

²⁹ These stages are similar to the first three phases of war with a major regional power as described in the Bottom-Up Review. Les Aspin and Colin L. Powell, *Bottom-Up Review*, Washington, D.C.: U.S. Department of Defense, Office of Assistant Secretary of Defense (Public Affairs), 1993; International Institute of Strategic Studies, 2014, p. 254.

³⁰ International Institute of Strategic Studies, *The Military Balance 2015*, London: Routledge, 2015, p. 264. The South Korean Army is scheduled to shrink by over 100,000 soldiers over the next six years. Ashley Rowland and Yoo Kyong Chang, "South Korea to Shrink Armed Forces by a Fifth in Next 8 Years," *Stars and Stripes*, 2014.

destroying invading North Korean forces. After this halt phase, the United States would continue to deploy forces to South Korea, while simultaneously attacking, with airpower and artillery, military targets throughout North Korea. Conceptually similar to the first 38 days of Operation Desert Storm, this military phase enables U.S. and South Korean forces to prepare for the counteroffensive.

U.S. military forces in the third phase have traditionally planned to defeat North Korean forces comprehensively, depose the regime, and occupy the entire territory of North Korea. Given the possibility of large-scale attrition of South Korean forces during the halt phase, and the twin U.S. advantages in mobile logistics and precision munitions stocks, participation by U.S. armored and mechanized forces in the counterattack would be essential. Absent the use by North Korea of nuclear weapons and no significant use of biological and chemical weapons, U.S. and South Korean forces would be expected to deal a fairly swift defeat to the remaining North Korean forces.³¹ U.S. forces appropriate for this scenario are adapted from DoD sources and RAND war games, and are presented at the end of this chapter.

Of course, the possibility of nuclear use by North Korea, especially as an attempt to stave off defeat, now hangs over this scenario.³² North Korea could employ nuclear weapons early in a war to bolster its battlefield chances. Additionally, a North Korean leadership that failed to achieve its military objectives early in a conflict might have strong incentives to use nuclear weapons as a means of coercing South Korea and the United States into halting their counteroffensive. The United States' overwhelmingly superior nuclear arsenal would surely be a factor in the North Korean calculus, but it would be imprudent to assume that nuclear deterrence will automatically hold in a war involving a nuclear-armed regional adversary. Put simply, an adversary leader facing almost certain defeat might easily come to believe that he will not be any worse off for having used a portion of a nuclear arsenal than if he were to forgo their use. North Korean nuclear weapons might also be employed accidentally or without authorization through a devolution of control to local commanders or a technical error in the North Korean command and control systems.³³

For these reasons, we believe that deterrence of a nuclear-armed adversary with inferior conventional forces may be more brittle than commonly thought. This reality underscores the importance of fielding improved capabilities for preventing (as opposed to deterring) the North's use of nuclear weapons—such capabilities as improved reconnaissance and tracking systems; rapid, precision strike; and multilayered, active defenses.³⁴ North Korea's preferred means of delivering nuclear weapons beyond the immediate battlefield zone will likely be bal-

³¹ Nick Beldecos and Eric Heginbotham, "The Conventional Military Balance in Korea," *Breakthroughs*, Vol. 4, No. 1, 1995. Beldecos and Heginbotham employ two different combat models, use extremely conservative assumptions about the performance of North Korean forces, and still find that a North Korean offensive is extremely unlikely to reach Seoul. For an analysis that uses an alternative "micro-model" and comes to similar conclusions, see Michael O'Hanlon, "Stopping a North Korean Invasion: Why Defending South Korea Is Easier than the Pentagon Thinks," *International Security*, Vol. 22, No. 4, 1998. However, none of these articles deals with the mission of the counteroffensive into North Korea.

³² Keir A. Lieber and G. Daryl, *Coercive Nuclear Campaigns in the 21st Century: Understanding Adversary Incentives and Options for Nuclear Escalation*, Monterey, Calif.: The Center on Contemporary Conflict, 2013.

³³ For a discussion of the technical problems in nuclear command and control and their potential to lead to accidental nuclear use, see Bruce G. Blair, *The Logic of Accidental Nuclear War*, Washington, D.C.: Brookings Institution Press, 1993; and Sagan, 1995.

³⁴ David Ochmanek and Lowell H. Schwartz, *The Challenge of Nuclear-Armed Regional Adversaries*, Santa Monica, Calif.: RAND Corporation, MG-671-AF, 2008. See also Lieber and Press, 2013, pp. 14–15.

listic missiles. Because defenses against such missiles are far from perfect, countering North Korean nuclear weapons will also call for the capability to destroy those weapons or their delivery means before they are launched. While conventional counterforce attacks by South Korean and U.S. forces would be the preferred option, it is certainly conceivable that U.S. forces could be called upon to strike North Korean nuclear weapons and missile facilities with nuclear weapons in the midst of a conflict. The North's use of biological or chemical agents on a massive scale or imminent nuclear attacks could justify such a response. This scenario would likely call for air-delivered weapons that could be delivered promptly and accurately, and with selectable yields to help minimize collateral damage and nuclear contamination.

One intriguing possibility for improving active defenses is the development of boost-phase intercept missiles carried aboard aircraft. Intercepting ballistic missiles in boost-phase obviates problems presented by decoy warheads and salvage fusing of nuclear payloads. Airborne theater missile defense concepts require interceptor aircraft—each of which could cover only a limited area—to dwell over or near enemy territory. But North Korea's relatively small size, combined with its easily suppressed air defenses, appears to make it a suitable candidate for this type of approach.³⁵ These capabilities could enable a counterforce operation to unfold simultaneously with the traditional military missions in a major war.³⁶

If North Korea progresses toward having an operational and survivable ICBM capability, DoD will also wish to continue to invest in improvements to the reliability and effectiveness of its national missile defense system for the homeland. Additional possible investments in response to North Korea's acquisition of nuclear weapons include passive defenses at theater bases, preparations for dispersed operations, large-scale counternuclear exercises, and hardening weapon systems against the electromagnetic pulse of nuclear weapons.³⁷ The U.S. Army's heavy and Stryker BCTs will also have to play an important role in the event of North Korean nuclear use.³⁸ Lighter IBCTs, while more difficult to localize, are more vulnerable to the effects of nuclear weapons. Resupplying forces in a nuclear environment will require an innovative logistical system.

The discussion of this scenario would be incomplete without mentioning an important wild card: China. To limit damage to China itself and to ensure that it has a role in determining the shape of any post-conflict settlement, China could intervene in a war on the Korean peninsula. On the one hand, a forcible Chinese intervention could reduce the burden on U.S. and South Korean forces of defeating North Korean forces and securing sensitive sites. On the other hand, neither ally will welcome Chinese involvement in decisions regarding the fate of Korea north of the 38th Parallel. Furthermore, the possibility of armed clashes between Chi-

³⁵ Fighter aircraft equipped with high acceleration air-to-air missiles could perform this boost-phase mission.

³⁶ "Counterforce" refers to striking nuclear targets—weapons sites, missile sites, and anything related to North Korea's nuclear program. This definition could also extend to North Korea's biological and chemical programs and any associated delivery means.

³⁷ Peter Wilson and E. Colby, *Fighting a Nuclear-Armed Regional Opponent: Is Victory Possible?*, Washington, D.C.: The Center for Strategic and Budgetary Assessments, 2008, pp. 60–61.

³⁸ Armored forces equipped with heavy track laying AFVs are the least vulnerable to tactical nuclear weapon effects. Stryker armored vehicles provide protection from flash and local radiation but are more vulnerable to blast effects. Infantry forces can survive only while dug-in but have no survivable battlefield mobility.

nese and allied forces cannot be ruled out, especially if there has been no pre-conflict political and military coordination in this regard.³⁹

Post-Conflict or Post-Collapse Stability Operations

U.S. leaders in World War II knew what their successors relearned following the recent military victories in Afghanistan and Iraq: Success on the battlefield does not guarantee the achievement of strategic objectives. In addition to defeating the enemy's military forces, the United States and its allies must be ready for post-war occupation and stability operations. Whether the North Korean regime collapses from internal forces or as the result of war, South Korean and U.S. forces will need to control and eliminate biological, chemical, and nuclear weapons, police major population centers and elsewhere, conduct large-scale humanitarian operations, control the borders amid large refugee flows, defeat remaining pockets of military resistance, and dismantle large stockpiles of conventional weapons.⁴⁰ Post-conflict operations could require more of some types of forces than the conflict itself, and these forces could be engaged in helping to stabilize the situation for several years. At least several hundred thousand troops (provided jointly by South Korea and the United States) would likely be needed to perform a stabilization mission.⁴¹ Likewise, if the DPRK were to survive a future war, U.S. forces might be called upon to sustain a deterrent force on the peninsula that is considerably larger than the force deployed there today.

The most comprehensive, publicly available estimate of the forces required for a stabilization mission in North Korea suggests that at least 250,000 to 400,000 military personnel could be required to perform the necessary missions.⁴² Nearly 80 percent of the personnel would be devoted to providing basic policing and security functions. Of course, South Korea will be able to devote a large contingent of troops to this mission. Nonetheless, the United States might be called upon to send tens of thousands—if not hundreds of thousands—of soldiers should such a situation arise. This situation would place heavy demands not only on Army IBCTs and Stryker BCTs but also on the sorts of “below the line” capabilities that proved so invaluable in the Afghanistan and Iraq stability operations: civil affairs, military police, transportation, intelligence, and civil engineering, as well as counter-WMD specialists. Given that a stabiliza-

³⁹ The prospect of such preconflict coordination between China, South Korea, and the United States appears very unlikely so long as Beijing perceives that even a nuclear-armed North Korea remains on balance a geo-strategic asset.

⁴⁰ Bruce W. Bennett and Jennifer Lind, “The Collapse of North Korea: Military Missions and Requirements,” *International Security*, Vol. 36, No. 2, 2011.

⁴¹ Bennett and Lind, 2011.

⁴² Bennett and Lind, 2011. It should be noted that the rules of thumb by which these numbers were calculated are less than precise. Increasing the troop-to-population ratio certainly eases the military mission, but there are no strict cutoffs below which success is impossible and above which successful stabilization is guaranteed. For the basis of this caution, see Jeffrey A. Friedman, “Manpower and Counterinsurgency: Empirical Foundations for Theory and Doctrine,” *Security Studies*, Vol. 20, No. 4, 2011. James Quinlivan, in the mid-1990s era of “peace operations,” wrote the piece that set the terms of the debate over force levels (see James T. Quinlivan, “Force Requirements in Stability Operations,” *Parameters*, Vol. 25, No. 4, 1995). A RAND report from the 2000s also discussed force sizing (see James Dobbins, Seth G. Jones, Keith Crane and Beth Cole DeGrasse, *The Beginner's Guide to Nation-Building*, Santa Monica, Calif.: Rand Corporation, MG-557-SRF, 2007, pp. 37–41).

tion mission could last for several years, rotational forces will be needed, including forces from the Army's reserve component.

Rapidly locating and securing sites in North Korea associated with biological, chemical, and nuclear weapons will be a high priority objective. Nearly 200,000 soldiers could be required for the most plausible WMD-elimination scenario.⁴³ The United States ought to rely on South Korea to the extent possible to provide local policing and security during WMD elimination operations. American military forces can then specialize in providing key "high-demand, low-density" capabilities, such as airlift, ISR, and WMD elimination.

A More-Stressful Scenario?

An outright invasion of South Korea is not the only way in which large-scale conflict could recur on the Korean peninsula. Given Pyongyang's proclivity for violent provocations, one can easily imagine a series of escalating incidents that lead the North to cross one or more "red lines," for example, unleashing an artillery barrage on Seoul. Such an action could create tens of thousands of civilian casualties within minutes, compelling South Korean and U.S. leaders to take immediate and forceful action to stop the violence and prevent a recurrence. In this event, allied forces would face an intact North Korean military that could "dig in," fortifying itself before U.S. and South Korean ground forces arrive. If the decision were made to make a limited ground incursion into the North, South Korean, and U.S. forces would face hard fighting. Detailed analysis of such a scenario is not publicly available, but requirements for some types of forces might exceed those identified for the baseline scenario. Of course, North Korean possession of nuclear weapons might radically limit such a forceful allied response. As noted, any counteroffensive force would have to include heavy maneuver brigades trained and equipped to fight in a WMD "dirtied" environment. Furthermore, the tactical and operational logistics system would have to be much modified to accommodate such a lethal battlefield environment. At some point, the size and diversity of the North Korean nuclear arsenal may make any counteroffensive option by South Korea and the United States militarily unworkable without the extensive use of U.S. tactical nuclear weapons.

Implications for Force Planning

A mercurial young leader anxious to consolidate his power and achieve world leader status can pose a particularly complex problem. His clear desire to build up his nuclear arsenal only exacerbates the problem. He can use the threat of nuclear weapons to undergird conventional operations. He has considerable ground forces, and, although they may not be equipped with the latest military technology, they can pose a formidable challenge. North Korea's artillery, special operations, and forward-deployed ground forces, coupled with the regime's bellicose behavior, pose serious threats to peace and stability and merit continued attention from both South Korean and U.S. forces. At the same time, the allies must find ways to prevent Pyongyang from gaining decisive leverage from its growing arsenal of nuclear weapons and ballistic

⁴³ Bonds et al., 2014, p. 63. This estimate assumes a hostile threat environment at the WMD sites, a ratio of support troops of 2.5:1, and the minimum number of highest priority sites.

missiles. The following force posture and investment priorities are intended to address both types of challenges.

Steady State

Current Posture

- one Army heavy BCT
- one CAB
- one artillery brigade
- one air defense brigade
- three squadrons of F-16C/D
- one squadron of A-10s and one squadron of U-2s
- eight Patriot batteries
- one THAAD battery (in 2017)
- one Air Force special operations (AFSO) squadron

Developmental Priorities

- improved ISR capabilities for tracking North Korean nuclear weapons and delivery systems
- boost-phase intercept options

Wartime Mission⁴⁴

- five or more Army divisions (16 BCTs)
- 18 Marine infantry battalions with up to 30 amphibious ships
- 24 Air Force fighter squadrons
- four Air Force heavy bomber squadrons
- five Navy aircraft CVBGs
- 15 squadrons of USMC fighter aircraft
- Patriot and THAAD SAM batteries
- SOF
- two high-end ISR orbits and low-end ISR platforms.

Developmental Priorities

- airborne boost-phase intercept missiles
- enhancements to GBI
- improved counterbattery capabilities
- better chemical weapon defenses and countermeasures.

⁴⁴ Force levels for large-scale conflict in Korea are derived from Aspin, 1993, p. 19.

Stabilization Mission

- eight to ten Army BCTs (primarily from the Army's reserve component)
- four CABs
- low-end ISR platforms
- chemical, biological, radiological, and nuclear (CBRN) response and decontamination assets.

Countering Iranian Aggressiveness and Maintaining Balance in the Persian Gulf Region

Background and Purpose

Since the end of World War II, the Middle East has been an important factor in U.S. foreign and defense policies. The United States has intervened both politically and militarily to protect its interests in the region, which range from countering terrorism to bolstering regional allies, and, critically, ensuring access to Middle Eastern oil. In 1953, the United States orchestrated a coup that toppled Iranian President Mohammad Mossadegh after he nationalized the oil industry. Following the withdrawal of British military forces from “east of Suez” in 1971, the United States became the de facto guarantor of stability in the Persian Gulf, which, as of 2014, accounted for approximately 31 percent of the world’s oil production.¹ That same year, the Middle East as a whole accounted for 34.8 percent of the world’s internationally traded crude oil.² In 1991, the United States led the international coalition that expelled Iraqi forces from oil-rich Kuwait. In 2003, U.S.-led forces forcibly deposed Saddam Hussein.

Since the Soviet invasion of Afghanistan and the Islamic revolution in Iran in 1979, the United States has been postured to use its military strength to ensure that there is a balance of power that favors Western interests in the Gulf region. Over time, and especially after Iraq’s invasion of Kuwait in 1990, U.S. forces have maintained a fairly robust presence in the Persian Gulf. Most recently, that presence has facilitated counterterrorist and stability operations in Iraq, Afghanistan, and elsewhere; deterred Iran from using overt aggression against the Gulf Cooperation Council (GCC) countries; and assured regional partners, including Israel, of the United States’ willingness and ability to underwrite regional stability. Those broad objectives will continue to animate U.S. defense planning and activities in the region, although changing regional dynamics may affect somewhat the “demand function” for U.S. posture and capabilities.

This chapter assesses the demands of the second and third of those missions—deterrence of Iran and assurance of neighboring regional partners. It deals with threats posed by Iranian-supported groups, but not meeting the demands of the long-term U.S. effort to counter Salafist-jihadi groups, such as ISIS, which is the topic of Chapter Six. It describes important trends in the region and some of its critical characteristics, such as the dependence of the region on exports of hydrocarbon fuels and the strategic import of the Straits of Hormuz. It posits a scenario in which Iran closes the straits and explores some of the potential military responses to

¹ British Petroleum, “BP Statistical Review of World Energy June 2015,” 64th ed., London, June 2015, p. 10.

² British Petroleum, 2015.

such an action. It then discusses the current state of Iran's military capabilities and concludes with a discussion of force planning implications.

Trends in the Gulf Region—A Surprise-Free Projection

Several consistent geopolitical dynamics have guided the trajectory of the Middle East for decades. While some trends are undergoing considerable shifts, others are entrenched in the region's history and culture.³ These dynamics are deep-rooted and, although the Middle East will not remain static, following the course of these trends can provide insight into how the Middle East might develop in the next few years.

Iran-GCC Relations

The contentious relationship between Shia-dominated Iran and Sunni-ruled Saudi Arabia will continue to shape events in the Middle East. The intense rivalry between these two powers over which is the rightful leader of Muslims and what the regional order should look like appears to be all but irreconcilable.⁴ The amicable relations between two U.S. allies in the 1970s soured after the Iranian revolution in 1979. Riyadh was a major support and financier of Baghdad during the Iran-Iraq War,⁵ and Ayatollah Khomeini's politicization of the hajj climaxed in 1987 with 402 deaths—275 of them Iranian pilgrims—with a stampede and clash with police.⁶ Relations improved somewhat after Khomeini's death in 1989—despite Tehran funding a terrorist attack against Khobar Towers in 1996—but began to deteriorate again after the U.S. invasion of Iraq. Riyadh saw the new government in Baghdad as tipping the balance of power in favor of Iran. President Mahmoud Ahmadinejad, elected in 2005, accelerated this trend with his nationalistic and strident tone in Iranian policy.⁷

In 2016, relations reached new lows. Early in the year Saudi Arabia executed a prominent Saudi Shia cleric for involvement in antiregime activities, sparking demonstrations across the Middle East and South Asia.⁸ The Saudi embassy in Tehran was sacked and burned, prompting Riyadh, along with several other GCC governments, to sever diplomatic ties with Iran. Tension has risen between Iran and Saudi Arabia with the rise of Crown Prince Muhammad bin Salman as the near-certain successor to his ailing father, King Salam. The former has launched an ambitious economic and political reform program that includes a purge of key figures in the Saudi dynastic leadership. Furthermore, he has undertaken ambitious regional

³ Herman Kahn, a noted nuclear-war strategist of the Cold War era, conceived the concept of the “surprise-free” projection. This is a scenario where all major factors in a forecast are extrapolated in a linear fashion with an understanding of the improbability of that projection into the future. See Herman Kahn and Anthony Wiener, *The Year 2000: A Framework for Speculation on the Next Thirty-Five Years*, New York, N.Y.: Macmillan, 1967.

⁴ Frederic Wehrey, Theodore W. Karasik, Alireza Nader, Jeremy Ghez, Lydia Hansell, and Robert A. Guffey, *Saudi-Iranian Relations Since the Fall of Saddam*, Santa Monica, Calif.: RAND Corporation, MG-840-SRF, 2009, p. ix.

⁵ Shaul Bakhash, “The Troubled Relationship: Iran and Iraq, 1930-80,” in *Iran, Iraq and the Legacies of War*; Lawrence G. Potter and Gary Sick, eds., Basingstoke, England: Palgrave Macmillan, 2006, p. 24.

⁶ Martin Kramer, “Behind the Riot in Mecca,” Washington Institute for Near East Policy, August 1987.

⁷ Wehrey et al., 2009, p. 21.

⁸ Simon Henderson, “Saudi-Iranian Diplomatic Crisis Threatens U.S. Policy,” Washington Institute for Near East Policy, January 4, 2016.

initiatives to counter Iran's influence. These initiatives include a major military intervention in the ongoing civil war in Yemen and an embargo of Qatar.⁹

The GCC-Iran rivalry is made even more acute by the endemic imbalance of military power in the region. The oil-rich Gulf states have equipped themselves with advanced military technology, such as Abrams tanks, F-15 and F-16 fighter aircraft, and high-performance missile patrol craft, while benefitting from the protection offered by the United States' military presence in the region.¹⁰ The GCC states collectively outspend Iran on defense. According to the 2015 IISS Military Balance, Saudi Arabia alone spent 4.5 times more on defense in 2013 than Iran.¹¹ Meanwhile, Iran's military relies heavily on largely outdated equipment. Sanctions and budget constraints have limited Iran to modernizing only select components of its armed forces.¹²

Yet, with its large and politically mobilized population and demonstrated ability to adequately use military and paramilitary instruments of statecraft to influence events, Iran is regarded as the state with the greatest potential to become the region's hegemon. While GCC states have been acquiring modern military equipment, Iran has developed the capabilities of the Islamic Revolutionary Guard Corps (IRGC), wields the region's largest ballistic missile arsenal and has allegedly pursued a nuclear weapons capability. In 2015, Tehran and the P5+1 reached an accord in which sanctions against Iran were lifted in early 2016 in exchange for Tehran putting constraints on its nuclear enrichment program and providing assurances it would not develop nuclear weapons. The longevity of this nuclear infrastructure roll-back and restraint regime is in doubt after President Trump "decertified" Iran's compliance with the "spirit" of the agreement.¹³ If Iran adheres to the deal, it will allow Iran access to conventional arms purchases starting in 2020 and ballistic missile purchases in 2023.¹⁴ With access to more advanced military technology, such as modern SAMs and long-range precision-guided LACMs, the disparity in capabilities between the GCC and Iran could narrow significantly.¹⁵

Iran has long used proxy groups and covert means to extend its influence. Iran actively supports Shia militia groups in Iraq, Hezbollah in Lebanon,¹⁶ and the Assad regime in Syria, and is suspected of providing military assistance to Houthi rebels in Yemen. Iran's assistance to Shia non-state actors is already a destabilizing dynamic, but this factor could be exacerbated if

⁹ "All the Crown Prince's Men: Saudia Arabia's Unprecedented Shake-Up," *The Economist*, November 11, 2017.

¹⁰ International Institute for Strategic Studies, 2015, pp. 326, 349, 350.

¹¹ International Institute for Strategic Studies, 2015, pp. 326, 349.

¹² Anthony Cordesman and Michael Peacock, "Military Spending and Arms Sales in the Gulf," *Center for Strategic and International Studies*, April 28, 2015, p. 4.

¹³ Mark Landler and David E. Sanger, "Trump to Force Congress to Act on Iran Nuclear Deal," *New York Times*, October 5, 2017.

¹⁴ Gordon Lubold and Felicia Schwartz, "Critics of Iran Deal Target Arms," *Wall Street Journal*, July 19, 2015; Bryan Bender, "How the Pentagon Got Its Way in the Iran Deal," *Politico*, July 14, 2015.

¹⁵ Michael Kaplan, "Russian Military Weapons To Iran: S-300 Missile Defenses Delivered To Tehran Ahead Of Sanction Relief," *International Business Times*, November 24, 2015.

¹⁶ This includes the provision of contemporary anti-tank guided missiles (ATGMs), anti-ship missiles, and SRBMs with precision guidance features. The former two were used with significant military and psychological effect during the 2006 sustained military operations in southern Lebanon with the Israel Defense Forces. The latter is of great concern to the Israel Defense Forces and has prompted the sustained Israeli investment in the Iron Dome family of missile defenses.

Iran provides these groups access to more advanced military systems.¹⁷ Iran has proven in Syria that it is capable of inserting IRGC personnel into militias and leading those militias to victory on the battlefield, a capability that has significant implications for Iranian power projection.¹⁸ Leaders in the Gulf states are concerned that Iran could support Shia groups within their borders, thereby fomenting domestic instability and social discord in these Sunni-led nations. The 2011 Saudi intervention in Bahrain to quash Shia uprisings reflects the seriousness with which GCC states take the threat of Iran spurring or exploiting popular revolts.¹⁹ This military intervention was followed in 2015 with the Saudi decision to intervene with GCC military assistance in the Yemen civil war, an ongoing conflict with no clear end in sight.

Reliance of Regional Economies on Hydrocarbons

The economies of the GCC states constitute another defining feature of the Middle East. The countries of the Arabian Peninsula are rentier states, relying largely on oil and gas exports to support their societies and governments.²⁰ Because of this dependence, they are highly sensitive to fluctuations in hydrocarbon prices. According to the U.S. Energy Information Administration, in 2013, Saudi Arabia was the world's leading oil exporter and held the largest proven crude oil reserves, as well as the world's largest oil production capacity at approximately 12 million barrels per day.²¹ In that same year, oil accounted for 85 percent of Saudi Arabia's export revenues, and in 2015 oil accounted for 75 percent of the state's total revenue.²² The United Arab Emirates (UAE) possesses the seventh-largest proven oil reserves and is among the world's top ten oil producers.²³ Although efforts to diversify the economy have been successful (only 25 percent of the UAE's GDP is based on oil and gas output), oil accounts for 45 percent of exports.²⁴ Qatar is similarly reliant on hydrocarbons. It is the world's leading exporter of liquefied natural gas (LNG) and the hydrocarbon industry accounts for approximately half of the government's revenue.²⁵ Similar trends are seen in other GCC countries, making the entire region vulnerable to financial and economic troubles stemming from fluctuations in global oil and gas prices. There is the prospect that oil prices will fluctuate around \$50 per barrel for some years to come. These lower prices would stem from the emergence of shale oil and gas

¹⁷ Lubold and Schwartz, 2015.

¹⁸ Paul Bucala and Frederick W. Kagan, "Iran's Evolving Way of War: How the IRGC Fights in Syria," *Critical Threats*, March 2016, p. 2.

¹⁹ Simon Mabon, "The Battle for Bahrain: Iranian-Saudi Rivalry," *Middle East Policy Council*, Vol. XIX, No. 2, Summer 2012.

²⁰ This "rentier" culture may explain in part why the Saudi and GCC elites are so nervous about the military balance with Iran. Saudi Arabia and the GCC have relied heavily on using foreigners to operate much of their military establishments, especially the more technically demanding services. This dependence is most pronounced with their ground forces; for example, the Saudi military has recruited and used mercenaries during its military intervention in the Yemen civil war.

²¹ U.S. Energy Information Administration, "Saudi Arabia: Overview," September 10, 2014.

²² U.S. Energy Information Administration, 2014; Matt Egan and Alanna Petroff, "Saudi Arabia Crushed by Cheap Oil—and the Cuts Are Coming," *CNN Money*, December 28, 2015.

²³ U.S. Energy Information Administration, "United Arab Emirates: Overview," May 18, 2015a.

²⁴ "United Arab Emirates," *CIA World Factbook*, December 7, 2015.

²⁵ U.S. Energy Information Administration, "Qatar: Overview," October 15, 2015c.

competitors in North America and the prospect that ground and sea transportation may shift toward the greater use of natural gas as a fuel source and the electrification of automobiles.²⁶

While oil exports continue to drive most of the economies of the region, other oil-related dynamics are at play as well. While the Middle East accounts for about 50 percent of the world's proven oil reserves, in 2015 the region consumed about 33 percent of the oil it produced, which was up significantly from the 20 percent of production that was consumed domestically in 2000.²⁷ Increasing populations, a growing middle class, and increased consumerism drive this rise in oil demand. The more oil that is used domestically, the less Gulf countries have to export to other consumers.

Given the centrality of the hydrocarbon industry to the economies of Gulf states, the continued dependence of the global economy on oil and natural gas imports is crucial to the region's future stability. Although the United States is no longer a significant importer of Middle East oil, China, India, and other developing nations have become major energy consumers, and their oil demand is expected to grow.²⁸ As Iran reenters the international oil trade, it is poised to become a more significant global economic player, with its primary customers being in the East rather than in the West. As time goes on, the nations that import large amounts of energy from the Middle East could become more active in regional affairs, because domestic and interstate stability will be crucial to ensuring the continuous flow of oil from this area.²⁹

Criticality of the Strait of Hormuz

Finally, the Strait of Hormuz will continue to be a defining geographical feature in the region. Approximately 17 million barrels of oil pass through the Strait of Hormuz every day. Since the Iran-Iraq War (1980 to 1988), the possibility that Iran might attempt to close the narrow waterway has loomed as a threat over world oil markets.³⁰ Ensuring that the Strait of Hormuz remains open and that oil and natural gas continue to flow out of the region have been important motivations for the United States to maintain its military presence in the region. As a major exporter of hydrocarbons, Iran also relies on the safe passage of tankers through the Strait of Hormuz.³¹ But in a future crisis in which the United States and others were pressuring Iran, the Iranian leadership might regard closing the strait as its most potent option for threatening or imposing strategic costs on the coalition aligned against it.

In addition to these engrained regional dynamics, some skepticism has emerged over the past decade regarding the depth of Washington's commitment to regional security. For several decades, the United States has been a staunch ally to both Israel and Saudi Arabia. However,

²⁶ Dieter Helm, *Burn Out: The Endgame of Fossil Fuels*, New Haven, Conn.: Yale University Press, 2017.

²⁷ Jude Clemente, "The Middle East's Growing Oil Demand Problem," *Forbes*, March 29, 2015.

²⁸ U.S. Energy Information Administration, "China: Overview," May 14, 2015b; Jude Clemente, "India's Rise to 3rd Place In Oil Demand," *Forbes*, August 7, 2015.

²⁹ U.S. Energy Information Administration, 2015b.

³⁰ Jonathan Schroden, "A Strait Comparison: Lessons Learned from the 1915 Dardanelle Campaign in the Context of a Strait of Hormuz Closure Event," Center for Naval Analysis, September 2011, p. 31.

³¹ Currently, Iran is highly dependent on the flow of refined products from India's large refinery complexes because protracted international sanctions have starved domestic investment in crude oil refining capacity. That will change over time, approximately five years, as a number of states, such as China and India, invest in Iran's petroleum and natural gas exploration and production infrastructures.

under the Obama administration, American outreach to Iran, as well as other policy initiatives, including attempts at shifting focus to Asia, left both allies concerned about the U.S. commitment to their security. Saudi Arabia and the United States have diverged on their approaches to handling events in the Middle East in recent years, including over the Iran nuclear deal, reactions to the Arab Spring, and involvement in the Yemeni civil war.³² In the wake of these differing views, Saudi Arabia has become more militarily assertive in the region.

Other Potential Directions for the Region

The earlier discussion outlines the surprise-free assumption that states and non-state actors in the region generally continue to follow their current paths. Of course, the Middle East is anything but predictable. In recent memory, the Arab Spring took the world by surprise. The rise of extremist groups in Syria and subsequent rapid loss of territory in Syria and Iraq to ISIS (also known as Daesh) forces were largely unpredicted. Less than 15 years ago, Turkey seemed to be on a path to join the European Union, while now Ankara's regression from democracy has ended any near-term prospect for membership, a reality that has been reinforced by the failed military coup in the summer 2016 and the regime's response to it. A few decades ago, it was the dimly foreseen Iranian Revolution that greatly altered regional dynamics. Events like these have caused major changes in the region's geo-politics, and future discontinuities could do the same.

The near-term fallout from several recent developments is still unknown. Syria and Yemen are engulfed in ethnically driven civil wars stoked by outside powers; Iraq's Shia-dominated government is struggling to keep the country stable and united; Iraq's Kurds are emerging as a regional player; and a determined, multipronged campaign has destroyed ISIS as a quasi-state. One potential consequence of the civil wars in Syria and Iraq is that these states might break up into smaller states along ethnic lines. For further discussion of the coalition operations to defeat ISIS in Iraq, see Chapter Six.

Iraq, in particular, has long had the potential to devolve into independent Kurdish, Sunni Arab, and Shia-dominated states. The Kurdistan Regional Government (KRG) is based in northern Iraq and is already a semiautonomous region that operates as a quasi-sovereign government. The Kurds maintain their own defense forces, known as the Peshmerga, and operate several government ministries independent from Baghdad, including ministries of education, finance, health and justice.³³ As ISIS advanced toward Baghdad after seizing Mosul and Tikrit during the late spring of 2014 and plunged Iraq into chaos, the Kurds appeared to be relatively capable of defending their territory, though American airstrikes were pivotal in warding off ISIS's advance toward Erbil, the capital of the KRG.³⁴ Today, the KRG's governmental functions receive little financial support from Baghdad; in fact, the KRG has not consistently received the monthly share of the federal budget Baghdad is required to provide in several years.³⁵ Although the Kurds still face significant financial problems, the prospect that the KRG

³² Council on Foreign Relations Staff, News Team, "U.S.-Saudi Relations," Council on Foreign Relations, April 21, 2016.

³³ Kurdistan Regional Government, "Ministries and Departments," undated.

³⁴ Ron Nordland and Helene Cooper, "Capitalizing on U.S. Bombing, Kurds Retake Iraqi Towns," *New York Times*, August 10, 2014.

³⁵ Maher Chmaytelli and Isabel Coles, "Kurds Ready for New Oil Deal with Baghdad if They Get \$1 Billion a Month," *Reuters*, June 15, 2016.

could emerge as an independent nation at some point in the future seems plausible. The KRG's overall strategic orientation and its antipathy toward ISIS open up the prospect of a future U.S.-Kurdistan security partnership.

While Iraq's Kurds could emerge as an independent power based in their capital of Erbil, a predominantly Shia state could coalesce in southern Iraq. This state would extend roughly from Salah al-Din province in what is currently central Iraq to Basra in the south, with Baghdad as its capital. Like the current Shia-dominated government in Iraq, this state is likely to align itself with Tehran.³⁶ The GCC countries likely would feel threatened by Iran's consolidation of this power base to their north, which could further intensify the Iran-Saudi rivalry and the mistrust GCC states feel for Tehran. By the end of 2017, the scenario of an independent KRG had been thrown into doubt by President Barzani's decision to call for an independence referendum. The referendum passed overwhelmingly but prompted Baghdad to take back Kirkuk by force of arms. Reflecting deep political divisions within the KRG, Kurdish forces put up no meaningful resistance to this military move by Baghdad.³⁷

The appearance of a Shia state led by Baghdad and a Kurdish state based in Erbil would leave Iraq's Sunni population with the territory centered on Anbar Province.³⁸ However, the Sunni rump state that might emerge from Iraq would lack significant oil resources and be a challenge to rebuild economically, leaving it vulnerable to ISIS resurgence or the rise of warring Sunni splinter groups (as discussed further in Chapter Six).³⁹ To prevent such an outcome and bolster their geostrategic position in the region, Gulf states are likely to provide significant assistance to the new Sunni state. While Iran can use Baghdad's Shia state as a platform for operations into the Gulf, so too could Gulf states use Anbar as a staging area for operations meant to undermine Iranian power in both Iraq and Syria. Moreover, the presence of a Sunni nation-state in Anbar would create a buffer between Syria and Iran, denying Iran a bridge that would connect most of the territory over which it exerts influence.

Positing futures for a post-civil war Syria is a more complicated enterprise. Syria's Kurdish population has already established a stronghold in northeastern Syria. Rojava emerged as an autonomous Kurdish region in 2013.⁴⁰ Unlike in Iraq, where the establishment of a Kurdish state could be widely accepted if the country dissolved, Syria's Kurds face tougher opposition. During the Syrian civil war, Rojava established ties with Turkey's Kurdistan Workers Party (PKK), the group located in southeastern Turkey that Ankara considers a terrorist organization. Turkey views relations between Rojava and the PKK as a PKK attempt to create a Kurdish state on its borders after having failed to create one in Turkey.⁴¹ Consequently, Turkey sees Rojava as a threat, and Turkish President Recep Tayyip Erdogan in June 2015 stated, "We will

³⁶ Mohsen Milani, "Tehran Doubles Down," *Foreign Affairs*, June 22, 2014.

³⁷ Seth Fantzman, "Shock in Kurdish Region as Kirkuk Falls to Iraqi Forces," *Jerusalem Post*, October 17, 2017.

³⁸ The fall of the northwestern Syrian city of Manbij, a key logistics node into Turkey, is a milestone in the systematic defeat of ISIS as a state. See Maria Abi-Habid and Margaret Coke, "U.S. Compromises Won Turkey's Backing for Kurdish-Led Offensive," *Wall Street Journal*, July 14, 2016; and Noam Raydan, "U.S.-Backed Force Takes Key Syrian City From Islamic State," *Wall Street Journal*, August 12, 2016.

³⁹ Tim Arango, "Sunni Resentment Muddles Prospect of Reunifying Iraq After ISIS," *New York Times*, February 12, 2016.

⁴⁰ "Kurdish Declaration of Autonomy in Syria Rejected by Turkey, Larger Opposition," *Rudaw*, November 14, 2013.

⁴¹ Wes Enzinna, "A Dream of Secular Utopia in ISIS' Backyard," *New York Times*, November 24, 2015.

never allow the establishment of a state in Syria's north and our south. . . . We will continue to fight in this regard no matter what it costs."⁴²

These fears of an emerging Kurdish state along the Syrian-Turkish border prompted Ankara to launch a military operation into Syria during the late summer of 2016. This military operation is designed to support non-Kurdish anti-Assad regime rebels, as well as contain the Syrian Kurdish territorial ambitions in this region.⁴³

As Syria's Kurds strive to carve out an independent state in the remnants of northeastern Syria, the remainder of Syria's territory may be divided among the civil war's other warring factions. Moscow and Tehran, however, appear to believe that the Assad regime can be preserved by force of arms, and the regime may emerge from this civil war largely in control of most of Syria. The implications of potential outcomes of the Syrian civil war are addressed further in Chapter Six.

Once the guns of the Syrian civil war are finally laid down, the region will face several serious issues that will need to be addressed. For example, years of war have destroyed infrastructure throughout Iraq and Syria, and this will be costly to rebuild. Depending upon the configuration of these emerging mini-states, some may have significant near- and medium-term income from the sale of petroleum and gas; others may not be so lucky. Furthermore, any peace deal between Syria's warring factions might require some sort of international enforcement. A long-term U.N. peacekeeping presence may be needed in the region. An international force will also be needed to provide security for the resettlement of the millions of refugees and internally displaced persons who have fled their homes in Iraq and Syria in recent years. Returning these individuals to their homes will be a long and very costly process. A U.N.-sponsored stabilization mission may require a substantial ground combat force, potentially including U.S. troops. More likely could be the long-term deployment of U.S. air and ground units in Turkey and/or the Kurdish region of Iraq. These forces could play a role in sustaining a regional deterrent force that is oriented toward Iran.

Iran's Military Capabilities

Today, GCC forces enjoy technological advantages over those of Iran, but the latter nevertheless possesses significant military capabilities that it could use against neighboring states and U.S. forces in response to perceived threats to the state or its proxies. Iran's short- and medium-range ballistic and cruise missile arsenal in particular is a concern for states in the region and for the United States. Tehran maintains the largest and most diverse arsenal of missiles in the Middle East.⁴⁴ Iran is thought to possess approximately 1,000 theater ballistic missiles with varied capabilities.⁴⁵ Iran is also developing IRBMs and ICBMs that could strike Europe or the United States.

⁴² Enzinna, 2015.

⁴³ Maximilian Popp and Christoph Reuter, "Turkish Invasion Highlights Rapidly Shifting Alliances," *Der Spiegel*, August 26, 2016.

⁴⁴ Michael Elleman, "Iran's Ballistic Missile Program," United States Institute for Peace, August 2015, p. 1.

⁴⁵ Jacob L. Heim, "The Iranian Missile Threat to Air Bases: A Distant Second to China's Conventional Deterrent," *Air & Space Power Journal*, July–August 2015, pp. 27–50, 30.

To be sure, Iran's ballistic missile capabilities are not in the same class as China's. Currently, most of them are not highly accurate, making them best suited to attacks on large, soft targets, such as urban concentrations and economic infrastructure. However, salvo attacks, particularly using cluster munitions, can inflict serious damage on some classes of military targets, including aircraft in the open and unhardened structures and airfields.⁴⁶ And it is to be expected that Iran will find ways to improve the accuracy of the next generation of missiles in its fields.

Iran's SAM arsenal is less impressive than its ballistic missile stockpile. Most of Iran's SAMs date back to the reign of the Shah and are based on Russian and Chinese SAM designs developed during the Vietnam War.⁴⁷ In the decades since these weapons were acquired, Iran has created integrated land-based air defense systems, hardened and sheltered air defense command and control centers, and upgraded outdated missiles. Despite these modernization efforts, Iran's air defense system is likely to be vulnerable to attacks by modern radar homing missiles, electronic warfare (EW) systems, and other weapons.⁴⁸ However, Iran has begun to import modern S-300 SAM systems from Russia, which will make its air defense more capable where it is deployed.⁴⁹

Iran's military and IRGC forces also operate a variety of UAVs. Tehran began a drone development program in the 1980s, and, despite sanctions, Iran has developed an array of weaponized and nonweaponized UAVs.⁵⁰ These aircraft have been used to conduct reconnaissance against U.S. naval vessels in the Persian Gulf, have been supplied to Hezbollah for use against Israel, and have been seen in Syria since the early days of the civil war. Iran has revealed several new UAV models in recent years, although their capabilities lag behind those of Israeli and Western systems.⁵¹

Iran also possesses an arsenal of several hundred ASCMs that could be used to threaten naval and commercial vessels transiting regional waters.⁵² Most of these missiles can be launched from mobile platforms, such as surface vessels, aircraft, or trucks, which makes them potentially difficult to destroy. Overall, these missiles could pose a serious threat to regional maritime commerce. Iran's sea mining capabilities also constitute a potential threat to shipping in the Gulf. Iran possesses several means of laying mines in its surrounding waters. Its collection of frigates, corvettes, and fast boats can lay mines, as can patrol and coastal combatants and specially designed ships and helicopters dedicated to this purpose.⁵³ Laying even a modest number of mines close to international shipping routes can have outsized effects on commerce

⁴⁶ Heim, 2015, p. 27–50, p. 38.

⁴⁷ Anthony Cordesman, "Iran's Rocket and Missile Forces and Strategic Options," Center for Strategic and International Studies, October 7, 2014, p. 27.

⁴⁸ Cordesman, 2014, p. 27.

⁴⁹ Cordesman, 2014, p. v.; Michael Kaplan, "Russian Military Weapons To Iran: S-300 Missile Defenses Delivered To Tehran Ahead Of Sanction Relief," *International Business Times*, November 24, 2015.

⁵⁰ Arthur Holland Michel, "Iran's Many Drones," Center for the Study of the Drone, Bard College, November 25, 2013.

⁵¹ "Iran: Air Force," in "Future Iranian Military Capabilities: Regional Implications of Defence Capability Expansion in the Gulf," *IHS Jane's*, January 27, 2016.

⁵² Caitlin Talmadge, "Closing Time: Assessing the Iranian Threat to the Strait of Hormuz," *International Security*, Vol. 33, No. 1, Summer 2008, pp. 82–117, p. 100.

⁵³ Talmadge, 2008, pp. 82–117, p. 89.

by raising insurance rates and deterring shipping owners from entering mined waters. And because mine clearing operations are time-intensive and dangerous, widespread mining can create major disruptions in maritime traffic. Iran also could develop or acquire a new generation of unmanned underwater vehicles (UUVs) that provide options for menacing ports and naval facilities in the GCC without resorting to detectable and vulnerable mine-laying surface craft.

Although Iran derives leverage from the possibility it could mine the Strait of Hormuz, the surface combatants of Iran's Navy (IRIN) are not actually a major factor in the region. After Operation Praying Mantis during the Iran-Iraq War, a sea battle in which the IRIN suffered substantial losses from American air and missile attacks, Tehran shifted its efforts away from strengthening conventional naval capabilities and toward developing asymmetric capabilities through swarming tactics employed by large numbers of small boats and missile-armed fast-attack vessels.⁵⁴ Iran has also invested in modern diesel-powered submarines.⁵⁵

While the IRIN's capabilities have atrophied, the Islamic Revolutionary Guard Corps Navy (IRGCN) has developed formidable, unconventional tactics known as swarming. Swarming tactics employ light, mobile naval forces to conduct fast-moving hit-and-run attacks on an opponent from multiple directions.⁵⁶ The most commonly used swarming tactic is called dispersed swarming, in which a small number of agile missile or torpedo vessels set off from different bases or ports before descending together upon a target.⁵⁷ Iran has fielded large numbers of small, fast boats armed with accurate, short-range anti-ship weapons to complement its land- and sea-based ASMs, attack submarines, and unmanned aerial vehicles.⁵⁸

Behind Iran's military capabilities and tactics lies the Iranian regular military, which is largely equipped with outdated weapons, and the IRGC, Iran's capable and potentially formidable irregular force. Iran's combined armed forces are made up of about 523,000 personnel.⁵⁹ The regular army is made up of 350,000 people, 220,000 of whom are conscripts.⁶⁰ The IRGC is composed of 125,000 people, 20,000 of whom are naval forces (IRGCN) and 5,000 of whom are marines. Iran's regular navy is made up of 18,000 people, its regular marines number 2,600 individuals, its regular air force has 30,000 people, and naval aviation maintains 2,600 people.⁶¹ Iran's paramilitary force comprises 40,000 to 60,000 people, and the Basij Resistance Force can mobilize about 1 million Iranians.

⁵⁴ Schroden, 2011, p. 34; and Fariborz Haghshenass, "Iran's Doctrine of Asymmetric Naval Warfare," The Washington Institute for Near East Policy, December 21, 2006.

⁵⁵ J. Peter Pham, "Iran's Threat to the Strait of Hormuz: A Realist Assessment," *American Foreign Policy Interests*, Vol. 32, pp. 64–74, 2010, p. 66.

⁵⁶ Haghshenass, 2006.

⁵⁷ Haghshenass, 2006.

⁵⁸ U.S. Navy, Office of Naval Intelligence, "Iran's Naval Forces: From Guerilla Warfare to a Modern Naval Strategy," Washington, D.C., Fall 2009, p. 23.

⁵⁹ International Institute for Strategic Studies, 2016, p. 327.

⁶⁰ International Institute for Strategic Studies, 2016, p. 328.

⁶¹ International Institute for Strategic Studies, 2016, p. 329–330.

Scenario: Iranian Aggression and a Closure of the Strait

In the event of war with Iran, the United States and its partners must be prepared to defeat Iranian aggression posed by a range of threats, including missile and unconventional attacks on energy facilities and other economic infrastructure, attacks on merchant shipping in and around the Gulf, and, of course, attacks on U.S. and GCC forces and bases. Any U.S.-led defensive campaign would be informed by a sense of urgency, because large-scale aggression would surely interrupt commercial shipping into and out of the Gulf, with potentially serious consequences for the global economy.⁶² An Iranian decision to develop a breakout nuclear weapon capability would further contribute to this sense of urgency.

Key campaign objectives for U.S. forces (in rough temporal order) would include the following:

- Protect deploying forces and bases from attacks by missiles, submarines, and naval vessels (especially swarms of small craft operated by Iran's irregular forces).
- Advise and assist partner forces in protecting their critical infrastructure and population centers.
- Gain and maintain air superiority by suppressing and dismantling Iranian air defenses (especially its most-capable SAM systems).
- Gain and maintain maritime superiority by suppressing and destroying operations by Iran's ASCMs, small craft, submarines, and surface combatants.
- Enable the free flow of commerce through the Strait of Hormuz and the Gulf. The principal task could be clearing the thousands of sea mines that Iran could deploy.
- If Iran had not been complying fully with its obligations under the Joint Comprehensive Plan of Action (JCPOA), U.S. forces might also be called upon to destroy facilities associated with its nuclear weapons program.

Although overall Iranian military and paramilitary capabilities are not on a par with those of China or Russia, Iran's investments in selected antiaccess capabilities, coupled with its ability to exploit the constraining geography of the Gulf, make this a rather daunting set of challenges. It should be expected that a future war with Iran would be significantly more costly and bloodier than the U.S.-led operations against Iraq, Serbia, and Libya were. To estimate the types and level of forces appropriate for such an operation, we took as a starting point the forces employed in Operation Iraqi Freedom (OIF) in 2003. The overall level of effort for coalition air forces in both operations should be roughly comparable, although Iran's air defense system today is considerably more capable than Iraq's was in 2003. Iraq at the time had essentially no ability to threaten U.S. naval operations; nevertheless, the United States sent four CSGs into the region for OIF, in addition to the CSG already on rotation in the region, largely as platforms for conducting air operations over the country. U.S. naval forces in a potential future war with Iran would be needed to prosecute attacks against Iranian submarines and surface

⁶² It must be assumed that Iran would not leave this to chance. Iranian government officials have repeatedly threatened to close the Strait of Hormuz in response to attacks by the United States. For example, the deputy commander of Iran's Revolutionary Guard in May 2016 stated on state television, "If the Americans and their regional allies want to pass through the Strait of Hormuz to threaten us we will not allow an entry . . . Americans cannot make safe any part of the world." (See Amir Vahdat, "Iranian Commander Threatens to Close Strait of Hormuz to U.S.," Associated Press, May 4, 2016.)

naval forces, to contribute to air and missile defense operations, and to take the lead in clearing mines and protecting commercial shipping when commerce in and around the Gulf resumed.

The biggest difference between the two campaigns, of course, is that large-scale ground force operations are not envisaged against Iran. U.S. Army and USMC forces might be called upon to assist GCC partners in securing key sites from terrorist, rocket, or mortar attacks by small Iranian (or proxy) parties or to secure temporarily parts of Iran's coastal areas being used to stage attacks on shipping.

Steady State Demands

Assuming that Iran continues to pursue objectives at odds with those of the United States and its regional partners, the primary U.S. objective in the region will be to maintain a modicum of stability and deter interstate conflict by ensuring that Iran's leaders see at least large-scale, overt aggression as unlikely to succeed. Iran, of course, has a range of options for challenging U.S. and allied interests in the region. First, it can continue to support proxy groups determined to undermine Sunni regimes or attack Israel. Second, it could use its naval capabilities to threaten commercial shipping or American naval operations in the region. Third, it could directly threaten or use coercive force against selected GCC states especially with its emerging long-range precision strike capability (see Figure 5.1). Finally, the discovery of violations of the terms of the Iranian nuclear deal would intensify the mistrust that Israel and Sunni states feel toward Iran, as well as unravel the rapprochement between Tehran and the West. In seeking to deter Iran from engaging in these activities, the United States will want to ensure that it has appropriate military capabilities deployed forward and available for reinforcement.

Forward base infrastructure is always an important component of regional posture. Assuming that Iran will continue to build more and better long-range missiles, the United States and its GCC partners will want to invest in capabilities to reduce their vulnerability to these weapons. This means, among other steps, developing a network of airbases and command centers that are hardened against attack, dispersed, located beyond the range of Iran's most numerous attack systems, or have some combination of these factors. To the extent that future ballistic missile defense systems can be made more cost-effective than currently available ones, they may also become attractive investment options. Planners should also ensure that adequate stocks of air-delivered munitions are stored in survivable ways in the theater. A robust effort by the United States and its GCC allies to provide an effective active defense and counterforce capacity against the emerging Iranian long-range precision strike capability will require a major investment in C4ISR and advanced munitions, as well as rigorous training.

Aside from the emerging threat posed by Iran's long-range missiles, U.S. and GCC partners will need capabilities to counter threats posed by Iran's irregular forces. The ISR and other assets mentioned earlier can contribute to this. However, U.S. SOF will play the leading role, training and advising partner forces and helping to protect U.S. bases and personnel deployed to the region.

As noted earlier, the next five or so years are likely to witness changes in borders and governance in Iraq and Syria—changes that could place new demands on U.S. military forces. The following additional deployments might be expected:

- humanitarian relief operations in parts of Syria and Iraq
- brigade-sized ground forces and associated ISR assets to enforce compliance with a settlement of the conflicts in Syria and Iraq

Figure 5.1
Current Iranian Ballistic Missile Ranges



SOURCE: International Institute for Strategic Studies, *The Military Balance 2014* (London: Routledge, 2014).

RAND RR1782-5.1

- long-term training and advisory assistance missions in the new Kurdish and Sunni states in Iraq.

Implications for Force Planning

Iran wants to be a regional hegemon and undermine the surrounding Sunni regimes. Iran's military capabilities are substantial, although they are not yet at the level to which Iran's regime aspires. However, the Iranians are developing tactics and techniques to take full advantage of what they have. Iran's location along the Strait of Hormuz gives it leverage over nations around the world, to include the United States. Its navy, use of proxy groups, and its long-range missile force all give it elements of power to carry out its agenda and present the United States with a number of operational demands, which make the following building block of combat forces appropriate to the needs of the U.S. warfighting commander:⁶³

Steady State Force Posture

- two to three Navy surface combatants supplemented by forward-based patrol craft
- two attack submarines
- mine countermeasures (MCM) vessels
- two squadrons of land-based fighter aircraft
- one high-end ISR orbit
- four Patriot batteries

Major War

- 21 USAF fighter squadrons; eight USMC fighter squadrons
- five USAF heavy bomber squadrons
- three high-end ISR orbits, as well as low-end UAVs and manned ISR aircraft (E-3, E-8, RC-135)
- four CSGs with associated surface combatants and support vessels.
- 12 attack submarines
- MCM vessels and helicopters
- six Marine infantry battalions with up to 18 amphibious vessels
- one MPF squadron with a Marine Expeditionary Brigade
- three Army BCTs
- Patriot and THAAD SAM batteries
- CABs
- SOF and Ranger forces.

Critical support assets would include aerial refueling aircraft, MPA, combat logistics force vessels, airlift and sealift. Regional partners would, of course, be expected to employ their assets in defense of their own territory, assets, airspace, and waters. Some, such as Saudi Arabia and the UAE, should have the capacity and capability to contribute to operations beyond their airspace and waters. Extraregional allies, such as Australia, the UK, and other NATO allies, could contribute significant air, maritime, and land capabilities but barring extended warning

⁶³ T. Michael Moseley, *Operation Iraqi Freedom—By the Numbers*, Washington, D.C.: United States Central Command Air Forces, April 30, 2003, p. 3; Linwood B. Carter, "Iraq: Summary of U.S. Forces," *Congressional Research Service*, November 28, 2005, p. 7.

of potential Iranian aggression, and without substantial airlift assets, it is not likely that these forces would be available during the critical early days of the conflict.

In addition to the force elements listed earlier, preparations for a conflict of this nature might include an emphasis on developing the following types of capabilities and systems:

- more effective, forward-deployed MCM systems
- longer-range weapons for suppressing and destroying modern SAM systems
- more cost-effective and survivable missile defense systems
- high-capacity close-in defenses for surface vessels.

Combating Salafist-Jihadi Groups: The Roles Played by U.S. SOF

Background and Purpose

The United States' "long war" against terrorist groups espousing violent interpretations of Islam that began after the September 11 attacks has evolved into a conflict of greater scope and complexity than most observers had envisaged at its outset. Future historians will determine whether this metastasized threat could have been avoided. What seems clear today is that the United States and like-minded partners will be devoting substantial attention and resources to combating Salafist-jihadi groups for the foreseeable future and that this campaign will continue to affect the size, capabilities, and activities of their military forces.

USSOCOM, whose mission is to synchronize the planning of special operations and provide SOF to undertake missions across virtually the entire spectrum of military operations, has been and will continue to be the part of DoD most affected by this set of challenges. This chapter, therefore, focuses on USSOCOM and the capabilities called for by the fight against these groups.

Since the summer 2014, al Qaeda and its franchise elements have been challenged by the rapid emergence of ISIS's de facto quasi-state out of the civil wars that have raged in Syria and Iraq.¹ The former is a product of the Arab Spring and the latter the product of the U.S. decision to overthrow the Hussein regime by force of arms in 2003. Following the withdrawal of the two large U.S. expeditionary forces associated with OIF in 2011 and Operation Enduring Freedom–Philippines (OEF-P) in 2014, USSOCOM has taken the lead in U.S. military efforts to combat the global threat from the various mutations of Salafist-jihadism. Most recently, USSOCOM has been a central component of the multiyear joint force and multinational campaign, Operation Inherent Resolve, to contain and destroy ISIS. During this campaign, USSOCOM has had three major roles. The first is to provide FID assistance (i.e., advisory and training assistance) to countries under attack by either foreign or internal threats. The second is to conduct direct action counterterrorism operations aimed at capturing or killing the leadership cadres of various violent non-state entities ranging from Salafist-jihadist to transnational criminal organizations. The third is to support the joint force campaign to contain and destroy

¹ A "quasi-state" is an emerging nation state that controls territory and the resources contained therein. Through extreme violence ISIS, was able to create a powerful fighting enterprise with state-like features and ambitions. Unlike more elusive transnational terrorist and criminal organizations, ISIS has attempted to create and rule a sovereign state while simultaneously conducting a global insurgency.

the quasi-state ISIS that has held territory in Syria and Iraq.² Put simply, the United States has created a hybrid military response to what appears to be a hybrid opponent. One of the main objectives of the strategic air campaign, Operation Tidal Wave II, is to destroy ISIS's capacity to generate income for its war effort.³ This aerial campaign is designed to cripple ISIS's captured petroleum infrastructure, as well as destroy the vast quantity of cash seized during the offensive campaigns of 2014 and 2015.⁴ As of late 2017, the combined air-and-ground campaign against ISIS had come very close to evicting the terrorists from most of the territory the group had controlled, including its former capital of Raqqa. This chapter focuses on the challenges posed by these three mission sets and the quantitative and qualitative demands that they generate for USSOCOM capabilities.

Operations against violent non-state actors call for capabilities that are quite different from those provided by most general purpose force elements. Most SOF operations call for highly trained and, typically, more experienced personnel, specialized combat and transportation vehicles, and integrated reconnaissance and strike capacities. Unlike high-technology combined arms forces, SOF units will in most circumstances face a less lethal military environment, especially in the realms of air defense and massed indirect fires. On the other hand, they face the prospect of protracted military operations that may not lead to a decisive strategic outcome over the course of many years. And, as we shall see, non-state and quasi-state adversaries have demonstrated the ability to acquire, master, and effectively employ increasingly high-tech and lethal systems.⁵

This chapter departs from the pattern of previous chapters in that it does not use a scenario nor does it describe detailed force implications. It begins by discussing the global nature of the Salafist-jihadi threat and follows with a discussion that posits that the special forces across the four services can be viewed as a fifth service because of its collectively unique capabilities, missions, and manner of employment. It then discusses the possibility of USSOCOM having to confront groups armed with technologically more sophisticated capabilities, which could either be obtained by overrunning conventional forces (as was the case in Iraq) or buying them in the global weapons bazaar. It concludes with a discussion of the budgetary implications of the global Salafist-jihadi conflict for USSOCOM and some of the likely force implications.

² Although Operation Inherent Resolve focuses on destruction of ISIS in Syria and Iraq, the United States will use multiple instruments of state power to conduct counterforce operations against ISIS enterprises that emerge elsewhere. The most recent case is the use of USN and USAF air power to support USSOCOM operations inside Libya.

³ The original Operation Tidal Wave was the World War II air campaign to destroy Romanian petroleum production capacity, a key element of the Nazi war machine.

⁴ Matthew M. Reed, "Tidal Wave II: Understanding the Pentagon's New Strategy to Cripple ISIS Oil," *The Fuse*, November 23, 2015.

⁵ Insurgent forces, such as Salafist-jihadi groups, for example, have been able to acquire anti-tank and anti-aircraft guided munitions from stores seized during their campaigns against such failing states as Syria and Iraq. Other state-sponsored insurgents, such as Hezbollah, have acquired guided weapons from their main state sponsor, Iran. Noteworthy has the exploitation of the new forms of multimedia that emerged with the Internet revolution by these groups to further their particular cause by use of the tools and techniques of propaganda, remote recruiting, and the psychological use of systematic acts of violence.

Salafist Jihadism as a Global Insurgency

The Middle East and North Africa (MENA) and South Asia are the primary theaters of operation for the various Salafist-jihadi movements that threaten U.S. interests. Secondary theaters include parts of sub-Saharan Africa, notably Kenya and Nigeria, as well as parts of SEA.

As noted above, the two most prominent Islamic revolutionary movements are al Qa'ida and its franchises and ISIS as a quasi-state and its "provinces." Often, they are in violent competition for local if not regional dominance. Although they disagree on timing, both strands of Salafist-jihadism call for the creation of an Islamic caliphate, which provides sufficient material power to affect a global revolution to overthrow all regimes and societies that do not adhere to a very strict interpretation of Islamic law. Both profess to believe that the ultimate victory of their global movement is divinely ordained. That said, al Qa'ida and ISIS differ fundamentally. The former believes that a protracted global insurgency will ultimately lead to an Islamic super state, while the latter has attempted through force of arms and systematic campaigns of terror to create an operational state.

Although these Salafist-jihadi movements have focused on gaining control of territory of failed or failing states in the vast theater identified earlier, they have demonstrated the capacity and will to strike at, or inspire others to strike at, targets in the United States and Europe, their "far enemy." Several successful attacks have been conducted by al Qa'ida and its franchises, including in New York, Washington, London, Madrid, and Mumbai.⁶ More recently, ISIS has inspired similar attacks in Paris, San Bernardino, Brussels, Orlando, and New York.⁷ Both groups have worked to recruit fighters through global multimedia to carry out acts of violence in the name of their variant of Salafist-jihadi ideology.⁸

As noted earlier, the United States has taken two distinctly different responses to the emergence of this new religiously inspired threat. First was the development of an increasingly refined counterterrorism capacity. The second was the deployment of SOF and general purpose forces to Afghanistan and Iraq to effect regime change, followed by a large-scale and sustained effort in national transformation (also known as nation-building).⁹ Despite years of effort involving the expenditure of thousands of American lives and much treasure, neither the stability operation in Afghanistan nor the one in Iraq has yielded the hoped-for results. As one result of this experience, the central component of U.S. counterterrorism strategy now is to

⁶ The attack on Mumbai was conducted by Lashkar-e-Taiba, an organization inspired and directed through a collaboration between the Pakistani security service (known as Inter-Services Intelligence, or ISI) and al Qa'ida. See Bruce Riedel, *Modeled on Mumbai? Why the India Attack Is the Best Way to Understand Paris*, Washington, D.C.: Brookings Institute, November 14, 2015.

⁷ The attacks against Paris and Brussels were commando-type operations to inflict maximum casualties with the use of small arms and explosives. The attacks in San Bernardino and Orlando were more acts of "propaganda by the deed" by a couple and an individual, respectively.

⁸ There is the prospect that al Qa'ida and its affiliates may reemerge as the dominant Salafist-jihadi movement if ISIS is militarily defeated. See Daveed Gartenstein-Ross and Nathaniel Barr, "How al-Qaeda Survived the Islamic State Challenge," Hudson Institute, Summer 2016.

⁹ The decision to launch an expeditionary operation into Afghanistan was primarily focused on the destruction of al Qa'ida and its Taliban ally; it evolved into a large and long-term COIN effort to rebuild an Afghan government that could defend itself from a resurgence of the Taliban and/or another Salafist-jihadi movement, such as an affiliate of ISIS. The rationale for the overthrow of the Hussein regime in Iraq was to destroy a regime on the verge of reconstituting its WMD program and possibly collaborating with al Qa'ida. When both rationales proved to be a null case, the rationale for the U.S. intervention evolved into a forcible nation building enterprise or big COIN operation.

“disrupt, contain, and destroy” Salafist-jihadist groups through the extensive use of air power, the IC, specialized general purpose ground forces, and USSOCOM. This “hybrid” response has led to the emergence of USSOCOM as the leading force in U.S. global counterterrorism, FID, and UW operations and, de facto, a new military service.

USSOCOM as the Fifth Service

The USSOCOM emerged as a unified command in 1987 out of the military and strategic disaster of the failed Iran hostage rescue operation in 1980, Operation Desert One. Since that time, USSOCOM has grown in size, capability, and prominence, especially after the September 11 attacks. As of FY 2016, USSOCOM has an end-strength of some 66,000 personnel from all four services.

USSOCOM has a global footprint with deployments in more than 80 countries, while filling GCC requirements and supporting ten named operations. On average, some 3,500 U.S. SOF personnel are stationed abroad, with an additional 7,000 deployed forward rotationally in support of ongoing operations. Over the past 15 years, USSOCOM personnel, especially those associated with direct action operations, have been subjected to high stress and high operational tempo (OPTEMPO). As of 2015, the average SOF member had deployed between four and ten times since 2001, with many having less than 12 months at home station between deployments. The SOF personnel profile is different from the mainline forces of the U.S. Army and USMC. They tend to be older, and more than half are married with children. During the long war against Salafist-jihadism and other missions since the September 11 attacks, SOF personnel have sustained more than 2,500 killed or wounded in action. Some 7,500 people are in the SOF Wounded Warrior program recovering from physical or cognitive disabilities incurred in protracted and intense combat operations. This demanding OPTEMPO has also reduced the time available for training the force.¹⁰

The Unique Capabilities of USSOCOM

The following are the specialized units provided to USSOCOM by the four major services.

US Army Special Operations Command (USASOC)

U.S. Army SOF (ARSOF) includes approximately 27,000 soldiers organized into Special Forces, Ranger, special operations aviation units, along with civil affairs units, military information units, and special operations support units. ARSOF headquarters and other resources, such as JFK Special Warfare Center and School, are located at Fort Bragg, North Carolina. Five active Special Forces Groups (Airborne), with about 1,400 soldiers each, are stationed at Fort Bragg; Fort Lewis, Washington; Fort Campbell, Kentucky; Fort Carson, Colorado;

¹⁰ Andrew Feickert, Special Operations Forces (SOF): Background and Issues for Congress, Washington, D.C.: *Congressional Research Service*, November 19, 2015; Joseph L. Votel, U.S. Army, Commander U.S. Special Operations Command, statement before the House Armed Services Committee, Subcommittee on Emerging Threats and Capabilities, 114th Congress, Washington, D.C., March 18, 2015; William H. McRaven, USN Commander, U.S. Special Forces Command, posture statement before House Armed Services Committee, House of Representatives, 113th Congress, Washington, D.C., 2013.

and Eglin Air Force Base (AFB), Florida. Two Army National Guard Special Forces groups are headquartered in Utah and Alabama. These units are the original Green Berets and are trained with various skills to affect long-term FID missions. Each group has a specific global geographic orientation to allow the personnel to develop relevant language and the geography, culture, and history of the regions of interest. Elite light airborne infantry units designed for direct action (e.g., seizure of key facilities, such as airfields) are organized around the 75th Ranger Regiment that is headquartered in Fort Benning, Georgia. This regiment has three Ranger battalions and the highly specialized aviation unit, the 160th Special Operations Aviation Regiment (SOAR).

ARSOF maintains the 95th Civil Affairs Brigade (Airborne). A second Civil Affairs Brigade, the 85th, was activated in September 2011 and does not report directly to USSOCOM. All other CA units are located in the Army Reserves and are affiliated with Army general purpose forces. Military Information Support Operations (also known as psychological operations units) are designed to provide media and psychological warfare support through multi-media. There are two active units, the 4th Military Information Support Group (MISG) (Airborne) and the 8th MISG (Airborne) based at Fort Bragg with their subordinate units aligned with the GCCs.

Air Force Special Operations Command (AFSOC)

The AFSOC is one of the USAF's ten major commands with approximately 19,500 active, reserve, and civilian personnel and is the primary air arm of USSOCOM. AFSOC operates out of four main continental United States (CONUS) bases and two locations overseas. The 1st Special Operations Wing (SOW), the 24th SOW, and Air Force Special Operations Air Warfare Center are located at Hurlburt Field, Florida. The latter is responsible for training, education, irregular warfare programs, innovation development, and operational testing. The Air Warfare Center provides the training and logistics for a wide array of specialized aircraft to support the full range of USSOCOM missions. Further, the Air Warfare Center trains and deploys Combat Aviation Advisors, medical element personnel, and AFSOC Security Forces.

One of the key roles of the 24th SOW is providing the USAF and joint force with special operations ground forces that enable global access, precision strike and personnel recovery operations. These special tactics capabilities comprise special tactics officers, combat controllers, combat rescue officers, pararescue men, special operations weather officers and airmen, air liaison officers, and tactical air control party operators. All of these USAF personnel are often embedded with other element of USSOCOM during ongoing and rapid reaction operations.

The 27th SOW at Cannon AFB, New Mexico, supports the subordinate 352nd and 353rd SOWs that operate from Europe (RAF Mildenhall, UK) and the Pacific (Kadena Air Base, Japan). Both SOWs provide capabilities similar to those described earlier and found in the 24th SOW's portfolio.

The AFSOC aviation inventory presents one of the largest elements of USSOCOM's capital investment both in terms of procurement and R&D. The most expensive programs are the fleet of CV-22 vertical takeoff and landing (VTOL) aircraft and the family of heavily modified C-130 cargo aircraft: the AC-130J gunship and the MC-130 combat assault aircraft. AFSOC manages a fleet of UAVs. Finally, it manages a broad spectrum of modified civilian and military aircraft to facilitate special missions in covert transportation and surveillance.

Naval Special Warfare Command

The Naval Special Warfare Command (NSWC) has approximately 10,000 personnel including active-duty Special Warfare operators aka SEALs, Special Warfare Combatant-craft Crewmen (SWCC), reserve personnel, support personnel, and civilians. NSWC is organized around 10 SEAL Teams, 2 SEAL Delivery Vehicle (SDV) teams and 3 Special Boat Teams. Naval Special Warfare (NSW) provides an effective means to apply counterforce in conjunction with national policy and objectives across the spectrum of hostilities from peacetime operations to limited war to general war. NSW forces focus on the conduct of the following core activities of special operations:

- direct action
- special reconnaissance
- foreign internal defense
- counterterrorism
- information operations
- security force assistance
- counterinsurgency
- activities specified by the President of the United States.

Additionally, NSW forces are involved in other activities, such as; unconventional warfare, counterdrug, personnel recovery, and special activities. NSW also provides maritime-specific special operations to meet U.S. Navy fleet requirements.”¹¹

Marine Special Operations Command

The Marine Special Operations Command (MARSOC) of approximately 3,000 personnel was created on November 1, 2005, and consists of four subordinate units: the Marine Raider Regiment that includes the 1st, 2nd, and 3rd Marine Raider Battalions, the Marine Raider Support Group, the Marine Raider Intelligence Battalion, and the Marine Raider School. On August 6, 2014, the Marine Special Operations units were renamed as Marine Raider units. The Marine Raider units can take advantage of their full integration into the USN-USMC maritime joint force and can readily operate from a variety of Gray and Black hulled sea basing platforms.

In addition to the Raider units, the USMC created three Special Purpose Marine Air-Ground Task Forces. One is based at the Sigonella Naval Air Station, Italy, and the second at the Al Taqaddam Base in Iraq. The third is based in Central America. These are battalion-sized task force drawn from the larger Marine order of battle to provide USAFRICOM, USCENTCOM, and USSOUTHCOM with a long-range, rapid-response company size force that relies on a mix of MV-22s and KC-130J for transportation and fire support. The first supports USAFRICOM’s rapid reaction requirements in its AOR.¹² The second is part of the hybrid campaign to contain and destroy ISIS and provides USCENTCOM with a rapid reaction CSAR capability. The third Special Purpose Marine Air-Ground Task Force (SPMAGTF)

¹¹ DoD, Special Operations University, *Special Operations Force Reference Manual—Fourth Edition*, MacDill Air Force Base, Tampa, Fla., June 2015.

¹² Matthew L. Schehl and Gidget Fuentes, “The Marines’ New Iraq Mission,” *The Marine Times*, February 14, 2016; U.S. Department of State, “U.S. Marine Corps Crisis Response in Africa: Interview with Colonel Calvert Worth, Commanding Officer, Marine Air Ground Task Force—Crisis Response Africa Unit,” New York, N.Y., March 30, 2016.

is designed to support the U.S. government's effort to counter the threat of transnational criminal organizations in the Caribbean and Central America. Depending upon future regional needs, additional SPMAGTFs may be created, if only on a temporary basis.¹³

General Purpose Joint Force Capabilities Supporting USSOCOM

Aside from the forces under direct USSOCOM command, the four and larger services of the joint force provide critical assets in support of USSOCOM operations.

The USAF provides specialized and long-range airlift; medium- and high-altitude ISR platforms; and specialized aerial fire support. In the latter case, the procurement of the USAF AC-130J fleet is a major line item.¹⁴ The USN provides a fleet of specialized vessels designed to conduct sustained operations along and inside littoral zones. These range from small high-performance combat vessels to much larger high-speed ferries and "mother ships" in the form of the Expeditionary Base (EB) family of support vessels. The main USN air assault and combat aviation elements that provide SOF with enablers include the full spectrum of sea-based aircraft. The most-relevant capability is the V-22 for long-range VTOL combat lift and the future F-35B to provide aerial escort and fire support. One unique organizational concept that has emerged out of the USMC is the creation of specialized company-sized units designed to support SOF-type operations that include the permanent attachment of V-22s and KC-130J freighter-tankers with a limited aerial gunship capacity.¹⁵ Finally, the USN provides clandestine transportation for naval SOF units in the form of submarine fleets with a number of these undersea warships specifically modified.¹⁶ The Army can provide additional aviation support beyond those specialized units assigned to the 160th SOAR. This aviation support will include additional combat and lift helicopters and the provision of integrated reconnaissance-strike complexes, along the design of Task Force Observe, Detect, Identify, and Neutralize (ODIN), that may be pre-deployed as the consequence of an ongoing GCC operation.¹⁷ Finally, the Army and USMC can provide combat support, such as long-range rocket artillery and engineering units.¹⁸

On a global scale, DoD and IC provide the Theater Special Operations Commands (TSOCs) with a wide range of tactical, operational, and strategic intelligence. This is the pro-

¹³ For an overview of the three SPMAGTF Crisis Response units, see Jim Dorschner, "Tailored Response," *IHS Jane's Defence Weekly*, September 7, 2016.

¹⁴ Tom Kaminski, "Super Hercules: Faster, Higher, Further," *Combat Aircraft*, Vol. 17, No. 4, April 2016. As of FY 2014, the USAF HC/MC-130J Recapitalization Program Acquisition Program Baseline includes 131 HC/MC-130Js, which include 37 HC-130J, and 94 MC-130Js; thirty-seven of the latter will be highly modified into AC-130J gunships.

¹⁵ Megan Eckstein, "Marines To Add 'Harvest Hawk' Weapons Kit to Entire C-130J, V-22 Fleet," *USNI News*, May 11, 2016a.

¹⁶ The four SSGNs have been modified to support SOF operations using a swimmer delivery vehicle.

¹⁷ The Army investment in the Airborne Reconnaissance Low program can serve USSOCOM and the IC on a wide range of ISR missions. The total cost of that program is carried in the U.S. Army budget. See Martin Streetly, "Eyes and Ears in the Sky: U.S. Army Airborne Reconnaissance Low Recapitalization," *IHS Jane's International Defence Review*, February 2016.

¹⁸ For a description of Marine artillery units operating in support of Iraqi forces from forward-operating bases in northern Iraq, see "Marines Expanding Combat Role in Iraq, U.S. Official Says," *Associated Press*, March 24, 2016. The U.S. Army has been providing indirect fire support from locations in Jordan, Syria, and northern Iraq with the use of the HIMARS long-range multiple rocket launchers. See Richard Sisk, "U.S. Army Troops Fire HIMARS Rockets from Jordan into Syria," *DoD Buzz*, March 11, 2016; Joseph Trevitchick, "U.S. Rocket Artillery Will Blast Islamic State From Turkey," *War is Boring*, April 29, 2016.

vision of a globally responsive reconnaissance capacity that can be tasked by the command and operational elements of a TSOC. This global reconnaissance-strike capability has two main elements, collection and analysis. Space-based collection assets as part of the National Security Space (NSS) architecture are maintained by the National Reconnaissance Office (NRO) and Naval Ocean Surveillance System with the USAF, the main service provider of the space transportation system.¹⁹ These collection inputs are strongly supplemented by a wide range manned and unmanned aerodynamic platforms.

USSOCOM's Major Theaters of Operation

Salafist-Jihadism as a Global Insurgency

MENA and South Asia are the primary theaters of operation for the various Salafist-jihadi movements that threaten U.S. interests. Secondary theaters include parts of sub-Saharan Africa, notably Kenya and Nigeria, as well as parts of SEA. As noted earlier, the two most prominent Islamic revolutionary movements are al Qa'ida and its franchises and ISIS as a quasi-state and its "provinces." Often, they are in violent competition for local, if not regional dominance. Although they disagree on timing, both strands of Salafist-jihadism call for the creation of an Islamic caliphate, which provides sufficient material power to affect a transnational revolution to overthrow all Islamic regimes and societies that do not adhere to a very strict interpretation of Islamic law.²⁰ Both profess to believe that the ultimate victory of their global movements are divinely ordained.

USSOCOM is a command with global responsibilities. While global in focus, the bulk of its commitment of personnel and resources has been directed to combat the two main Salafist-jihadi groups al Qa'ida and its affiliates and ISIS. Most of these counterterrorism and FID operations are found in the theater of operation that spans from North and Central Africa²¹ to the Greater Middle East that includes Egypt, Turkey, Saudi Arabia and Iran. To the east of this zone of conflict is the ongoing struggle to stabilize Afghanistan and Pakistan from the various South Asian strains of Salafist-jihadism. Lesser, but strategically meaningful, Salafist-jihadi threats have waxed and waned on the Indian subcontinent and the states of SEA, with large Islamic populations in Malaysia, Indonesia, and the Philippines. Basically, this is a conflict being fought along the 10th parallel of the world south of Eurasia along a historical religious and fault line between Islam (primarily to the north) and Christianity and animism to the south (see Figure 6.1).²² The main demand signals for USSOCOM capabilities are likely

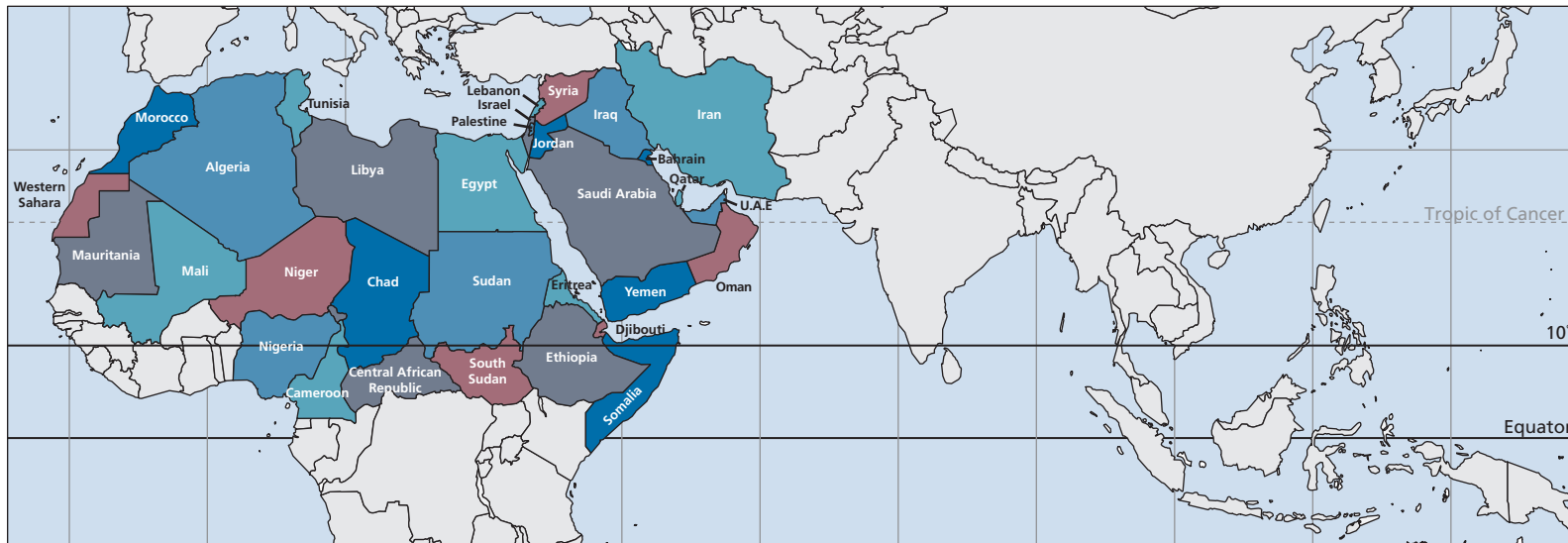
¹⁹ Currently, the USAF has two certified space launch vehicle (SLV) providers, the United Launch Alliance (ULA) and the Space Exploration Corporation (SpaceX). Additional providers may be certified by the end of the decade, especially those that offer much lower flight costs to orbit. Several contenders, such as Orbital Science ATK, Blue Origins, and Virgin Galactic, are plausible new entrants.

²⁰ Currently ISIS's strategic priority is to overthrow the regimes found in the zones of direct conflict as described above. Other than conducting terrorist strikes for the objective of strategic intimidation, ISIS does not aspire to actually overthrow the governments in the Western Hemisphere, Europe, Australia, the bulk of China, Northeast Asia, and much of southern Africa.

²¹ Central Africa includes Nigeria and its neighbors, as well as Kenya and its neighbors, which provide fertile ground for the emergence of Salafist-jihadi movements, such as Boko Haram and Al Shabab.

²² Eliza Griswold, *The Tenth Parallel: Dispatches from the Fault Line Between Christianity and Islam*, New York, N.Y.: MacMillan, 2010.

Figure 6.1
USSOCOM's Long War Along the North 10th Parallel



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to remain in these regions. This is not to say there will not be counterterrorism and FID requirements elsewhere in the world, for example, in Mexico, the Caribbean, and the rest of Latin America and NATO Europe, but these likely will remain a far smaller factor in shaping demand for U.S. SOF capabilities.²³

MENA Theater of Operations

At the center of the MENA theater of operations are two failed or failing states that have emerged out of the destabilizing events that followed the Arab Spring in 2011. They are Syria, which is deep in civil war, and Iraq, which has been fractured by ISIS. For all practical purposes, the Syrian and Iraqi civil wars have nearly merged into one operational theater. The central, common feature of these conflicts is the rapid rise of ISIS. It emerged on the scene with military successes during summer and fall 2014 to seize large areas in eastern and central Syria and western Iraq. Units of USSOCOM, along with elements of U.S. joint force and allied general and special purpose forces, are now engaged in parallel campaigns that combine elements of a strategic air campaign, counterterrorism, FID, and unconventional warfare. For an overview of the areas of current and possible future conflict engaging USSOCOM along the 10th parallel outside of the theater of operation against ISS in Syria and Iraq, see Appendix C.

Hybrid War Against ISIS in Iraq and Syria

As noted earlier, in late summer 2014, the United States created an ad hoc anti-ISIS coalition and launched Operation Inherent Resolve. To defeat the quasi-state of ISIS, Washington understood that a pure counterterrorism campaign would not be sufficient. Central to Operation Inherent Resolve, therefore, was a sustained air campaign to destroy the territorial assets of ISIS, most specifically its major sources of revenue—the smuggling of petroleum, seized cash, and sale of other assets. Air power has also been used to support SOF operations to capture and kill the key leadership cadre. Finally, air power has been used to support indigenous ground forces in Syria and Iraq to retake territory seized by ISIS during its first year of existence. Over time, there has been a buildup of U.S. and allied general purpose forces in Iraq to provide additional long-range precision fires, attack helicopters, CSAR, engineering, training, and logistics.²⁴ Inside Syria, the U.S. and allied ground presence has remained quasi-covert, with SOF providing military assistance to the tentative military alliance between the Syrian Kurds and more moderate elements of the Sunni Syrian rebellion.

Aside from the large and sustained aerial campaign to contain, degrade, and destroy ISIS, U.S. ground forces have been conducting training and equipping efforts to reconstitute the ISF that were routed by ISIS's opening offensive to seize Mosul and much of western Iraq. U.S. forces have been providing direct and indirect military assistance to the forces of the KRG in northern and western Iraq.²⁵ They have also provided air support, if only intermittently, to Shia

²³ The focus of most SOF activity in the Western Hemisphere is in support of regional and national operations against transnational criminal organizations. In East Europe, there is the new old mission of providing training for East European SOF units to conduct FID operations in defense of “active measures” by the Russian Federation or providing these states with enhanced UW capabilities.

²⁴ For description of the on the ground US military presence in Iraq, see Mike Giglio, “Inside The Real US Ground War on ISIS,” *BuzzFeed*, April 16, 2016.

²⁵ These aerial operations by the United States to support the Kurdish nationalist in northern Syria are a continued source of tension between Ankara and Washington. The former views the Syria Kurds as closely allied with the radical wing of the Kurdish nationalist movement inside Turkey, the PKK. In November and December 2015, the ceasefire between the PKK

militia units. To defeat ISIS, the United States has supported two major elements of the anti-Assad rebellion in Syria.

By summer 2016, both anti-ISIS campaigns have had significant success. In Iraq, the key ISIS-held cities of Ramadi and Fallujah had fallen to a combined Iraq force of elements of the ISF and the Iranian-supported Shia militias. And by early 2017, Iraqi forces, supported by U.S. airpower and advisors, were close to expelling ISIS from Iraq's second largest city, Mosul. Even if ISIS is defeated in the narrow military sense, there will remain the daunting task of trying to sustain some form of national reconciliation between the Shia, Sunni Arab, and Kurdish political factions in a modern Iraq that will likely take on features of Lebanon after its civil war.²⁶

In northeastern Syria, the U.S. coalition has had considerable success in providing air power, ISR, and SOF support to the Syrian Kurds, the YPG, and the Sunni Syrian allies under the label of the Syrian Democratic Forces (SDF). Several key ISIS-controlled towns along the border with Turkey, such as Manbij, have fallen, thereby nearly closing off most lines of communication between the ISIS "heartland" and Turkey.²⁷ These successes prompted Ankara to launch a military operation to gain control of a portion of the Syrian-Turkish border to ensure that the Syrian Kurds could not create a de facto state along the entire border region. Washington acknowledged this Turkish priority by providing Turkish ground forces and their non-Kurdish Syrian insurgent allies with air and SOF support.²⁸

Unlike Iraq, where Iran is a de facto ally with the United States and its allies in the war against ISIS, the situation in Syria is much more complex, with the Assad regime receiving substantial indirect and direct military aid from Iran; its Lebanese ally, Hezbollah;²⁹ and the Russian Federation.³⁰ In the latter case, that military support has escalated with a major aerial campaign and the deployment of artillery and Special Forces to shore up the Assad regime's fighting capabilities.

During spring 2016, the Russian aerial campaign had some success in helping the Syrian armed forces to defeat a variety of rebel groups in and around Aleppo, Syria's second-largest city. The Russian aerial intervention has complicated U.S. and allied use of air power and SOF units to inflict damage on ISIS. Furthermore, the United States has had a strategic problem with the key allies, Turkey, Saudi Arabia, and several GCC states with willingness to support

and the government of Turkey completely collapsed when the Turkish Armed Forces launched military operations against elements of the PKK in eastern Turkey. The PKK has replied with a campaign of bombings. On the other hand, Washington views the Syrian Kurds and the Iraqi KRG fighting organizations as some of the most effective ground forces in the fight against ISIS. The failed military coup against the Erdogan government will only heighten tensions between Washington and Ankara in this regard.

²⁶ Erika Solomon, "Iraq's Post-ISIS Outlook Darkens as Factions Turn on Themselves," *Financial Times*, October 7, 2016.

²⁷ Chris Kozak, "Syrian Situation Report: June 18–24," Institute for the Study of War, June 24, 2016.

²⁸ Umit Ozdal and John Davidson, "Turkish Tanks Roll Into Syria, Opening New Line of Attack," *Reuters*, September 4, 2016.

²⁹ Although Hezbollah has demonstrated a global reach in conducting terrorist operations on behalf of the state interests of Iran, it should not be conflated with the Salafist-jihadi threat. The Salafist-jihadis and many Sunni-dominated states, such as Saudi Arabia, view Hezbollah as a dangerous Shia arm of the regional and global ambitions of Iran.

³⁰ The challenge of the diverse interests held by members of the anti-Daesh coalition are well described in Frederick W. Kagan, Kimberly Kagan, Jennifer Cafarella, Harleen Gambhir, Christopher Kozak, Hugo Spaulding, and Katherine Zimmerman, "U.S. GRAND Strategy: Destroying ISIS and Al Qaeda, Report Two—Competing Visions for Syria and Iraq: The Myth of an Anti-ISIS Grand Coalition," Institute for the Study of War, January 2016.

Jabhat al Nusra (also known as Ahrar al-Sham), the Salafist-jihadi fighting arm of al Qa'ida.³¹ Ahrar al-Sham has proven to be one of the most militarily effective rebel groups outside of ISIS in inflicting heavy losses on the Syrian Armed Forces. During the summer of 2016 Ahrar al-Sham and its more "moderate" Sunni rebel allies launched successful counteroffensive to break siege of Aleppo.³²

During this period of heavy fighting, the United States appears to have acquiesced to the argument from its Islamic regional allies that the non-ISIS rebel organizations should be supplied with advanced infantry weapons, including the tube-launched, optically-tracked, wire-guided (TOW) anti-tank guided missile (ATGM). These improved infantry weapons have been used with good effect to allow the various non-ISIS rebel forces to repel several Syrian ground offensives following the extensive use of Russian air power.³³ That success was tempered by the effective use of Russian carpet-bombing of rebel-held zones inside Aleppo and its suburbs and a successful ground operation by the Syrian Armed Forces to surround those rebel forces.³⁴

Prospect of Technologically Enabled Hybrid Threats

The ready availability of increasingly lethal and advanced weapons, including man-portable guided munitions, will raise the cost and introduce new challenges for USSOCOM. Insurgents and transnational terrorist organizations may benefit from acquiring advanced weapons during the collapse of a failing state.³⁵ The most-recent example of this phenomenon is the rapid seizure by ISIS of ISF equipment during its initial and successful offensive in western Iraq. Unless resupplied by a major state power, those inventories will be consumed and/or destroyed over time during continued combat operations.³⁶

States may choose to use insurgents or transnational terrorist organizations as weapons against other states. A recent example of this phenomenon is the large-scale provision by Iran of advanced guided weapons to Hezbollah. This form of adversary has been labeled a hybrid

³¹ This dilemma for the United States is highlighted in Kagan et al., 2016. To broaden its political appeal in Syria, Jabhat al Nusra renounced its formal connection with al Qa'ida and changed its name to Ahrar al-Sham.

³² Borzou Daragahi, "This is Why the Syrian Rebels' Takeover of Aleppo Matters So Much," *BuzzFeed*, August 12, 2016.

³³ This has included the use of TOW missiles to inflict noteworthy personnel losses to the senior cadre of Russian and Iranian advisory corps during fall 2015 and winter 2016. See Michael Weiss, "Are U.S. Missiles Taking Out Russian Military Officials?" *The Daily Beast*, February 5, 2016.

³⁴ This offensive aborted another attempt by the United Nations with strong U.S. support to negotiate a cease-fire and a transition to a national regime with Assad not in power to be followed by elections. See Chris Kozak, "Assad Regime Gains in Aleppo Alter Balance of Power in Northern Syria," Institute for the Study of War, February 5, 2016.

³⁵ For a discussion of the phenomenon of the diffusion of advanced weapon systems and technologies, see Davis and Wilson, 2011.

³⁶ Aside from destroying captured equipment held by ISIS, other major objective of the multinational air operation, Tidal Wave II, is to destroy ISIS capacity to function as a proto-nation state. These targets include the destruction of the petroleum infrastructure and transportation system to deny ISIS both a source of hard currency and the destruction of the store of hard currency seized by ISIS. SOF units play a vital role in the comprehensive effort to provide timely target acquisition for the coalition air power.

threat, an insurgency aided by an allied nation state.³⁷ Other examples of this form of assistance are the provision of ATGMs to the anti-Assad rebel groups by the United States, Turkey, Saudi Arabia, and the GCC states and the provision of Man-Portable Air Defense Systems (MANPADS) and ATGMs to the Afghan insurgents during their war against the Soviet Union.³⁸ Several types of capability are likely to be provided to violent non-state actors, including

- MANPADS—mostly EO- and laser-guided
- SHORADSs—all-weather radar-guided
- precision-guided direct fire munitions, such as ATGMs and precision-guided rockets
- precision-guided indirect fire weapons that include mortars, short-range rockets, tubed artillery, and long-range rockets
- armored fighting vehicles
- anti-ship guided missiles
- UAVs
- UUVs.

Aside from these purpose-built military weapons, Salafist-jihadi and other transnational terrorist and criminal organizations will be able to acquire a wide range of dual-purpose civilian system that act as force multipliers, including

- night vision equipment
- encrypted mobile communications
- mobile phones with GPS
- micro- and small UAVs (armed and unarmed), some with swarming features³⁹
- laser range finders
- Internet-enabled money transfer systems and smart cards to help address the logistics of “laundering” of illicit income
- ubiquitous surveillance with facial recognition
- commercial satellite reconnaissance data⁴⁰
- big data surveillance of the global multimedia system
- next-generation camouflage uniforms and body armor
- cheap EO and radio frequency countermeasures.

All of these possibilities suggest that military operations against Salafist-jihadi organizations may become higher risk. This will require the United States and its partners and allies to invest in a wide array of countermeasures and new capabilities. More broadly, USSOCOM operations may have to be much more heavily reinforced with joint force assets.

³⁷ The Soviet Union and China were very effective in providing advanced weapons to North Vietnam during its long struggle with the United States to liberate South Vietnam. One could label that operation as a hybrid campaign.

³⁸ For a discussion of the diffusion of advanced military capability, see Shawn Brimley, *While We Can: Arresting the Erosion of America's Military Edge*, Washington, D.C.: Center for a New American Security, December 2015.

³⁹ Huw Williams, “Find and Fix: Counter-UAV Solutions Emerge to Tackle Latest Challenges,” *IHS Jane's International Defence Review*, February 2016a; Andrew White, “Swarm Theory: Commercial UAVs Pose Rising Security Challenge,” *IHS Jane's Intelligence Review*, December 2015.

⁴⁰ Allison Puccioni, “Commercial Lift-Off: Paid-for Satellite Imagery to Boom by 2020,” *IHS Jane's Intelligence Review*, December 2015.

From the USSOCOM Perspective: How Much is Enough?

USSOCOM R&D and Capital Investment Portfolio

To address operationally unique challenges, USSOCOM is provided with a modest R&D and acquisition budget. This has allowed USSOCOM to invest in a variety of weapons and capabilities that are not in the programs of record for the four major services. These include an array of small-arms innovations; manned light attack and reconnaissance aircraft; enhanced communications;⁴¹ enhanced sensors for a fleet of MQ-9 UAVs; up-armoring for the USAF fleet of CV-22 prop-rotor aircraft; and the development of the Tactical Assault Light Operator Suit (TALOS).⁴² Another major initiative is the replacement of the current-generation swimmer delivery vehicle, the Mark 8, with a new generation vehicle that may have a manned and unmanned option.⁴³ In fact, USSOCOM does harvest new technologies and capabilities that emerge out of the joint force and DoD laboratories. For example, DoD Strategic Capabilities Office (SCO) has been developing microdrones that mimic the swarming behavior of insects, a new capability of direct relevance to USSOCOM's unique operational requirements.⁴⁴ For a more-complete discussion of these technologies, see Appendix A, "The Third Offset and the Future of DoD's R&D Investment Portfolio."

One of the most important investments for USSOCOM will be a next generation of VTOL aviation. At the present time, the joint force's most ambitious VTOL program focuses on the competitive development of medium-weight follow-ons to the UH-60 with advanced aerodynamic features. Two variants are in competition. First are variants of the V-22 convertiplane, such as the Bell V-280 Valor. Second is the successful development of a counter-rotating compound helicopter, such as Sikorsky S-97 Raider in the form the larger Defiant variant. Both offer flight speeds of approximately 250 knots—more than 100 knots greater than a conventional helicopter with a cruise altitude above 20,000 feet, and a payload similar to the Blackhawk.⁴⁵ The higher cruise altitude is useful while flying to a landing zone to over-fly low-altitude air defense threats. Both variants will provide USSOCOM with an interesting investment opportunity sometime in the early 2020s. On the heavy-lift side, the Chinook, a 50-year-old design, is likely to remain the Army's only medium-heavy lift helicopter until

⁴¹ See Sandra I. Erwin, "Special Operations Equipment Plugs Into the Digital Revolution," *National Defense*, January 2016.

⁴² A major UAV initiative by USSOCOM and the USMC in collaboration with the Defense Advanced Research Projects Agency (DARPA) and the Office of Naval Research (ONR) is the development the VTOL tactically exploited reconnaissance node (TERN), an unmanned combat aircraft with some of the performance of the larger MQ-9 Reaper with increased operational agility and lower costs. See Allyson Versprille, "Affordable Surveillance a Priority for Special Operations," *National Defense*, January 2017; Huw Williams, "Northrop Grumman Selected for the Latest Phase of the TERN Programme," *IHS Jane's International Defence Review*, February 2016b.

⁴³ Andrew White, "Covert Action: Insertion Technology Takes a Step Forward," *IHS Jane's International Defence Review*, January 2016.

⁴⁴ These investments are not inconsistent with the U.S. Army's Big 8 program to maintain a degree of overmatch on the battlefield. These programs include (1) Future Vertical Lift development; (2) active protection of combat vehicles; (3) cross-domain fires; (4) next-generation combat vehicles; (5) robotics and autonomous systems; (6) expeditionary mission command concepts; (7) resilience to cyberthreats and electromagnetic threats; and (8) enhance soldier-team performance (also known as the mobility enhanced and armored combat soldier). See Jen Judson, "U.S. Army Unveils Its 'Big 8' Initiatives," *Defense News*, March 16, 2016a.

⁴⁵ These aircraft designs are in competition for the Joint Future Vertical Lift (JFVL) program that may emerge as a joint service R&D effort.

2040, if not later. Only the USN and USMC have budgeted the development and deployment of an upgraded version of the Sea Stallion, the CH-53K, which will replace earlier variants during the early 2020s.⁴⁶

A somewhat more unconventional option is for the USSOCOM to acquire a fleet of fixed-wing light reconnaissance attack aircraft, such as the turboprop Embraer A-29 Super Tucano, AT-6C Wolverine, or the recently developed all jet Cessna Scorpion.⁴⁷ These aircraft have a much higher performance than even an advanced rotorcraft design. As competitors to next-generation helicopter gunships, these fixed-wing reconnaissance attack aircraft can use a combination of sensors and precision standoff CAS munitions from altitudes and with speeds that make them less vulnerable to anti-aircraft artillery and MANPAD threats. Furthermore, the operations and maintenance (O&M) costs of this class of aircraft will be much less than an advanced rotary-wing aircraft. This makes the concept of the light fixed-wing reconnaissance attack aircraft an attractive option for a very wide range of countries with limited military budgets.⁴⁸ Currently, the USAF is exploring these options through its OA-X test program.

The Size and Cost Demand Signal

The size of USSOCOM is programmed to stabilize at around 70,000 personnel by 2019. An additional 5,000 to 10,000 increase is possible, but there are practical pressures to ensure that such an increase is incremental. Given the likely rise in the investment and operational costs of all types of combat infantry-type forces, there will be a downward pressure not to increase the numbers of ground combat personnel. Furthermore, the philosophy of the SOF community is that quality must supersede quantity in all cases; otherwise, SOF run the risk of becoming less “special.”

The direct costs of USSOCOM in terms of budget and personnel are relatively modest compared with the large budgets of the mainline services and the OSD account. The current topline is approximately \$10 billion, or about 1.6 percent of the entire defense budget, including Overseas Contingency Operations (OCO) spending (see Figure 6.2).

Some increase in SOCOM's share of the budget is plausible if both USSOCOM and the traditional joint forces adopt a number of the technologies identified earlier. Given the importance of containing and defeating all branches of Salafist-jihadism, satisfying this demand signal does not seem unreasonable. One example of this demand signal is the global requirement of UAV orbits, the bulk of which are committed to supporting ongoing operations against ISIS and the continued support military operations in Afghanistan (see Figure 6.3).⁴⁹ On the

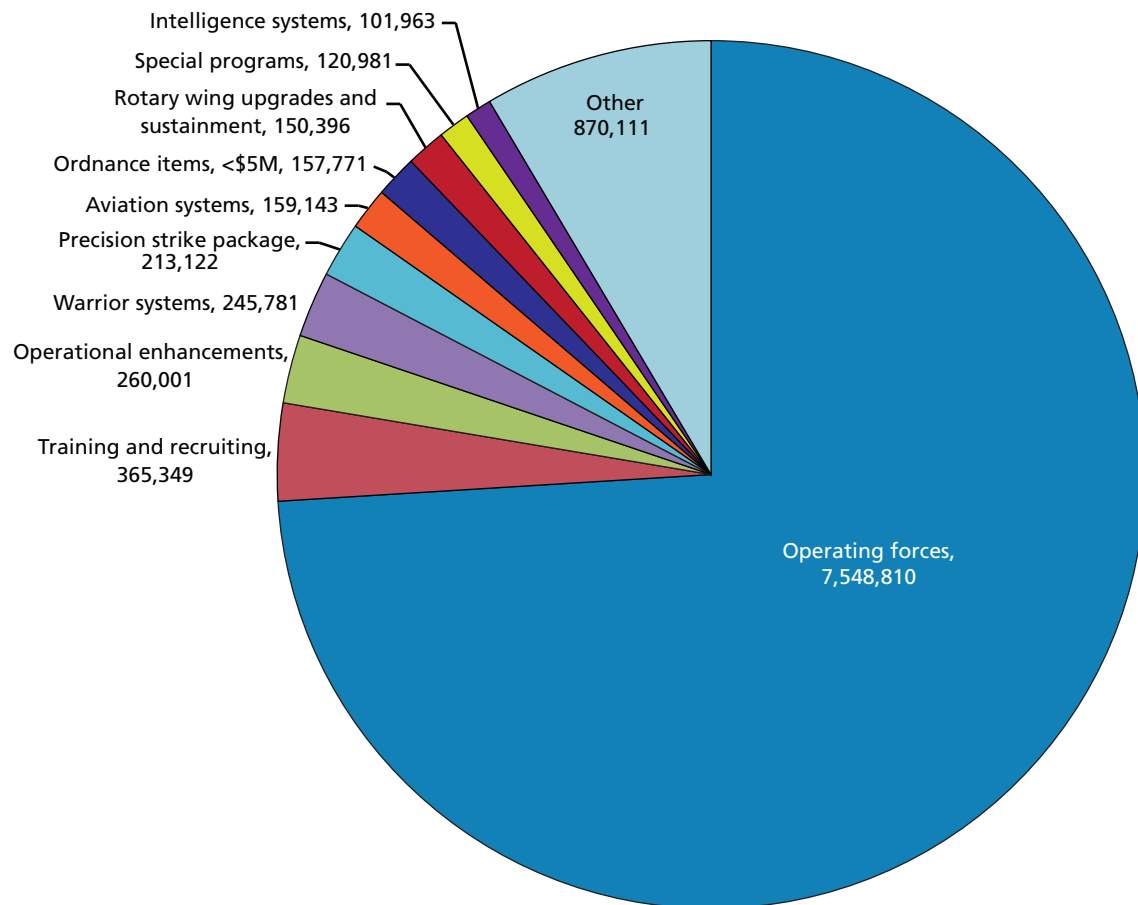
⁴⁶ For a discussion of the JFVL program, see Richard Aboulafia, “Army Tries Another Too-Big-Fail Project—The Coming Rotorcraft Non-Revolution,” *Aviation Week & Space Technology*, June 16, 2014.

⁴⁷ For a description of the Combat Dragon II operational deployment in Iraq of two modernized versions of the OV-10 light attack aircraft, see Andy Walton, U.S. Navy, “Bronco 12 Cleared Hot,” *Proceedings*, June 2016. This operational experiment demonstrated the efficiency and effectiveness of using light turbo prop power attack aircraft equipped with modern sensors and PGMs to conduct CAS and reconnaissance strike missions at an operation cost a fraction of the use of a fast fighter bomber.

⁴⁸ For an example of building an air force using light attack and reconnaissance aircraft in a country with limited personnel and budget means, see Franz J. Marty, “Rising From the Ashes: While Building the Afghan Air Force Is Still a Work in Progress, its Capabilities Are Improving. However, Efforts Remain Focused On Attack Capabilities, Seemingly Neglecting Airlift,” *IHS Jane's Defence Weekly*, September 14, 2016.

⁴⁹ Josh Smith, “Exclusive: Afghan Drone War-Data Show Unmanned Flights Dominate Air Campaign,” *Reuters*, April 20, 2016; Jeremiah Gertler, “How Many UAVs for DoD?” *Federation of American Scientists*, IN 10447, August 27, 2015.

Figure 6.2
Planned Allocations of USSOCOM's Budget for FY 2017 (in Thousands of \$)



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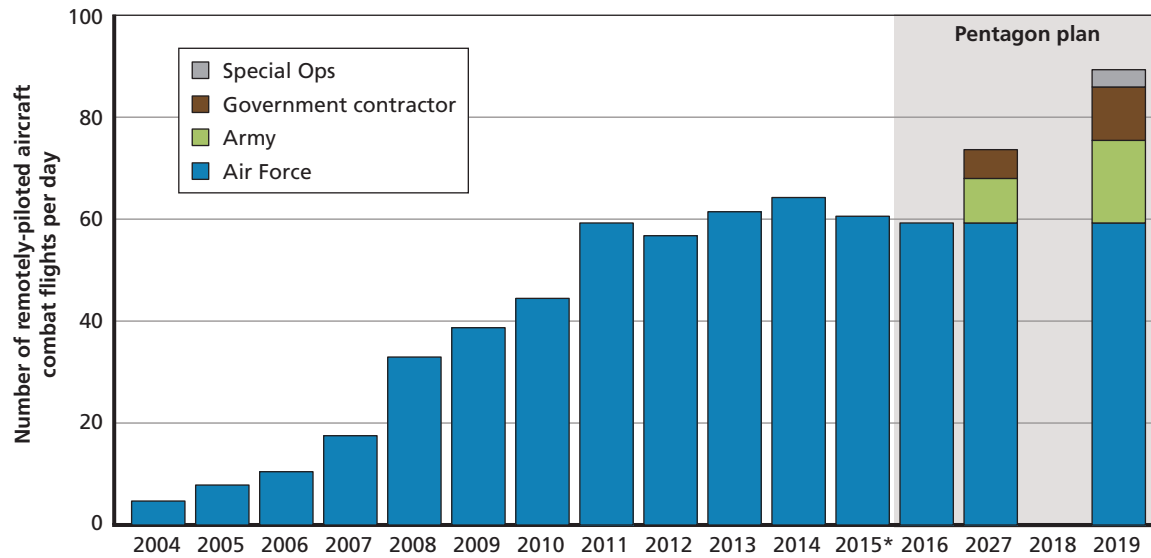
other hand, the actual cost of SOF is higher when the role of the joint force enablers is taken into account. A precise accounting of those costs to the joint force is not straightforward, but our analysis suggests that these shadow costs may represent an additional 1 percent of the total DoD budget. This price seems not unduly burdensome given the demand signal associated with the joint force requirements to provide for very high-performance defense and deterrence capabilities in East Asia, SEA, and Europe.

Implications for General Purpose Forces

U.S. general purpose forces play crucial roles in the fight against Salafist-jihadi groups, especially the quasi-state ISIS. Given the prospects for continued military operations against these groups, DoD should plan to sustain in the field forces along the following lines for the indefinite future:⁵⁰

⁵⁰ This will include the significant use of aerial tanker and airlift squadrons during the course of a hybrid operation similar to Operation Inherent Resolve. From August 2014 to July 31, 2016, the coalition flew 39,063 CAS, Escort, and Interdiction

Figure 6.3
Global Demand for UAV Sorties



SOURCE: Gordon Lubold, "Pentagon to Sharply Expand U.S. Drone Flights over the Next Four Years," *Wall Street Journal*, August 16, 2015. Used with permission.

NOTE: No data available for 2018.

RAND RR1782-6.3

- three Army BCTs
- three USMC infantry battalions
- five USAF fighter squadrons
- one USAF bomber squadron
- one USMC fighter squadron
- 90 to 100 orbits of "low-end" UAS for ISR and precision strike.⁵¹

Conclusion

The force planning requirements for USSOCOM are unlikely to change dramatically over the course of the FYDP planning cycle. The strongest case for a modest expansion of USSOCOM's force structure flows from the ongoing personnel stress generated by current operations. Basically, there is the risk of burnout for personnel who are subjected to high-frequency tours into high-risk environments. The biggest near-term uncertainty is the intensity, timing,

sorties compared with the 17,142 Airlift and Airdrop; 17,526 manned and unmanned ISR; and 26,989 aerial tanker sorties. See U.S. Air Forces Central Command, Combined Air and Space Operations Center, "Combine Forces Air Component Commander 2011–2016 Airpower Statistics as of 31, July 2016," *Operation Inherent Resolve: Targeted Operations Against ISIL Terrorists*, Washington, D.C.: U.S. Department of Defense, 2016.

⁵¹ The USAF is expected to provide the capacity of providing the joint force, USSOCOM, and the IC with approximately 90 combat air patrols or "orbits" by the end of the decade. To maintain an orbit over a distant foreign location requires a total of four unmanned aircraft and appropriate flight crews. The preferred ratio to an orbit and personnel is 10:1. See Dave Majumdar, "Exclusive: U.S. Drone Fleet at 'Breaking Point,' Air Force Says," *The Daily Beast*, January 2, 2015; Lubold, 2015.

and long-term consequences of Operation Inherent Resolve. Currently, the U.S.-led hybrid campaign with its mix of USSOCOM and general purpose joint forces and indigenous ground forces generates the strongest demand signal for resources for this war against Salafist-jihadism. At the time of the writing of this report, the ISIS quasi-state has been defeated in the narrow sense of the word with the fall of Mosul in Iraq and Al Raqqa in Syria. As suggested in Chapter Five, the post quasi-state era of ISIS is likely to see continued and major challenges for the United States and its allies. ISIS is an ideological wing of Salafist-jihadism will likely sustain a number of groups in the zone of conflict along the northern 10th parallel, especially in parts of Africa. Furthermore, there is the prospect that al Qa'ida in its various manifestations will have resurgence as the leading global Salafist-jihadi movement following the demise of its ideological rival.⁵² This will likely require a significant USSOCOM presence in Iraq. Further to the east, the U.S. presence in Afghanistan has increased somewhat. In South and Southeast Asia, the demand signal remains ambiguous. USSOCOM will likely play a limited but useful role in the Philippines and Indonesia. On the Asian mainland, the question remains as to whether USSOCOM will provide a significant assistance to either Thailand or Myanmar (also known as Burma). In the former case, there is an incipient radical Islamic-inspired insurgency. In the latter, there is the challenge to the central government from a broad spectrum of regional separatist movements, several of which may get outside support from China.

As for other global theaters of operation outside of northern Africa and southern Eurasia, the demand signal for USSOCOM resources seems mixed. With the peace treaty in place, a 50-year insurgency in Colombia has come to an end. Mexico and the Caribbean region will remain troubled by transnational criminal organizations. There will continue to be a counterterrorism and FID demand signal for USSOCOM in support of USSOUTHCOM and USNORTHCOM operational requirements. In Europe, there is the heightened demand for USSOCOM expertise and assistance in the realm of unconventional warfare (UW). This effort is designed to make the East European states, specifically the Baltic states, more resilient to Moscow's use of various forms of active measures, including the possible use of its "little green men" capabilities.

Finally, USSOCOM will have to modernize its capabilities if only to adapt to the likely global diffusion of a wide array of dual and purpose built military technologies. These will include the acquisition and exploitation by insurgents, terrorist and criminal organizations of advanced multimedia, encrypted communications, night vision sensors, body armor, commercially available micro-UAVs, and direct and indirect PGMs.

⁵² For a forecast making this point, see Daniel Benjamin and Steven Simon, "The Global Terror Threat in 2016: A Forecast," *CTC Sentinel*, January 19, 2016.

Alternative Force Planning Constructs and Associated Forces

The preceding chapters lay out a demanding and dynamic set of challenges facing U.S. military forces. How should planners in DoD go about preparing the force to confront these challenges? The question is not merely rhetorical: Assuming both that the defense strategy continues to call for forces that can fight and win two major conflicts in overlapping time frames and that no significant increase occurs in defense spending, DoD will not be able to invest in all of the capacity (force structure) and capabilities (principally, new hardware, training, and base infrastructure) called for by five adversaries. Planning in the presence of resource constraints requires a sense of priorities. Past efforts to set such priorities have sought, sometimes implicitly and sometimes explicitly, to identify a particular region or regions of the world as most important, to identify the adversary that posed the most serious challenges to the nation's security, or to elevate one or more mission types above the others. In this complex and turbulent security environment, such approaches are unlikely to be satisfactory.

For a lesson in why, one need look no further than the strategic guidance document released by the secretary of defense in January 2012, which shaped the defense program submitted to Congress in that year and the years immediately following. As noted in Chapter Two, the document, responding to direction from the President, set rather clear priorities for DoD. Specifically, it announced that, as a response to China's emergence as an influential regional power, DoD would "rebalance" its efforts and investments "toward the Asia-Pacific region." Seeing Europe as a region where most countries were "producers of security rather than consumers of it," DoD signaled its intentions to continue reducing its forces stationed there. The document went on to declare that DoD in the future would be more selective in undertaking efforts to train with the forces of partner states and would cease sizing U.S. forces for large-scale, protracted stability operations, such as those that had been conducted in Iraq and Afghanistan in the preceding years.¹

Three years later, pretty much every element of this guidance had been rendered invalid.

- Following Russia's forcible occupation of Crimea and armed aggression against Ukraine, it was clear that the U.S. and allied defense posture on NATO's eastern flank was inadequate and needed shoring up.
- In the wake of offensives by ISIS that overran U.S.-trained Iraqi forces and large parts of Syria, U.S. forces were sent to both regions to bolster defenses and train partners.

¹ U.S. Department of Defense, 2012, pp. 2–6.

- With the Taliban continuing to threaten the Afghan government's ability to control important parts of the country, plans to withdraw U.S. combat forces from that country were put on hold indefinitely.
- In light of these unforeseen demands on U.S. defense resources and rigid constraints on defense spending imposed by the Budget Control Act of 2011, DoD has found it difficult to implement the rebalance to the Asia-Pacific.

Elevating one or more mission areas and their associated forces over others can also incur risks. The starkest example of this was the Eisenhower administration's New Look strategy that favored large and diversified nuclear forces over conventional ones. Launched in the mid-1950s, the strategy sought to use the United States' overwhelming advantages in nuclear weapons to help contain Soviet expansionism. The strategy rather decisively shaped U.S. forces in the years that followed, leading to the creation of an enormous nuclear weapons infrastructure and the atrophying of U.S. conventional forces. Unfortunately, it was never clear that implicit U.S. threats to respond with nuclear weapons to small-scale provocations or aggression were credible, either to the Soviets or to our allies, a problem that grew more acute as the Soviets fielded larger numbers of nuclear weapons and achieved a secure second-strike capability against the United States. And when U.S. forces found themselves poorly prepared to fight the North Vietnamese in the mid-1960s, the drawbacks of a force shaped by New Look became manifest.²

Start-Small Approach to Force Planning

Events, in short, have a way of upending even carefully crafted defense strategies and the priorities embedded in them. That said, one approach to setting priorities for allocating defense resources offers a way to avoid the inescapable pitfalls that stem from our inability to predict future defense resource allocation demands: Force planners can use a suite of scenarios to portray a wide range of operational demands that could plausibly be placed on the force, both today and in the future, and then to direct that forces be prepared—trained, equipped, and postured—to defeat any one of the adversaries that animate those scenarios. DoD in recent years has embraced the first part of this approach: As noted in Chapter One, DoD's leaders have said that they use essentially the same five scenarios that we have examined in this report—scenarios that, in aggregate, span quite a wide range of operational challenges. What DoD has not done is to insist that its components—principally, the services—ensure that the forces they field have the wherewithal to defeat the most capable of these adversaries, particularly China and, now, Russia. DoD's ability to meet this requirement has been hamstrung, in part, by its continued adherence to the two regional wars criterion, in concert with the constraints that have been placed on its topline. As a result, the United States now fields forces that are, at once, larger than needed to fight a single major war, failing to keep pace with the modernizing forces of great power adversaries, poorly postured to meet key challenges in Europe and East Asia, and insufficiently trained and ready to get the most operational utility

² In the early years of the Vietnam War, the USAF was reduced to using aircraft designed to intercept Soviet bombers to engage (on the whole, unsuccessfully) in dogfights with North Vietnamese fighters and bringing World War II-era fighter-bombers out of mothballs to provide CAS.

from too many of its active component units. The United States needs to do better than this. Unless one deems it unnecessary to deter coercion and aggression by either Russia or China, increased emphasis should be placed on modernizing U.S. forces and posture for operations in the Western Pacific and in Europe. The approach outlined next does that and shows forces that could result from such an approach at different levels of resources.

One Major War

On a conceptual level, we recommend that DoD begin its force planning by directing its components to allocate resources in ways that would provide sufficient capabilities to defeat any one of the four state adversaries identified in our (and, presumably, their own) planning scenarios. (Forces will also be needed for conducting sustained operations against Salafist-jihadi groups and for deterring nuclear use—demands that we address later in this chapter.) This will mean sizing and shaping each element of the future force such that it can meet the demands that would be presented by the adversary that poses the most stressing test on that force element. A conflict involving either China or Russia would present the most demanding challenge for most, but not all, force elements. We can size this One Major War force by adding up the maximum demands placed on each type of force element across our suite of scenarios.

Table 7.1 summarizes the quantitative demands for forces in the five scenarios and 12 subsets of those that we explored in Chapters Two through Six. The primary combat-capable force elements fielded by each service are listed in the left-hand column, with the scenarios listed across the top.³ Each cell of the matrix shows the number of units of that type that are called for to meet the demands of that scenario. The most-demanding cases for each force element type are coded red; the second-most demanding are coded orange; and the third-most demanding are coded yellow. Note that the colors do not align vertically: We judge that the most quantitatively demanding scenario for USAF fighter aircraft is a conflict against Russia; for most USN assets, war with China calls for the most forces; and for Army BCTs and Marine amphibious forces, a future war with Korea would be the most demanding fight in terms of numbers of units, albeit not for the capabilities of those units (more on that dimension later in this chapter).

Applying the dictum that the joint force must be capable of defeating any single adversary, one would size each type of force element to meet the maximum single demand that would be placed on it (i.e., the number in the red box for that force element's row). Force building must also account for other demands that would be additive to those of a major conflict. Principally, this means accounting for forces that are routinely stationed or deployed abroad and therefore would not be readily available for deployment to a fight in another region. For example, we assume that Army ballistic missile defenses, USAF fighter squadrons, and naval vessels in East Asia generally would not be deployed out of theater to a conflict elsewhere. In addition, some parts of the force (e.g., forces recently returned to home station from extended deployments and navy ships and submarines in extended overhaul) will be unavailable for short-notice combat

³ Important elements of the joint force, such as naval surface combatants, theater missile defenses, CABs, airlift and aerial refueling aircraft, maritime patrol aircraft, and others are not shown here. In most cases, this is because our analysis of the scenarios did not offer sufficient fidelity to allow us to estimate appropriate levels for these types of forces. Accordingly, our cost estimates for alternative future forces leave programmed levels for these types of forces generally unchanged.

Table 7.1
Summary of Force Levels Employed Across Five Scenarios

		North Korea			China			CT*	Russia			Iran	
		Steady State	Major Conflict	Post-Conflict	Steady State	Major Conflict	South China Sea	Steady State	Steady State	Hybrid	Major Conflict	Steady State	Major Conflict
USAF	Fighter Squadrons	4	24	4	4	25	6	5	5	7	28	2	21
	Heavy Bomber Squadrons	—	4	1	1	7	3	1	—	1	7	—	5
	ISR Orbit—High End	1	2	—	1	10	4	—	1	—	5	1	3
USN	Aircraft Carriers	—	5	—	1	5	3	—	—	—	2	1	4
	Carrier Air Wings	—	5	—	1	5	3	—	—	—	2	1	4
	Amphibs	—	30	—	3	15	12	3	—	—	—	3	18
USMC	Infantry Battalions	—	18	3	1	6	6	3	—	3	6	1	6
	Fighter Squadrons	—	15	—	1	8	4	1	—	3	6	1	6
Army	Total BCTs	1	16	10	—	3	2	3	2	1	9	—	3

■ Highest demand ■ Second-highest demand ■ Third-highest demand

* CT = counterterrorist operations.

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operations. When one applies these considerations to the task of determining the appropriately sized force for a One Major War criterion, one gets the result shown in Table 7.2. The right-hand column depicts the force that results from applying our One Major War criterion; the left-hand column shows the level of each force element that is programmed for FY 2019. The assumptions and numbers used to derive the force levels for the One Major War force, as well as for the forces associated with our other force planning constructs, are provided in Appendix D. (Note that unclassified figures are not available for the number of high-end ISR orbits, if any, that could be generated today.)

Not surprisingly, the One Major War criterion yields a smaller force overall than today's: USAF fighter squadrons would be reduced from 51 to 48; Army active-component BCTs from 30 to 27; and USN aircraft carriers from 11 to seven. On the other hand, heavy bombers and amphibious ships that experience high levels of demand would not be reduced. We exhort the reader not to place too much store in the numbers in the table. They are based on the authors' estimates using internal analyses and unclassified sources. The numbers that DoD would use are undoubtedly somewhat different. Our purpose in presenting them is not to attempt to provide definitive estimates of need, but rather to show a concrete example of how our recommended approach could be applied and to provide a basis for first-order comparisons of the size and cost of the resulting forces.

Table 7.2
Comparison of a One Major War Force with the Programmed U.S. Force (Selected Combat Force Elements)

	Force Element Type	Program (FY 2019)	One Major War
USAF	Fighter squadrons	51	48
	Heavy bomber squadrons	9	9
	ISR orbit–high end	?	8
USN	Aircraft carriers	11	7
	Carrier air wings	10	6
	Amphibious ships	33	33
USMC	Infantry battalions	24	21
	Fighter squadrons	22	18
Army	BCTs (active component)	30	27

Qualitative Enhancements

There are, to be sure, reasons to be dissatisfied with a force of this size. Later in this chapter, we examine other force planning constructs that yield larger forces. But before judging the adequacy of this force on grounds of size alone, one must first consider the value and cost of the added investments in key capabilities that would be mandated under our One Major War criterion. How a force is equipped and postured, and what operational concepts it employs, can be as important to a force's actual effectiveness as the number of people, systems, and units it fields. For example, in a war with China set in 2020, if U.S. forces were to use the same operational concept for power projection that they have used since Operation Desert Storm and employed currently programmed weapons and munitions, those forces would likely face great difficulties in achieving air superiority over the Taiwan Strait, no matter how many fighter squadrons and CSGs are sent to fight. Likewise, without a forward posture better suited to meeting the challenges of a hostile Russia, increasing the number of BCTs in the Army would have virtually no effect on NATO's ability to deter or defeat a Russian invasion of the Baltics. So investments in new capabilities, operating concepts, and posture must be considered in tandem with investments in force structure when evaluating options for aligning the defense program as a whole with the demands of strategy and the security environment.

Table 7.3 summarizes judgments rendered in Chapters Two through Six regarding the sorts of enhanced capabilities and posture that are called for to ensure that future U.S. forces will be able to accomplish their missions as outlined in each of our five planning scenarios. Initiatives along these lines will not, of course, guarantee success in future operations, and adversaries will work to adapt to counter any improved capabilities as they are fielded. However, these enhancements address serious and, in some cases, long-standing shortfalls in the capabilities of U.S. forces, and moving to field them should have salutary effects on deterrence and the credibility of U.S. security guarantees. **All three of the forces developed in**

Table 7.3
Priority Enhancements to U.S. Forces and Posture

China
<ul style="list-style-type: none"> Accelerated development and fielding of a longer-range, fast-flying radar-homing air-to-surface missile* and a longer-range air-to-air missile* Forward-based stocks of air-delivered munitions, including cruise missiles (e.g., JASSM, JASSM-ER, and LRASM)*, SAM suppression missiles (e.g., HARM, MALD)*, air-to-air missiles (e.g., AIM-9X and AIM-120)* Prepositioned equipment and sustainment for ten to 15 platoons of modern SHORADS for cruise missile defense Additional base resiliency investments, including airfield damage repair assets and expedient aircraft shelters, and personnel and equipment to support highly dispersed operations Accelerated development of the Next-Generation Jammer* A high-altitude, low-observable unmanned aerial vehicle system* More resilient space-based capabilities (achieved by dispersing functions across increased numbers of satellites and increasing the maneuverability, stealth, and “hardness” of selected assets)* Counter-space systems, including kinetic and non-kinetic (e.g., lasers, jammers) weapons*
Russia
<ul style="list-style-type: none"> * = Items listed under “China” that are marked with an asterisk Three heavy brigade combat teams and their sustainment and support elements forward based or rotationally deployed in or near the Baltic states One Army fires brigade permanently stationed in Poland, with 30-day stock of artillery rounds; one additional fires brigade set prepositioned Forward-based stocks of artillery and multiple launch rocket system rounds; anti-tank guided missiles Forward-based stocks of air-delivered anti-armor munitions (e.g., SFW/P3I) Station or rotationally deploy eight to 12 platoons of SHORADS forces in NATO Europe Increased readiness and employability of mechanized ground forces of key NATO allies
Iran
<ul style="list-style-type: none"> Improved, forward-deployed mine countermeasures High-capacity close-in defenses for surface vessels
North Korea
<ul style="list-style-type: none"> Improved ISR systems for tracking nuclear weapons and delivery systems Exploratory development of boost-phase ballistic missile intercept systems Continued investments to improve the reliability and effectiveness of the GBI system to protect the United States
Salafist-Jihadi Groups
<ul style="list-style-type: none"> Improved intelligence collection and analysis capabilities and capacity Acquire next-generation vertical takeoff and landing aircraft Acquire light reconnaissance and attack aircraft Develop powered exoskeleton (also known as the Talon Project) Develop swarming and autonomous unmanned vehicles

this report include investments in the enhancements listed in Table 7.3. (Note that this list encompasses investments that we believe should be made over and above things already in the DoD future years defense plan. It does not include ongoing programs to develop and field new major platforms, such as the F-35 fighter, the B-21 bomber, or the Ford-class carrier, which we assume continue as planned.)

If one accepts the view that, in a world of constrained and uncertain resources, a force capable of defeating any single adversary is preferable to a force whose capabilities against the most-capable adversaries are in question, it makes sense to start small and specify the forces and capabilities appropriate for defeating aggression by any single adversary, while also meeting other important needs. Specifically, DoD should build the force conceptually in stages as follows:

1. **Modernize the strategic nuclear forces.** United States' strategic nuclear forces remain the ultimate guarantor of the nation's security, as well as that of our major allies. For the foreseeable future, the nation will wish to maintain a force that can guarantee a crippling retaliation against any adversary, even in second strike, and that is at least as large as Russia's strategic nuclear forces. Also, there can be no room for compromise in ensuring that U.S. nuclear forces are safe, secure, and reliable. Today, this requires modernizing at least the sea-based leg of the strategic triad. The current fleet of Ohio-class SSBNs is approaching the end of its service life and will need to be replaced with ten to 12 new-design SSBNs. As we have seen, projecting power against adversaries with advanced A2/AD capabilities will call for long-range aircraft that can defeat sophisticated air defenses. This is the rationale behind USAF's new stealthy bomber. Equipping these aircraft for nuclear operations will represent a small fraction of the overall cost of the program. We have not undertaken an assessment of the value and expense of developing and procuring a new nuclear-armed cruise missile, modernizing the nation's nuclear command and control and weapons infrastructure, and recapitalizing the ICBM force. See Appendix B for further discussion of factors bearing on the modernization of U.S. nuclear forces.
2. **Modernize and posture power projection forces to prevail in a conflict against any single state adversary.** The centerpiece of U.S. national security strategy since the end of World War II has been to build strong and deep-rooted relationships with those states with which our nation shares basic interests and values: the democracies of Europe, East Asia, and Australasia. Close to the heart of those relationships is the U.S. commitment to help defend those allies from attack. Therefore, it is essential that U.S. and allied armed forces retain the ability to defeat aggression against those shared interests by any plausible adversary. Today and for the foreseeable future, China and Russia will pose the most-challenging threats. As we have seen, meeting these challenges is, above all, about modernizing key capabilities, concepts, and posture—not about fielding more forces. Spending what it takes to upgrade the capabilities of U.S. forces against these major powers has the added benefit of improving the odds in any fight against a regional adversary (e.g., North Korea or Iran).
3. **Ensure that SOF and associated enablers are adequate to the demands of the campaign against Salafist-jihadi groups.** For the next several years at least, the nation will want to prosecute aggressive operations against ISIS, as well as the more virulent elements of the al Qa'ida franchise. We judge that a force of 75,000 to 80,000 SOF will be

appropriate for this (compared with the current force of just under 70,000), along with greater capacity for sustained intelligence gathering and analysis, aerial strike, secure communications, and other enhancements.

4. **Fully fund readiness accounts for all active component forces and early arriving reserve component forces.** All of our planning scenarios reflect the judgment that the adversary will generally be able to choose the time and place to initiate hostilities. This—plus the fact that U.S. forces generally must deploy over great distances to fight in the enemy’s “back yard”—means that it makes little sense to maintain forces over the long term that are not ready to fight on short notice and unable to sustain high-tempo combat operations for the duration of the fight. Today, far too many units within the U.S. armed forces are at low states of readiness.⁴ Consequently, we call for increased spending on training, maintenance, spare parts, and munitions. The importance of superior training will only grow as the proliferation of advanced technologies gives adversaries access to more capable weapons and support systems.

Were the nation to stop building its forces at this level of ambition, it would have a force capable of deterring a rational adversary from attacking the United States with WMDs; defeating, with high confidence, any single nation-state adversary; maintaining some forces forward in key regions; and prosecuting a vigorous and sustained campaign against ISIS and similar groups.⁵ Most elements of the general purpose forces would be smaller than they are today, but they would be highly modernized and well-trained. When one includes the capability and posture investments listed in Table 7.3, as well as the expenditures required for reaching full readiness, a force along these lines could be fielded and sustained over the next ten years at an estimated average annual cost of approximately \$583 billion in FY 2017 dollars—roughly comparable to the FY 2016 defense budget when costs for overseas contingency operations are included.⁶ By 2024, defense spending at this level would represent approximately 3.2 percent of projected GDP.⁷

One Major War Plus One Regional War

Of course, a One Major War force might fail to address the problems that motivated the two-war criteria of the past. If such a force were committed to a conflict against a major power, the United States might lack the wherewithal to defeat aggression elsewhere for some period

⁴ For a brief review of the causes and extent of readiness shortfalls in U.S. forces, see Ochmanek et al., 2015, pp. 18–21.

⁵ Note that we do not explicitly provide forces for defense of the U.S. homeland and support to civil authorities. For the most part, such forces can be drawn from those at home station that are not needed for ongoing, forward operations or are not sufficiently trained for those demanding expeditionary combat operations. Similarly, like DoD, we do not field major elements of force structure for disaster relief or humanitarian operations, which historically have generated demands that have been lesser-included cases of large-scale power projection operations.

⁶ This figure, like those for the costs of the other two forces developed in this chapter, assumes continued expenditures of \$60 billion per year to cover the costs of overseas contingency operations.

⁷ For an explanation of methods and assumptions used in developing cost estimates for this report, see Appendix D.

of time, potentially tempting an opportunistic adversary to strike.⁸ And there would be little margin for error if a larger-than-expected threat were to emerge quickly. Should the nation decide that it wanted added insurance against these possibilities, planners could add a fifth “layer” to the four-layer approach outlined earlier, adding to the force the capacity to permit nearly simultaneous combat operations against a regional adversary. The force levels called for by this added increment can be found in the shaded column of Table 7.4. Air Force fighter squadrons, for example, would be sized and equipped to conduct operations against Russia and Korea (as well as supporting the fight against ISIS and others) in overlapping time frames. We estimate that the marginal annual base budget cost of this “regional adversary package” would total approximately \$27 billion per year, for a total annual defense budget of approximately \$610 billion, or 3.3 percent of GDP in 2024.

It is unfortunate but probably inevitable that, should the nation decide to adopt something akin to this One Major and One Regional War force planning criterion, the resulting approach will be called, in shorthand, a One and a Half Wars strategy. Observers will note that the force proposed here is considerably more expensive than the force of today, which has heretofore been known as a Two War force. Of course, the difference is that our One Major War is a far more-stressing conflict than either of the two regional wars envisaged in the early years of the post–Cold War period. This reflects a recognition that over the past decade or so the security environment has deteriorated from the U.S. standpoint and that U.S. forces must now prepare for conflicts with major powers and at least one nuclear-armed regional adversary.

Table 7.4
Force Structure for One Major and One Regional War Force

Force Element Type		Program (FY 2019)	One Major War	One Major + One Regional
USAF	Fighter squadrons	51	48	64
	Heavy bomber squadrons	9	9	14*
	ISR orbit–high end	?	8	12
USN	Aircraft carriers	11	7	10
	Carrier air wings	10	6	9
	Amphibious ships	33	33	45**
USMC	Infantry battalions	24	21	24
	Fighter squadrons	22	18	20
Army	BCTs (active component)	30	27	30

* No practical options exist to field a new bomber prior to the B-21 in the late 2020s. Assumes five squadrons swing from first to second conflict.

** Assumes 12 ships swing from first to second conflict.

⁸ An interesting analytical effort would be to assess how well this One Major War force might be able to achieve national objectives in nearly simultaneous conflicts against two regional adversaries, such as Iran and North Korea.

Two Major Wars

Fielding a force with the capacity and capabilities requisite for defeating any two adversaries would call for investments above and beyond those associated with the One and a Half Wars force in force structure and certain types of consumables, most prominently, advanced stand-off munitions. Note, however, that adherence to the start-small approach for force planning would have led DoD to invest in all of the basic ingredients for victory over any adversary—platforms, weapons and munitions, posture, training—under the One Major War criterion. So the marginal cost between the Two Major Wars force and the One Major and One Regional War force is perhaps not as great as one might assume. Table 7.5 shows the main elements of the Two Major Wars force, which we estimate could be fielded and sustained at an average annual cost of \$628 billion per year. By 2024, defense spending at this level would represent approximately 3.4 percent of the GDP.

Getting From Here to There

It is one thing to specify a desired set of military capabilities and the major outlines of a future force that could provide them. It is quite another to translate those desiderata into choices about actual programs and initiatives that can be executed along the required time lines. This latter task, of course, is the job of DoD and its components, but we can offer some further views regarding the details of how the forces we envisage might evolve.

Table 7.5
Force Structure for Two Major Wars Force

	Force Element Type	Program (FY 2019)	One Major War	One Major + One Regional	Two Major Wars
USAF	Fighter squadrons	51	48	64	69
	Heavy bomber squadrons	9	9	14*	16*
	ISR orbit–high end	?	8	12	12
USN	Aircraft carriers	11	7	10	11
	Carrier air wings	10	6	9	10
	Amphibious ships	33	33	45**	48**
USMC	Infantry battalions	24	21	24	27
	Fighter squadrons	22	18	20	23
Army	BCTs (active component)	30	27	30	31

* = No practical options exist to field a new bomber prior to the B-21 in the late 2020s. Assumes five to seven squadrons swing from first to second conflict.

** = Assumed 12 ships swing from first to second conflict.

Air Force

The USAF faces important choices regarding both its future mix of combat aircraft and its approach to basing and operating those aircraft in conflicts against the most capable adversaries.

Bombers. The effort to develop USAF's new bomber—dubbed the B-21—has been under way since 2012. This aircraft is expected to achieve initial operating capability some time after 2025. Assuming that it provides the capabilities expected of it, the B-21 will play important roles in future operating concepts that will almost certainly rely more heavily than today on air and maritime operations from extended ranges. In the intervening years, both our One and a Half Wars and Two Major War forces, call for more heavy bombers than USAF fields today (14 to 16 squadrons, compared with nine in today's force), and there is no realistic option for fielding additional bombers during that period. The gap can be mitigated somewhat by planning to “swing” some bombers from one conflict to another after the most critical opening phase of the conflict has culminated. The key to getting the most value out of today's fleet of heavy bombers is to invest heavily in appropriate weapons for them, and that, particularly for the B-1s and B-52s, means buying much larger quantities of standoff weapons than those that are currently programmed.⁹ In the meantime, the Air Force should keep all of the heavy bombers it has in its active inventory and ensure that they and their aircrews maintain high rates of readiness.

Fighters. The USAF's fighter force, like that of the USN and the USMC, will be called upon to prepare for and conduct missions such as those represented across the five planning scenarios. These will encompass missions that include countering advanced fighter aircraft and SAM systems fielded by Russia and China, attacking the full array of surface targets in North Korea and Iran, and providing on-call precision firepower in support of regular and irregular operations against terrorist and insurgent groups. In the face of this variegated set of tasks, all three services plan to evolve their fighter forces to purely fifth-generation (stealthy) fleets over the next two decades. This seems inapt: It seems safe to assume that neither non-state adversaries nor less capable regional adversaries, such as North Korea or Iran, will field large numbers of the sophisticated, radar-guided air defenses that fifth-generation aircraft are optimized to defeat. And while fighters, such as the F-22 and F-35, are capable of providing the sorts of capabilities called for in fights against such adversaries, using them in this way is akin to driving a Ferrari to take the kids to soccer: It is at once more expensive than it needs to be and poorly suited to the job. Consider, for example, that the average cost per flying hour of the F-22 today is approximately \$44,000. By comparison, the A-10 costs about one-fourth that amount to fly.¹⁰

For this reason alone, DoD should seriously consider options for maintaining mixed fleets of fourth- and fifth-generation tactical fighters for the indefinite future. This could mean procuring modest numbers of aircraft such as the F-15E or F-16 for the Air Force and F/A-18E/Fs for the USN and USMC for several years to come. Alternatively, an even lower-cost light

⁹ As an example, the USAF is planning to procure fewer than 400 JASSMs and JASSM-ERs per year. A force of four squadrons of B-1s and B-52s (about half the force) can deliver close to 1,000 cruise missiles—more than two years' worth of procurement—in a single day under conflict conditions. The programmed inventory of these weapons is clearly inadequate to the demands of a major conflict against a highly capable adversary. Mark F. Cancian, *U.S. Military Forces in FY2017*, Washington, D.C.: Center for Strategic and International Studies, May 2016, p. 39.

¹⁰ Jeremy Bender, “This Chart Shows The Staggering Hourly Cost Of Operating U.S. Military Aircraft,” *Business Insider*, December 30, 2014.

attack turboprop aircraft, such as Embraer's Super Tucano A-29, Beechcraft's AT-6 Wolverine or Cessna's Scorpion may be deemed most appropriate. Making aircraft such as these a part of the USAF's structure would have the added advantage of providing platforms that are well suited to combined training and operations (and foreign military sales) with partner forces from nations that do not operate high-end fighter aircraft.

Base Resiliency. The Air Force must also find a way to base and operate its forces in the presence of growing threats to land bases. Land-based aircraft of the USN and USMC face this challenge as well. As we saw in Chapter Two, China's forces today can attack bases within 1,000 kilometers of their borders with more than 1,000 accurate ballistic and cruise missiles, and more distant bases in the region with hundreds of missiles. When launched in concentrated salvos, these missiles can overwhelm local defenses and inflict serious damage on aircraft, personnel, fuel, and other assets essential to the conduct of combat operations. Analysis points to a broad array of measures that can ameliorate but not eliminate the effects of such attacks. Several such measures, including airfield damage repair capabilities, expedient shelters for aircraft, cruise missile defenses, and assets to support highly dispersed operations, are included in our list of priority force enhancements (see Table 7.3). But considerable investments in operational experimentation, training, materiel, and diplomacy (to expand access to dispersed operating locations) will also be required to realize the full value of these measures.

Navy and Marine Corps

Carriers and Carrier Aviation. This report takes a conservative approach to Navy force structure. In particular, the analyses available to us did not permit an in-depth examination of the questions of the survivability of major surface combatants or the viability of large-scale amphibious landings in conflicts against the most capable of the United States' adversaries. As threats to these platforms and operations have grown, USN and USMC have striven to counter those threats with new defensive systems, decoys, tactics, and other measures. Our assessment assumes that these measures will be, on the whole, effective. However, for operations against a wide range of threats, the USN would be well-served by fielding within its carrier air wings some aircraft that offered greater range and endurance than its current and planned mix of combat fighters. The USN's Unmanned Combat Air System Demonstration (UCAS-D) program, which has produced two flying prototype aircraft, seemed to promise just such capabilities but it has been inexplicably curtailed.¹¹

Attack Submarines. Of all the U.S. armed forces' major types of platforms, the USN's fleet of nuclear-powered attack submarines has been the least affected by the profusion of A2/AD capabilities that we are witnessing. This is partly because their extended ranges enable them to operate largely independent of forward bases and because their medium of operations (subsurface) and low signatures afford the ability to hide from most types of long-range sensors. So submarines look like relative winners in the contest to defeat A2/AD threats. But modern nuclear submarines are expensive and the industrial base for producing and maintaining them is, for the near-term to midterm at least, fixed, so there are limits to the number that the USN can afford and build. Moreover, the payload of a submarine is inherently constrained. Today's Virginia-class boats typically carry 12 Tomahawk land-attack cruise missiles, as well as torpedoes. Block 3 models of the Virginia class equipped with the Virginia Payload Module

¹¹ Robert Martinage and Shawn Brimley, "The Navy's New Museum Drone and Strategic Malpractice," *War on the Rocks*, April 28, 2015.

will be able to carry 40 Tomahawks.¹² But once these weapons are expended, the submarine is out of the fight for an extended period as it returns to port to be reloaded. So these platforms, valuable as they are, cannot be a panacea. Unmanned underwater vehicles may provide a less costly means to deploy weapons and sensors to contested battlespaces.

Army

The USAF and USN have now been grappling with the challenges of an emerging near-peer adversary (China) for a decade or so. But because our approach to plausible conflicts with China would have little call for land maneuver forces and because the Army has been preoccupied with conducting counterinsurgency and stability operations in Iraq and Afghanistan, the Army has not until quite recently devoted much effort to understanding or preparing for the demands of large-scale maneuver warfare against a highly capable state adversary. The prospect of war with Russia now means that the Army has considerable catching up to do. In their operations in eastern Ukraine since 2014, Russia's ground forces have demonstrated the ability to generate sizable formations of armored and mechanized forces quickly, to sustain those forces in the field, to reconnoiter a sizable battle space, and to bring heavy firepower effectively to bear against a mobile enemy.

Artillery and Armor. Responding to these developments, General Mark Milley, chief of staff of the Army, testified that his forces would be “outranged, outgunned on the ground” in a conflict with Russian forces.¹³ The Army's current cannon artillery can shoot at targets 14 to 24 kilometers away, while Russia's self-propelled guns can shoot up to 29 kilometers. The Army's Multiple-Launch Rocket System can strike targets 40 to 70 kilometers away; Russian forces, by contrast, field two rocket artillery systems that can strike targets up to 90 kilometers away. Additionally, Russian forces have fielded important upgrades to the armor, weapons, and sensors carried aboard their tanks and infantry fighting vehicles.¹⁴

Development and Training Priorities. In short, the Army's challenge today is easily framed but will only be solved through years of hard, focused work and investment: How can the Army introduce forces into a theater and maneuver them in an A2/AD environment when the joint force cannot be assured of having air or maritime superiority or provide means to defeat TBMs and heavy artillery? Several development priorities for the Army are listed in Table 7.3. Others include active protection systems for its armored vehicles; ISR, rapid targeting, and artillery systems that can effectively engage long-range rocket artillery; backup systems to the GPS that can provide precision timing and location data in the presence of heavy jamming; and jam-resistant tactical and theater communication systems.¹⁵ The Army will also need to ensure that it provides adequate resources—money and time—to training its units for operations against highly capable adversaries. Ensuring that its heavy BCTs, in particular, have ample opportunities to prepare for full-spectrum operations at the National Training Center and other specialized training grounds will be especially important.

Missile Defense. Recommendations regarding procurement of currently available systems for theater missile defense (TMD) are conspicuous in this report by their absence. This

¹² Kris Osborn, “Navy Wants 28 More Tomahawks on Virginia-Class Submarines Sooner,” *Military.com*, March 16, 2015.

¹³ Shlapak and Johnson, 2016a.

¹⁴ Shlapak and Johnson, 2016a.

¹⁵ David E. Johnson, 2016, p. 10.

may seem odd given the severity of the problems created for U.S. and allied forces by modern ballistic missiles, but it reflects the reality that today's systems for defending against ballistic missile attack do not fare well in most war games against the most capable adversaries. A battery of the Army's THAAD system, for example, costs approximately \$750 million to procure.¹⁶ It comes equipped with one radar and six missile launchers that mount a total of 48 interceptor missiles.¹⁷ In our games, capable adversaries typically target THAAD batteries with multiple warheads and decoys, providing high confidence of destroying the system's radar in the first missile salvo. Until more robust and affordable concepts for defeating attacks of this nature are devised, further investments in TMD do not look appealing.

Space

In their daily operations and in wartime, U.S. forces rely on space-based assets to provide critically important functions, including communications, reconnaissance, positioning, precision timing, and weather monitoring. In every military operation since the dawn of space flight, U.S. forces have enjoyed uninterrupted use of these assets. Recognizing the important roles played by space-based assets in U.S. power projection operations, China and Russia are developing and fielding a host of systems that can disrupt, damage, or destroy those assets. These include powerful electronic jamming devices, high-powered lasers, and both direct-ascent and co-orbital antisatellite weapons for kinetic attacks.¹⁸ DoD is taking steps to address these growing threats.

In principle, all of the approaches available for countering military threats to terrestrial assets—improved situational awareness, hardening, maneuver, redundancy, stealth—are options for improving the survivability and resiliency of space constellations. Cost, however, is often a key stumbling block to implementing these. Building sophisticated military satellites is expensive, as is getting them into orbit. The cost for putting one pound of payload into low Earth orbit with today's expendable launch vehicles or the now-retired space shuttle, for example, has remained around \$10,000.¹⁹ Fortunately, new opportunities are arising that offer the possibility of building and deploying more-robust constellations.

- Miniaturization is allowing smaller, lighter satellites to do more.
- The proliferation of commercial satellites is providing options for DoD to purchase space services when surge capacity is needed. Many of these satellites can also accept "hosted payloads," allowing DoD to add, for example, sensors or transponders to non-DoD satellites, proliferating capabilities across multiple platforms at low cost.

¹⁶ Joakim Kasper Oestergaard Balle, "About the THAAD System," *Aerospace & Defense Intelligence Report*, October 22, 2014.

¹⁷ Missile Defense Agency, "Terminal High Altitude Area Defense (THAAD)," Washington, D.C.: U.S. Department of Defense, undated.

¹⁸ See Kevin Pollpeter, Eric Anderson, Jordan Wilson, and Fan Yang, "China Dream, Space Dream: China's Progress in Space Technologies and Implications for the United States," Washington, D.C.: U.S.-China Economic and Security Review Commission, pp. 86–93.

¹⁹ "The Space Shuttle and the Costly Nature of Space Access," *Roger Launius's Blog*, March 6, 2015.

- New concepts for space launch, such as SpaceX, promise to reduce the cost of placing payloads into orbit.²⁰
- In addition to these measures, DoD may wish to supplement selected space-based capabilities with airborne or terrestrial systems that are less susceptible to attack. The United States will also need to overcome its reluctance to field its own antisatellite weapons. The “weaponization of space” that U.S. policy has long sought to avoid is already under way. Making offensive counterspace weapons available to U.S. forces can provide options for disrupting an enemy’s military operations. Such weapons might also provide some deterrent to adversaries considering attacks on U.S. military constellations.

Concluding Thoughts

The approach we advocate in this report stems from the conviction that force planning and resource allocation in DoD have placed too little emphasis on modernizing the capabilities, posture, and operating concepts of U.S. forces for power projection. The result—a force that is insufficiently robust to face the challenges posed by the most capable adversaries—poses growing risks to the viability of the United States’ most important security relationships. Adopting the nested, start-small approach to force planning suggested here would certainly not guarantee that the nation would field forces better suited to the demanding security environment we are in, but it could help prompt a more fruitful and substantive debate regarding the appropriate level and allocation of resources to the nation’s defense. Specifically, it could help by

- better aligning force planning with a post-post–Cold War security environment, in which the United States faces not only regional adversaries but also great power and non-state adversaries
- spelling out more clearly the relationship between inputs to the defense program (dollars, manpower) and outputs (fielded military capabilities and reduced strategic and operational risks)
- highlighting the investment needs of highest priority for specific mission areas
- providing a vehicle for generating concrete alternative defense programs at different budget levels, rather than a single, “take it or leave it” planning criterion and program.

What differentiates the three forces developed in this report from one another, other than their cost, is the degree of insurance the each provides against the possibility of multiple, simultaneous wars or other demands that cannot yet be foreseen. In a world as turbulent as today’s, a sense of humility about one’s ability to foresee future challenges and demands looks like the beginning of wisdom. This argues strongly in favor of Two Major Wars or the One Major plus One Regional War force postures described above as the more prudent options for the United States. Given the added robustness and deterrent value of these two forces in comparison to the One Major War force, and the comparatively modest additional cost (0.1 to 0.2 percent of GDP), the choice seems obvious.

²⁰ SpaceX, for example, claims that its Falcon-class of rockets will be able to place sizable payloads into low-earth orbit for less than \$1,000 per pound. “SpaceX—Breaking the \$1,000 per Pound Launch Cost Barrier,” *BTE Blog*, May 27, 2013.

The Third Offset and the Future of DoD's R&D Investment Portfolio

Our assessments of the current and projected military capabilities of potential adversaries in the main body of this report identify a range of challenges that collectively raise serious questions regarding the ability of U.S. forces to meet the multiplicity of demands facing them. Prominent among these are the need to project power in the face of the sophisticated A2/AD capabilities being fielded by China and Russia and the need to counter North Korea's arsenal of nuclear weapons and ballistic missiles.

Aside from these state-specific challenges, the global military technological environment is likely to deteriorate from the perspective of the United States. First, there is the continued diffusion of advanced military weapon systems through the global arms market. Second is the diffusion of advanced military systems to various insurgent organizations via nation-state assistance or local military success during a civil war.¹ Third is the militarization of the domain of space with the prospect of many nations being able to exploit this zone of orbital operations during peace and war. Finally, there is the overall unsettling reality that the creation of an artificial global environment of cyberspace has created a domain of warfare where U.S. military advantages are far from certain, much less enduring.

DoD has embarked upon on a major effort to address these challenges by focusing a portion of its very large R&D budget on initiatives grouped under the Third Offset program. It is hoped that through a more focused effort DoD can both direct and leverage major U.S. civilian R&D capacities in the information technology sector to maintain superior military capabilities in face of the A2/AD efforts of China and Russia.² The major technology areas that have been publicly highlighted include the development of (1) sophisticated artificial intelligence capacity to turn big data (also known as exabytes of data)³ into actionable intelligence; (2) increasingly autonomous robotic sensors and fighting systems that can operate cooperatively; (3) enhanced or armored infantry; (4) lighter, longer-ranged, and lower-cost PGMs; (5) operationally effective tactical directed energy weapons (DEWs); (6) major advances in

¹ Prior to the Russian military operations to seize the Crimea and destabilize eastern Ukraine, the concept of insurgents being technologically enabled by a nation state was referred to as "hybrid" warfare. Models of this concept are the Iranian provision of advanced weapons to Hezbollah; U.S. material support of the Afghan anti-Soviet insurgents; and Soviet and Chinese military assistance to North Vietnam.

² For an overview of the Third Offset strategy, see Robert Work, "The Third Offset Strategy," speech delivered at Reagan Defense Forum, Reagan Presidential Library, Simi Valley, Calif.: U.S. Department of Defense, November 7, 2015.

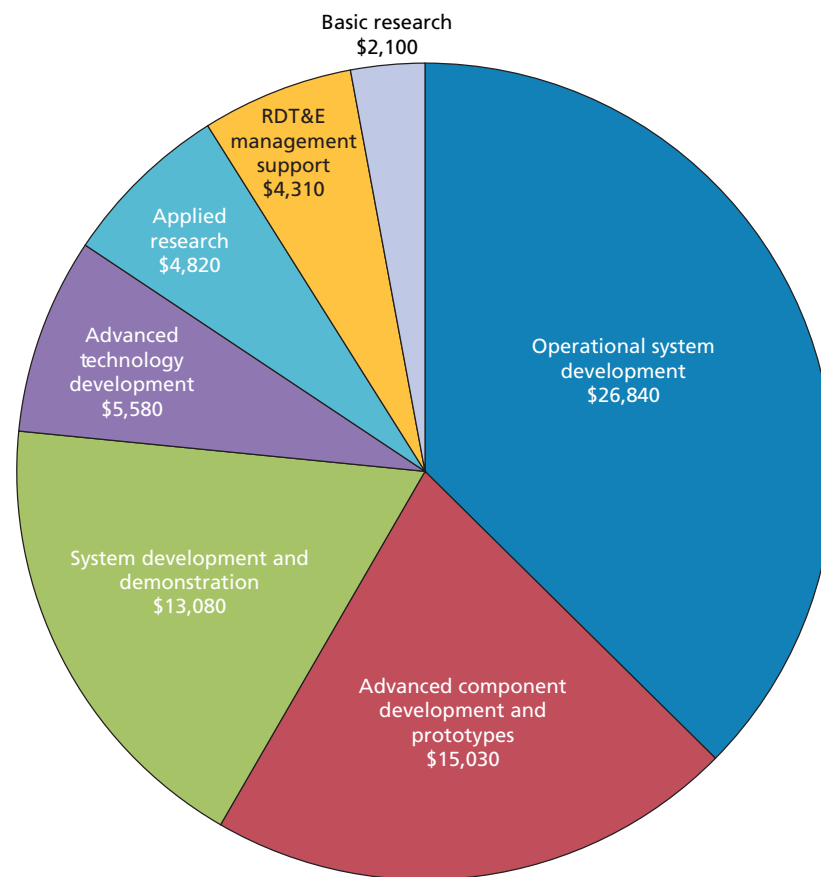
³ 10 to the 18th bytes.

electrical power storage; (7) next-generation low-observable (LO) vehicles; (8) low-cost access and exploitation of space; and (9) cyber networks with increased resilience.⁴

In support of this effort, the United States continues to make a massive investment in military R&D and remains the clear global leader in this regard. Figure A.1 provides a breakdown of the current distribution of military R&D and testing investments, which total just over \$71 billion.

The hope is that by making these types of focused R&D investments, U.S. forces will have capabilities during the 2020s and 2030s to conduct large-scale power projection operations in Eurasia without suffering excessive losses of personnel and material. These daunting requirements should be viewed as a central military capacity if the United States is going to be able to continue making credible extended deterrent commitments to its allies in Eurasia.

Figure A.1
FY 2017 Research, Development, and Testing Budget (in Billions of \$)



SOURCE: Office for the Under Secretary of Defense Comptroller, *National Defense Budget for FY 2017 (Green Book)*, Washington, D.C.: U.S. Department of Defense, March 2016.

RAND RR1782-A.1

⁴ Timothy A. Walton, "Analysis: Securing the Third Offset Strategy: Priorities For Next US Secretary of Defense," Center for Strategic and Budgetary Assessments, July 27, 2016; Graham Warwick, "Humans at the Core: Efforts to Restore U.S. Military Superiority Will Build on AI and Manned/Unmanned Teaming," *Aviation Week & Space Technology*, January 18–31, 2016a.

Without this military credibility, the entire global security structure that undergirds the “liberal economic and trading order” would be called into question. Not to be forgotten, these security relationships are a critical component of the U.S. grand strategy of slowing down, if not reversing, the emergence of new nuclear-armed states that could collapse the current nuclear non-proliferation regime enshrined in the Nuclear Non-Proliferation Treaty.

The Third Offset initiative will have limitations. First, many of the technological investment initiatives, especially in the realm of information technology, will be dominated by the investments of the global and commercial telecommunications, computer, and automotive industries.⁵ This suggests that the U.S. comparative advantage in the exploitation of big data, secure networks or data storage, and deployment of ubiquitous sensors may be quite short-lived, if not nonexistent.⁶ With a major investment in robotic and swarming systems, DoD may sustain a lead but it is likely to be tenuous. Only in operational DEW systems and LO aerial vehicles might the United States sustain a meaningful operational lead with major and sustained investments. Where DEW systems are at the very beginning of their technological maturation at the bottom of a technological S-curve, LO technology may be approaching the zone of diminishing returns.⁷ On the other hand, the diffusion of PGMs may mean that a number of U.S. opponents will have something close to parity in their ability to locate and strike targets over the horizon. By the mid-2020s, many of the technologies associated with the Third Offset and their global diffusion will produce a new array of military capabilities.

Autonomous and/or Swarming Unmanned Air and Ground Vehicles

Ground and aerial robots will be a common feature of dismounted operations in the mid-2020s.⁸ Packbots and other small unmanned vehicles have become common for contemporary squad and platoon operations in support of the ordnance disposal mission. Although the cancellation of the FCS program led to a dramatic drop off in Army UGV R&D, the current Army scientific and technical (S&T) programs are continuing to develop robotic “mules” that will reduce soldier loads. However, the implications of squad-level robotics extend far beyond reconnaissance and load carriage. For example, such technologies as the Special Weapons Observations Remote Reconnaissance Direct Action Systems (SWORDS) robot demonstrated more than a decade ago that a squad robot could evolve into a fighting system equipped with what used to be considered crew-served weapons by the mid-2020s.⁹ This will allow 12.7 mm-class machine guns, high-capacity grenade and mortar launchers, and next-generation small

⁵ Steven E. Shladover, “The Truth About Self-Driving Cars: They Are Coming, But Not the Way You May Have Been Led to Think,” *Scientific American*, June 2016.

⁶ Yoshua Bengio, “Machines Who Learn: After Decades of Disappointment, Artificial Intelligence Is Finally Catching up to its Early Promise, Thanks to a Powerful Technique Called Deep Learning,” *Scientific American*, June 2016.

⁷ For a discussion of limits of the shelf life of particular generation of LO technology, see Daniel Katz, “Stealth Science 101: How Low-Observable Technology Enhances Aircraft Survivability,” *Aviation Week & Space Technology*, July 4–17, 2016a; Daniel Katz, “The Radar Strikes Back: Exploring the Physics and Progress of Low-Frequency Counterstealth Technology,” *Aviation Week & Space Technology*, August 29–September 11, 2016b.

⁸ Robert O. Work and Shawn Brimley, *20YY Preparing for War in the Robotic Age*, Center for New American Security, January 2014.

⁹ Barbara J. Machah and SPC David B. Platt, “Armed UGV/SWORD: Development, Tactics & Deployment,” Systems Concepts and Technology, ARDEC, February 23, 2015.

ATGMs to migrate down to the squad level.¹⁰ To reduce the requirement of the trooper to directly control these fighting systems, there will be a big push to develop semiautonomous robots requiring only low-bandwidth communications. By the late 2020s, the ground robot fighting system may take on near-complete autonomy.¹¹ The greatest accelerator of this progress in robotic autonomy may well not come from military R&D investments rather from the massive investment made by Google and its commercial competitors to develop the autonomous passenger vehicle by the 2020s.¹² Both Japan and South Korea are likely to invest heavily in humanoid robots to supplement their labor forces.¹³

Micro-UAVs flying above the squad will likely be features of dismounted operations by the 2020s.¹⁴ The larger of these will likely be armed to provide persistent armed over-watch. The other class of UAVs will be flying micro-machines that will be used primarily for battlefield reconnaissance and replace the current Raven class small UAV. These flying machines will have the capacity to swarm and set up multilink communications networks.¹⁵ Their endurance will be enhanced by their capacity to draw energy from any functioning source of electricity, such as power lines.¹⁶ Furthermore, the evolution of this class of UAV is likely to accelerate with their mass introduction into the civilian economy now that the Federal Aviation Administration has released rules on their proper and safe use.¹⁷

As small-unit robotics continues to develop, it will make less and less sense for success at the tactical level of war to hinge on the ability of humans to accurately fire a rifle (or any other weapon of similar form factor). It is no secret that the human biomechanical system is profoundly suboptimized for the mechanical task of firing a weapon to achieve precise effects. Postural sway, the optics of the human eye, and numerous other factors combine to limit the degree of accuracy that a human shooter can obtain. It is not apparent that there is a ready technological fix that can overcome millions of years of evolution. Shooting is fundamentally an algorithmic exercise—a precise shot is the solution to straightforward (if multivariate) geometric and physical equations.¹⁸ This is exactly the kind of mechanical task that robots do

¹⁰ For a description of the latest variant of a Squad Multipurpose Equipment Transport, see Patrick Tucker, “Beyond Big Dog: The U.S. Army Searches for an Infantry Squadbot,” *Defense One*, October 3, 2016.

¹¹ Mitchell Chan, “Penn to Research Autonomous Flying Robots for Department of Defense,” *Daily Pennsylvanian*, November 12, 2015; Geoff Dyer, “U.S. Military—Robot Wars,” *Financial Times*, February 7, 2016.

¹² For a description of the technological race toward vehicle autonomy between the traditional automotive industry and IT industry, see Neal E. Bondette, “Ford Promises Fleets of Driverless Cars Within Five Years,” *New York Times*, August 16, 2016; Bill Vlasic and Mike Isaac, “Uber Aims for an Edge in Race for a Self-Driving Future,” *New York Times*, August 18, 2016.

¹³ Graham Warwick, “Managing Unmanned: Projections for Growth in Civil Unmanned Aircraft Operations Boost NASA Plan to Create Low-Altitude Airspace System,” *Aviation Week & Space Technology*, June 16, 2014.

¹⁴ For a comprehensive overview of OSD’s 25-year roadmap for the joint force unmanned systems, see Office of the Secretary of Defense, *Unmanned Systems Integrated Roadmap FY2013–2038*, Reference No. 14-S-0553, Washington, D.C.: U.S. Department of Defense, 2012.

¹⁵ Graham Warwick, “ONR: Swarming UAVs Could Overwhelm Defenses Cost-Effectively,” *Aviation Week & Space Technology*, April 23, 2016b.

¹⁶ James Walker, “New ‘Bird’ Drones Land on Power Lines to Recharge Themselves,” *Digital Journal*, April 14, 2014.

¹⁷ Graham Warwick, “Unmanned Unleashed: Years in the Making, the FAA’s First Regulations for Unmanned Aircraft Meet with Industry Welcome,” *Aviation Week & Space Technology*, September 12–25, 2016c.

¹⁸ Before the powered exoskeleton emerges, guided bullets may be developed. See Evan Ackerman, “DARPA’s Self-Steering EXACTO Bullets in on Moving Targets,” *IEEE SPECTRUM*, April 21, 2016.

well. Freeing soldiers from the mechanical task of shooting would enable them to focus on maintaining awareness of the tactical picture and making decisions. Offloading the physical mechanics of shooting to a robotic platform, with human control over the decision to shoot, would also free up time currently spent on marksmanship drills for soldiers to train on making complex decisions during tactical engagements.¹⁹ Given the push to give greater responsibility to lower echelons of command, this kind of training time will soon become an urgent need.²⁰

Unmanned Vehicle Challenge to the Submarine

By the late-2020s, the viability of manned submarine operations in confined littoral waters, such as China's First Island Chain, may be called into question. Major advances in unmanned surface vehicles (USVs) and UUVs may have proliferated to the point that active and collaborative swarms of these vehicles may make littoral zones in the ocean quasi-transparent.²¹ Furthermore, this array of autonomous vehicles that act cooperatively could be armed to conduct sustained ASW operations.²² Similar to the problem of the proliferation of micro-unmanned air and ground swarms on the land battlefield, there will be the challenge of conducting offensive operations under the ocean before that medium is "deloused" of this potentially lethal array of mobile sensors. At minimum, conducting offensive operations in future undersea battle space might require a campaign to gain "information dominance" through the use of armed unmanned vehicles as counters to the analogous threat. Even if this prospect of a big change in the undersea battle space does not emerge in the 2020s, the investment in large long-endurance UUVs will like see the large-scale diffusion and procurement of long-range self-deploying mining systems.²³

The Emergence of Enhanced and Armored Infantry

The exoskeleton-enabled "Starship Trooper," or "Ironman," has been a gleam in the eye of science fiction writers and some in the Army S&T community since the late fifties and the target of recent investment by DARPA and the services. This is objective of the TALOS program, a

¹⁹ The USAF experience with the operational use of UAVs (also known as remotely piloted vehicles) suggests the management of robotic systems with low levels of autonomy will put a major burden on the combat soldiers operating at the squad and platoon echelon. For discussion of the challenge of sustaining a UAV pilot cadre and analytical support staff, see Michael S. Schmidt, "Air Force, Running Low on Drone Pilots, Turns to Contractors in Terror Fight," *New York Times*, September 5, 2016. This suggests the next-generation UGVs acting as a combat assistant to a soldier on the battlefield may require the intelligence similar to that of a dog and be able to receive and act on verbal or wireless commands.

²⁰ Jason Augustyn, Nathan Burkholder, Dan Evans, Brian Freeman, John Graham, Nicholas Sambaluk, David Siry, Charles Thomas, and John Willis, *Envisioning the Deep Future of Small Arms 2022-2042*, U.S. Army AT&L, SAALZT-TR-2013-03, 2013.

²¹ Mark Pomerleau, "DoD Plans to Invest \$600 Million in Unmanned Underwater Vehicles," *Defense Systems*, February 4, 2016.

²² For a discussion of the technological prospects of naval use of USVs and UUVs, see Office of the Secretary of Defense, *Unmanned Systems Integrated Roadmap FY2011-2036*, Reference No. 11-S-4613, Washington, D.C.: U.S. Department of Defense, 2009; Robert W. Button, John Kamp, Thomas B. Curtin and James Dryden, *A Survey of Missions for Unmanned Undersea Vehicles*, Santa Monica, Calif.: RAND Corporation, MG-808-NAVY, 2009.

²³ Edward Lundquist, "Unmanned Underwater Vehicles: Is Bigger Better?" *Marine Technology News*, May 16, 2016.

USSOCOM R&D priority.²⁴ There are fundamental technical barriers for practical exoskeletons for infantry forces. There is the need to develop safe and reliable control systems and provide the huge amounts of power that an exoskeleton would need for sustained operations. The control system problems are more or less solved, with progress having benefited greatly from investments in bipedal robotics. The power problem remains vexing, but investments in S&T promise breakthroughs over the next few years.²⁵ For instance, nano-weave technology should significantly reduce the weight of an exoskeleton without compromising its ability to augment human strength. A lighter suit requires less power, which could be provided by fuel cells currently in development.²⁶ Another challenge is reducing the strain on the human operator during operations on irregular terrain—the price of a rigid frame supporting body armor. Aside from many survivability attributes, the combat suit could feature “mounting points” for several different types of small arm providing soldiers a range of effects options. Feedback-control between the suit and firing systems could also eliminate much of the human error in marksmanship associated with stabilizing the body.

An alternative to the powered and armored exoskeleton is the “soft” version. This powered suit would provide additional strength and endurance without the armor protection and the rigid structure.²⁷ Even in combat operations, this type of powered suit might be operationally valuable by providing the combat trooper with additional strength and endurance to carry out a mission.

Interest and investment in the exoskeleton concept has waxed and waned. Exoskeletons are truly at the cutting edge of several S&T domains, and there is every reason to expect that soldiers would need different doctrine to employ this capability effectively.²⁸ A variant of the exoskeleton could be valuable by enabling rear area logistic personnel to perform the lifting and moving duties currently conducted by a manned forklift.²⁹ In fact the exoskeleton using an external power source may emerge first as a logistic support system before the deployment of a fully operational and autonomous armored and powered combat suit.

The U.S. Army and Special Forces might be able create a new kind of mobile and very high performance assault force by the late 2020s. This mobile assault infantry could be in two forms. One could be foot mobile but supported by robotic enablers that could include micro-UAVs, logistic UGV (also known as mechanical mules), and UGVs with crew serviced weapons. The second could be assault troops equipped with armored exoskeletons.³⁰ The two types of force might operate together at the platoon echelon and above. At higher echelons, say the

²⁴ Kevin McCaney, “U.S. Special Forces a Step Closer to ‘Iron Man Suit,’” *Defense Systems*, January 22, 2015.

²⁵ The massive investment made in the commercial sector by the electric automotive and renewable energy industries will provide major advances in energy storage that have military applications. See Junwen Deng, Xueyi Lu, Lixiang Liu, Lin Zhang, and Oliver G. Schmidt, “Introducing Rolled-Up Nanotechnology for Advanced Energy Storage Devices,” *Advanced Energy Materials*, Vol. 6, Issue 23, July 27, 2016.

²⁶ Marcel Sangsari, “Fuel Cells Set to Power up the Drone Industry,” *CBC News/Technology & Science*, September 25, 2016.

²⁷ Tom Green, “Exoskeleton Revolution: From Rigid to Soft to Ultrasoft,” *RBR-Robotics Business Review*, November 17, 2014.

²⁸ Augustyn, 2013.

²⁹ Alternatively, the forklift could also be robotized. Obviously, trade-offs will have to be made between giving rear-area personnel enhanced strength or just providing them with the equivalent of robotic laborers.

³⁰ A third option might be soldiers equipped with soft exoskeletons with limited armor to provide the combat soldier with enhanced endurance and lifting capacity.

BCT level, these forces might fight with infantry optimized to operate with medium or heavy fighting vehicles. This new high-technology infantry will free itself from traditional logistic constraints by relying on

- enhanced individual firepower, protection, and sensing capacity
- robotic enablers—small UAVs and UGVs
- situation awareness provided by the joint force
- long-range indirect fires provided by the joint force
- aerial delivery of logistics by manned and unmanned means.

Initially, one or more battalion-sized units could be created, perhaps formed out of one or more Ranger battalions or Special Forces units. Delivery of these forces to conduct a wide range of Ranger-type missions could be affected by unconventional means. These include the delivery by current wide-body airlifters, such as the C-17 and C-5M, operating at medium altitude (25,000 feet above ground level) using the mature technology of precision airdrop.³¹ Obviously, the combat troops would have to be trained in conduct high-altitude/low-opening (HALO) air assaults, but their full body armor and environmental systems should facilitate such high-altitude operations.³²

The development of exoskeleton-equipped infantry or the provision of the infantry squad with increasing robotic assistance will dramatically increase the bulk and weight of the infantry squad and will affect the design of the next generation VTOL assault aircraft and armored infantry carriers.³³ Either the next-generation infantry assault vehicles will either have to be much larger with a larger payload thereby being more expensive, or infantry squads and platoons will have to become more specialized. The current trend is toward dismounted force specialization with the emergence several classes of infantry that could include: light SOF, heavy assault infantry, heavy infantry with robotic enablers, and motorized and mechanized infantry that fight from and near their parent fighting vehicles. The mix of next-generation small arms for each type of infantry unit will likely become highly specialized.

³¹ Aside from the development of the guided parafoil, the other innovation in precision airdrop is the emergence of the wingsuit for flying personnel from medium altitude. A ram-air parachute affects a precision landing at low altitudes. This innovation has been part of the extreme sports scene for a number of years. The concept might be applied to the precise delivery of assault infantry from medium to high altitude to drop zones some tens of miles away from the transport aircraft. See David Reynolds, "Airborne Forces: Evolving for the Future," *IHS Jane's Defence Weekly*, June 28, 2013.

³² USSOCOM is already using small open-cage ATVs to provide light forces with cross-country mobility with the General Dynamics *Flyer* and Polaris MRZR "dune buggies". It is likely that all of the airborne brigades will be equipped with a similar vehicle to provide air assault unit with enhance mobility and firepower. See Tyler Rogoway, "U.S. Special Ops MRZR Buggies Full of Javelin Missiles Spotted Near Mosul," *The Drive*, May 31, 2016. These types of vehicles with combat crews aboard could be used to conduct assault glider-type operations from medium altitude. They could exploit the successfully development in precision airdrop, the Joint Precision Air Drops System (JPADS) precision cargo delivery system. Over the past 15 years, the Strong Parachute Company, Orlando, Florida has demonstrated this concept of motorized air assault.

³³ The current design parameters for the JFVL may well be insufficient in size and payloads to accommodate enhance armored infantry, a point USSOCOM will have to keep in mind as it considers its next generation VTOL family of combat aircraft.

Extending the Operational Life of Large Combat Vehicles

Given the diffusion of tactical targeting systems in the form of low-cost unmanned air and ground vehicles, coupled with precision direct and indirect fire weapons, there is the question of the operational viability of the current and next generation of combat vehicles. Can the current generation of AFVs survive the proliferation of direct- and indirect-fire PGMs? Various forms of active defense concepts have been proposed and are under development.³⁴ The effectiveness of these active defense system may determine whether the next large-scale ground operation is dominated by the offense or the defense. To provide for enhanced vehicle protection via passive and active armor, a future Main Battle Tank (MBT) is likely to have smaller combat crews, if only to minimize the crew volume needing protection.³⁵ Active protection systems that use kinetic means are likely to proliferate to provide protection against low- and medium-velocity guided anti-tank missiles. Protection against hypervelocity cannon-fired ammunition will likely require substantial passive protection (e.g., vehicle armor and weight).³⁶ Certainly the synergistic combat relationship between manned AFVs, unmanned vehicles, infantry, and their supporting indirect fire systems will undergo major changes in technology and operational concept. The mass deployment of a DEW system on AFVs is unlikely because of their cost, weight, size and power requirements.

On the other hand, the USN has a more credible expectation that the next generation of tactical DEWs can provide a new and more efficient form of terminal defense for its major surface warships and logistics ships.³⁷ Warships have the power and space to employ a tactical DEW. Rapid-fire light cannons or rail guns and short-range SAMs are the current competitors to first-generation DEW systems. Beyond the 2020s is the prospect of rapid-fire electromagnetic cannon as a direct defense weapon. As for large aircraft, such as gunships, that are operating “low and slow,” DEW could prove to be very effective against MANPADS and SHORADS.³⁸ At higher speeds and altitudes, there is still the U.S. commitment to LO technology coupled with electronic warfare (EW) to enhance the survivability of higher performance combat aircraft. The massive investment in the F-35 and B-21 reflects the belief in the continued viability of this approach.³⁹ As already discussed the self-life of effective LO technology may be limited. In the future these costly and high performance aircraft might be armed with a DEW to defeat high performance SAMs and air-to-air missiles.

³⁴ For a description of non-U.S. development in active protection systems, see Tamir Eshel, “IDF Expands Use of Active Protection System (APS),” *Defense Update*, January 31, 2016; and Nicholas de Larrinaga, “In Harm’s Way,” *IHS Jane’s Defence Weekly*, September 7, 2016.

³⁵ This is the underlying design concept of the new Russian MBT, the T-14.

³⁶ The proliferation of very high performance and rapid-fire medium caliber automatic cannon will put stress on any active protection system that is optimized to defeat single projectiles.

³⁷ Daniel Goure, “The Next U.S. Asymmetric Advantage: Maritime Lasers to Counter the A2/AD Challenge,” Lexington Institute, March 2014.

³⁸ For a detailed analysis of the joint force and allied active and passive defensive options in the face of the rising A2/AD threat in Indo-Pacific region, see Mark Gunzinger and Bryan Clark, *Winning the Salvo Competition: Rebalancing America’s Air and Missile Defenses*, Center for Strategic and Budgetary Assessments, 2016.

³⁹ It should be noted that one of the most important attributes for both the F-35 and the B-21 is their enhanced capacity to provide battlefield situation awareness to a variety of combat platforms. Recently, a Marine F-35B provided a shore base Aegis system with over the horizon tracking information to guide a SM-6 SAM. See Sam LaGrone, “Video: Successful F-35, SM-6 Live Fire Test Points to Expansion in Networked Naval Warfare,” *USNI News*, September 13, 2016.

Global-Range Precision Strike

From a defense planning perspective, there is the larger question about the strategic requirement for the overall size of the U.S. war reserves of high performance but costly LACMs. Furthermore, there is the question as to the industrial capacity of United States and its key allies to replenish wartime stocks on an urgent basis. Initially, those facilities in Eurasian territories may be quite vulnerable to limited LCAM attacks by either the Russians or Chinese.⁴⁰ That threat may evolve with the emergence of the theater and transoceanic ballistic missiles equipped with maneuvering re-entry vehicles or hypersonic glide vehicles.⁴¹ The response to this strategic threat may be a mix of active and passive defenses. A more robust active aerospace defense program and a parallel investment in putting key missile production facilities underground may be needed.⁴² In conjunction with attacks through cyberspace the prospect of devastating strategic non-nuclear warfare will be fully in view.⁴³

Conflict Through Cyberspace

Societal and military vulnerability of the governments, civil institutions, and commercial enterprises has dramatically increased as they exploit productivity benefits from the mobile Internet, the Internet of Things, cloud computing, and big data.⁴⁴ This vulnerability is the product of the concurrent global diffusion of “cyber war” tools and techniques in the hands of both nation states and non-state actors.⁴⁵ The capacity to conduct increasingly sophisticated computer network operations (CNO) will be in the hands of not only the major global powers but a wide range of smaller but technologically sophisticated powers and non-state actors.⁴⁶ For example, Yahoo has suffered a data security breach of 200 million customers by a nation state actor of uncertain origin.⁴⁷ North Korea demonstrated the capacity to conduct a damaging computer network attacks against a major media enterprise, the Sony Corporation and a

⁴⁰ Russian demonstrated this type of long-range LACM capability during a wave of strikes against Syrian “insurgent” targets from long-range aircraft, corvettes in the Black Sea, and from a submarine in the Mediterranean. See Brendan McGarry, “Strike Highlights Russia’s Advances in Cruise Missile Technology,” *DefenseTeck*, October 8, 2015.

⁴¹ Richard D. Fisher Jr., “U.S. Officials Confirm Sixth Chinese Hypersonic Maneuvering Strike Vehicle Test,” *IHS Jane’s Defence Weekly*, November 27, 2015.

⁴² An important intelligence “tell” as to whether China or Russia were preparing for a long duration regional war under high technology conditions is evidence that either are putting key missile production facilities underground.

⁴³ A recent RAND study has raised the prospect that war with China might become protracted. See David C. Gompert, Astrid Stuth Cevallos and Cristina L. Garafola, *War with China: Thinking Through the Unthinkable*, Santa Monica, Calif.: RAND Corporation, RR-1140-A, 2016. A central assumption of that analysis is that neither China nor the United States would carry out strategic kinetic attacks against their homelands out of fear of nuclear escalation. That analysis may prove to be wrong in this regard.

⁴⁴ For a late 1990s analysis of the prospect of war through cyberspace, see Roger C. Molander, Peter A. Wilson, B. David Mussington and Richard Mesic, *Strategic Information Warfare Rising*, Santa Monica, Calif.: RAND Corporation, MR-964-OSD, 1998.

⁴⁵ “2015 Highlights & Trends in the Deep and Dark Web,” *FLASHPOINT*, February 2016.

⁴⁶ Benjamin Wittes and Gabriella Blum, *The Future of Violence, Robots and Germs, Hackers and Drones*, New York, N.Y.: Basic Books, 2015.

⁴⁷ Michael Kan, “Yahoo Uncovered Breach After Probing a Black Market Sale,” *Computer World*, September 23, 2016.

variety of global banks.⁴⁸ Already, the aggressive conduct of computer network exploitation by China has become a major source of tension with the United States.⁴⁹ Furthermore, there have been a number of high-profile attacks by suspected state sponsored perpetrators in Russia against a wide array of data systems, such as the Democratic National Committee and a large number of American Olympic and top-ranked commercial athletes.⁵⁰ Therefore, the protection of these critical infrastructures is a central national security imperative. In turn, societal and military institutions will have to develop increasingly sophisticated defense, response, and recovery systems and resilience processes. U.S. and allied military forces will have to train to fight in a low-bandwidth environment where future networks have been disrupted and corrupted during a future regional, if not global, war with a near-peer opponent, such as China or Russia. As noted in the following section, this requirement to operate in an environment of information austerity could be prompted by a regional conflict escalating into a conflict in the space domain.

Finally, there is the prospect that a variety of nation states and non-state actors have and will exploit the multimedia environment that has emerged from the Internet communications revolution to conduct information operations (IO) as a very sophisticated form of 21st century soft power.⁵¹ These tools and techniques of IO will become a part of a form of full spectrum if not continuous warfare, a concept recently demonstrated by the Russian Federation during its political conflict with Estonia in 2007 and military operation against Georgia in 2008. It is noteworthy that the more recent Russian military operations to seize Crimea and support a rebellion in the Donbas region of Ukraine proper relied heavily on the tools and techniques of psychological warfare rather than on CNO.⁵²

By the mid- to late 2020s, the United States and its near-peer military competitors, such as China and Russia, will have the option of conducting non-nuclear strategic attacks on their respective homelands through the combined use of cyberweapons through cyberspace and the employment of long-range precision guided cruise and ballistic missiles. As noted earlier, these strategic attacks might be directed at critical war production industries that are both vulnerable and few in numbers.

⁴⁸ Nicole Perlroth and Michael Corkey, "North Korea Linked to Digital Attacks on Global Banks," *New York Times*, May 20, 2016.

⁴⁹ Dominic Rushe, "OPM Hack: China Blamed for Massive Breach of U.S. Government Data," *The Guardian*, June 5, 2016.

⁵⁰ Michael Birnham, "Alleged Russia Involvement in DNC Hack Gives U.S. a Taste of Kremlin Meddling," *Washington Post*, August 13, 2016; and Laura Mills and Matthew Futterman, "World Doping Agency Says Russian Hackers Stole Medical Records of Olympic Athletes," *Wall Street Journal*, September 13, 2016.

⁵¹ For a discussion of Russian "active measures," or what is now labeled as *hybrid warfare* tools and techniques, see Chapter Three in this report.

⁵² Following the physical disruption of the power grid between Ukraine and Russian annexed Crimea, Moscow appeared to respond with an attack on the Ukrainian power grid through a cyberspace attack. See Robert M. Lee, Michael J. Assante, and Tim Conway, *Analysis of the Cyber Attack on the Ukrainian Power Grid*, Washington D.C.: SAN Industrial Control Systems and Electricity Information Sharing and Analysis Center, March 18, 2016.

The Emergence of War in the Space Domain

By the mid-2020s, Russia, China and possibly India will have the military capacity to disable and/or destroy satellites at all orbital altitudes from low-earth orbit to geosynchronous orbit.⁵³ These capabilities include the deployment of high-performance anti-ballistic missile defenses to the development and deployment of specialized “inspector-killer” satellites that could be launched during peacetime or crisis by higher-performance SLVs.⁵⁴ Due to the proliferation of high-performance anti-ballistic missile systems armed with hit-to-kill warheads, other significant powers such as Japan, India, South Korea, Vietnam, and Pakistan may have an inherent capacity to attack low-earth orbit satellites.⁵⁵ Aside from kinetic weapons, China and India may deploy an array of DEWs that include high-powered microwave and laser weapons to provide attack options that can provide a disruptive vice destructive capacity.⁵⁶

The prospect that one or more Eurasian powers might use ASAT capabilities during a crisis, much less during a regional conflict, exists. China, Russia, India, and Japan will have deployed increasingly sophisticated NSS architectures to provide Earth observation, positioning-navigation-timing (PNT), and mobile communications capabilities during the 2020s. These space architectures support a wide range of military, economic, and scientific missions. In turn, these high-value architectures are now hostage to the outbreak of hostilities in the space domain. The origin of attacks against space targets is likely to be more readily identified if they are produced by kinetic and electromagnetic effects. On the other hand, CNO tools and techniques may well be used to disrupt and corrupt various systems within the NSS architecture to generate an important degree of ambiguity about the origin of the attacker. On the other hand, these space architectures have become critical elements of the regional reconnaissance strike systems deployed by the major powers in Eurasia especially in support of their A2/AD capabilities. The effectiveness in these kill chains may prompt direct action to disable an opponent's space architecture during the course of a regional conflict.

Simultaneously, the tools and techniques associated with being a space power with an independent space launch capability and the capacity to build military, civilian, and scientific satellites is diffusing to a larger number of national actors.⁵⁷ Currently, the space business is dominated by a relatively small number of national players that include China, the European Union, India, Japan, and Russia. That will change, as a new-generation of SLVs are developed

⁵³ For an analysis of India's interest in anti-satellite (ASAT) options, see Harsh Vasani, “India's Anti-Satellite Weapons,” *The Diplomat*, June 14, 2016; for an analysis of Russia's ASAT programs, see Brian Weeden, “Dancing in the Dark Redux: Recent Russian Rendezvous and Proximity Operations in Space,” *The Space Review*, October 5, 2015 and Mike Gruss, “Maneuvering Russian Satellite Has Everyone's Attention,” *SPACENEWS*, July 17, 2015.

⁵⁴ Lee Billings, “War in Space May Be Closer Than Ever,” *Scientific American*, August 10, 2015; Brian Weeden, “Through a Glass, Darkly: Chinese, American, and Russian Anti-Satellite Testing in Space,” *Secure World Foundation*, March 17, 2014.

⁵⁵ During the winter of 2008, the USN used a modified Aegis cruiser to shoot down a failed U.S. national security satellite before it re-entered the atmosphere. This Operation Burnt Frost demonstrated the feasibility of using a theater missile interceptor as a low-earth orbit ASAT weapon. See Navy News Service, “Navy Succeeds In Intercepting Non-Functioning Satellite,” U.S. Department of the Navy, NNS080220-19, February 20, 2008.

⁵⁶ For a summary of the PLA's emerging ASAT capabilities, see Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2016*, Washington, D.C.: U.S. Department of Defense, April 26, 2016.

⁵⁷ For a description of a successful India SLV launch of wide array of small and micro-satellites, see William Graham, “ISRO PSLV Conducts SCATSAT-1 Launch,” *NASASpaceFlight.com*, September 25, 2016, and Justin Ray, “Ambitious Space Missions in Small Packages Win Free Launch Slots on Atlas 5,” *Spaceflight Now*, September 22, 2016.

and deployed that radically reduce the cost of putting a payload into orbit.⁵⁸ Currently, the leader in this revolution are Space X and Blue Origin, private U.S. companies that are forcing traditional aerospace industrial enterprises, such as the United Launch Alliance and Arianne Space, to develop a next generation of lower cost launchers that include the recovery and reuse of the first stage of those SLVs.⁵⁹ Simultaneously, the global space satellite industries are rapidly exploiting the opportunity provided by the information technology revolution to develop, procure, and deploy a new generation of space vehicles of much lower weight and production costs. This is the emergence of small, if not micro, satellite constellations that initially will provide important global surveillance and communication functions.⁶⁰ These two parallel events suggest that the DoD and its agents that construct and maintain the NSS architecture, the USAF and NRO, have an opportunity to substantially improve the design of the next generation of NSS architecture. The current architecture consists of a relatively small number of very high value satellites that are vulnerable to a wide array of ASAT weapons. There is the prospect that next-generation NSS architecture could be made much more resilient while being deployed and replenished at much lower costs by a more-robust space launch architecture.

This phenomenon means that access to and the utilization of space can and will be exploited by a rapidly expanding array of non-state and state actors. Simultaneously, a growing array of national actors will have the capacity to interfere with or directly attack satellite systems that threaten their security interests during the time of covert or overt regional conflict. Similar to costs and benefits found in cyberspace, major military powers will have to develop technological and operational options in circumstances where their access to the NSS architecture has been severely compromised. For example, global GPS systems may become compromised by a major regional war involving multiple combatants, thereby prompting reliance on an entirely different mode of navigation, such as the use of “cold atom” technology.⁶¹

The potential combined effects of attacks through the electromagnetic spectrum in cyberspace and space on the joint force’s C4ISR architecture will compel the major services to prepare for a low-bandwidth war coupled with corrupted information. One of the most critical technical and operational weakness of the Army’s Future Combat Systems (FCS) program was the assumption that enemy “radio-electronic combat” through these two mediums would not degraded its high-bandwidth networks, which were central to the concept of “see first, decide

⁵⁸ An example of emerging lower cost and more flexible space launch systems is the Virgin Galactic’s concept of using a converted 747 as an aerial platform to launch a low-cost space launch vehicle, the LauncherOne. See Chris Bergin, “Virgin Galactic Preparing for a Busy LauncherOne Future,” *NASA Spaceflight.com*, June 30, 2016.

⁵⁹ SpaceX is developing a seven-person orbital “space taxi,” which will have a precision soft rocket landing capability. Furthermore, that corporation, along with such competitors as Blue Origin, is developing reusable space boosters that will radically reduce the cost of putting payloads into orbital or suborbital flight. See Lara Seligman, “Space X’s Reusable Rocket: The ‘Holy Grail’ of Space Flight?” *Defense News*, January 6, 2016; Jeff Foust, “A Look Inside Blue Origin,” *The Space Review*, March 21, 2016; and Jeff Foust, “The Shifting Commercial Launch Landscape,” *The Space Review*, March 14, 2016.

⁶⁰ Sara Boettiger and Sean Wagstaff, “‘Flock’ of Nano Satellites to Capture High-Res Views of Whole Earth,” *Scientific American*, January 10, 2014.

⁶¹ For a description of guidance options that do not rely on GPS, see Office of the Secretary of Defense, 2009; Robert Lutwak, “Micro-Technology for Positioning, Navigation and Timing (Micro-PNT),” Defense Advanced Research Projects Agency, Program Information, 2016; and Lin Haas, “Adaptable Navigation Systems (ANS),” DARPA, Program Information 2016.

first, and shoot first.”⁶² By the mid-2020s, the U.S. joint force will have to develop a wide range of training programs and exercises to allow the U.S. forces operating against major Eurasian opponents to fight with much more “primitive” C4ISR capability.

This is a case where the dominance and dependence of the tools and techniques associated with the Third Offset may prove vulnerable to the creative use of electromagnetic countermeasures, including the employment of specially designed nuclear warheads designed to create wide-area high-altitude electro-magnetic pulse (HEMP) effects.⁶³ As in preparing for an opponent's use of biological and chemical weapons, preparing for a low-bandwidth conflict will put an additional burden on demanding conventional training syllabi.⁶⁴

A related investment decision for the joint force is how much investment should be made in alternatives to the capabilities found in the current NSS architecture and its reliance on cyberspace for the backbone of its C3 needs. Currently, the USAF and USN are making an investment in long-range Global Hawk-class UAVs to provide alternative theater communication links and act as pseudo-satellites to generate PNT signals to supplement the NSS architecture.⁶⁵ Electronically controlled adaptive high-frequency radios may be back in vogue during the 2020s to provide global and theater-sized communication links. In a world of tight defense budgets, these backup options may be hard to sell to the services without clear direction and intervention by the U.S. senior national security leadership.

Other Areas of Innovation

Innovation in Transoceanic Logistics

The challenge of the emerging A2/AD threats to U.S. expeditionary forces highlights the challenge to the U.S. transoceanic and intra-theater logistics capacity in time of war. Currently, U.S. forces are highly reliant on medium-speed logistic ships and wide-body airlifters to sustain any expeditionary operation. It is possible that these air and sea fleets would be subjected to an interdiction campaign by either China or Russia during future Eurasian regional war. The air fleets may be less vulnerable during transoceanic travel than logistics ships to interdiction; after all, the latter face the traditional threat of submarines and now the threat of long-range precision strike systems. On the other hand, airlift typically accounts for only about 5 percent of the materiel transported to theaters of major conflict. The importance of this problem has increased, especially in the European theater, where there is a new requirement

⁶² One of the unresolved vulnerabilities of the FCS concept of high networked form of air and ground maneuver operations was the reliance on very high-bandwidth satellite-based communications. For a history of the demise of the FCS program, see Christopher G. Pernin, Elliot Axelband, Jeffrey A. Drezner, Brian Barber Dille, John Gordon, Bruce J. Held, K. Scott McMahon, Walter L. Perry, Christopher Rizzi, Akhil R. Shah, Peter A. Wilson, and Jerry M. Sollinger, *Lessons from the Army's Future Combat Systems Program*, Santa Monica, Calif.: RAND Corporation, MG-1206-A, 2012.

⁶³ For a discussion of nuclear weapons effects, including HEMP during a regional war, see Wilson and Colby, 2007.

⁶⁴ The dramatic advances in virtual reality gaming, technical training, and mission planning systems may provide to opportunity to train forces in a combat environment that is “dirtied” by the extensive use of CNO, EW, and electromagnetic weapons, including the limited use of nuclear weapons. See Bryant Jordan, “Virtual Reality Dome to Assess Soldier Thinking in Virtual Combat Environment,” *Defense Tech*, March 18, 2016.

⁶⁵ This option is now fully developed through the Battlefield Airborne Communications Node (BACN) program of providing high capacity communications via Global Hawk UAVs. See “Northrup Grumman Wins \$61 Million U.S. Air Force BACN Contract,” *Defense World*, April 26, 2016.

Figure A.2
Lockheed Martin Commercial Hybrid Airship



SOURCE: Lockheed Martin press photo.

RAND RR1782-A.2

to be prepared to deploy heavy ground forces equipment and supplies from CONUS as part of NATO's efforts to deter Russian aggression against the alliance's eastern flank. Ongoing aircraft innovation, including hybrid airships, should be explored (see Figure A.2).⁶⁶ Conceptually, it is possible to design a hybrid airship with a 500-ton payload with a transoceanic range.⁶⁷ The airship would allow the direct delivery of combat troops and material to austere landing sites, bypassing large and vulnerable airfields and ports.

On "Going Winchester"

During a future regional war in Europe or Asia, U.S. and allied forces may face the circumstance that their inventory of LACMs and other PGMs are exhausted during a period of intense fighting. This has been referred to as "going Winchester," or running out of bullets during a cavalry meeting engagement. The problem is more acute for the USN since its surface and submarine fleets rely on the vertical launch system (VLS) to store and launch large offensive and defensive weapons. Once exhausted, the warship must withdraw from the combat theater to find a safe port to affect a pier-side reloading. A prototype at-sea VLS rearming system for the USN's fleet logistics ships was developed but not deployed.⁶⁸ Currently, the USN is considering whether to address this problem for surface warships with the development of a dynamic crane that allows logistic ships to rearm the current generation of warships in unfavorable sea

⁶⁶ Lockheed Martin, "Hybrid Enterprises Receives First Customer's Letter of Intent to Purchase Lockheed Martin Airships," press release, March 30, 2016.

⁶⁷ For an analysis of the risks and benefits of hybrid airships, see Zachery B. Jiron, "Hybrid Airships for Lift: A New Lift Paradigm and a Pragmatic Assessment of the Vehicle's Operational Challenges," Air University, Maxwell Air Force Base, Ala., December 2011.

⁶⁸ Marvin O. Miller, "Underway Replenishment System Modernization," Port Hueneme Division, Naval Sea Systems Command, 2000.

states. One step in this effort is the development of a dynamic cargo crane design to transfer containers and vehicles during moderate sea states.⁶⁹

This problem is not as acute for aircraft carriers since they can be resupplied through at-sea logistic systems. Obviously, wide-body airlifters can supply forward-deployed, land-based aviation if their resident airfields are not subjected to repeated air and missile attacks.

In summary, if they hope to gain a meaningful measure of military supremacy in light of the trends cited above, DoD and the services will have to continue to make robust investments in military-related technologies, while also becoming much more opportunistic and efficient in exploiting emerging dual purpose technologies.⁷⁰ DoD has already taken a number of steps to accelerate the process of U.S. military innovation. These steps include the creation of the SCO in 2011 and the ongoing initiative to enhance collaboration between the OSD R&D community, especially DARPA, and U.S. information technology industries.

The success of the Third Offset and DoD's overall program will depend in large measure on the extent to which DoD is able to address the following military challenges that face U.S. forces today or are likely to emerge by the mid-2020s:

- building a C4ISR infrastructure that is very resilient to near-peer attacks through the space domain and cyberspace
- training the joint force to operate in an environment with a highly degraded C4ISR infrastructure
- fielding forces that can detect, identify, locate, track, and damage or destroy mobile military assets, such as mechanized ground force units and surface ships, even in circumstances in which U.S. forces lack air superiority
- defeating through active defense and counterforce mobile ballistic and cruise missiles that may be nuclear armed.
- developing new ways to rapidly suppress and neutralize dense networks of modern SAM systems
- ensuring that forward-based forces on land and at sea can sustain operations even in the presence of repeated attacks with accurate ballistic and cruise missiles
- providing a strategic air and sea logistics lift capacity that can operate in an A2/AD military environment.

⁶⁹ "Revolutionary Crane Technology May Be in Navy's Future," *PHYS.ORG*, June 1, 2010.

⁷⁰ A potential technological wildcard beyond the scope of this analysis is do-it-yourself (DIY) genomics technology. This new medical technology may be exploited by criminals and terrorists in the not too distant future and may become a major homeland security threat. Although recombinant DNA technology will facilitate public health and bio-war defenses via the construction of accurate pathogen databases, there is the prospect that there will be a technological "arms race" in both offense and defense, not unlike the offensive and defensive competition within cyberspace. For a more fulsome discussion of this issue, see Wittes and Blum, 2015.

On the Future of the U.S. Nuclear Posture

Background

For the foreseeable future, the United States will have to maintain a robust and diverse nuclear arsenal. As noted previously in this report, the extended deterrent commitment that the United States provides to its allies in Eurasia is a central feature of a 70-year policy to reassure technologically and industrially powerful allies so that they see no compelling need to acquire their own nuclear arsenals. The demand signal for this deterrence “umbrella” has become much stronger with the emergence of China and the Russian Federation as two nuclear-armed continental sized powers that have taken on a geo-strategically revisionist agenda. Second is the demand signal generated by the threat of nuclear-armed regional states, most specifically North Korea. Attempts to moderate if not reverse these nuclear capabilities have produced, at best, a mixed picture. The United States and the Russian Federation were able to sign the New Strategic Arms Reduction Treaty (START) in 2010, which imposed further reductions on their operational nuclear arsenals. On the other hand, the deterioration of U.S.-Russian relations after Moscow’s aggressive actions against Ukraine in 2014 will preclude any further strategic nuclear force reductions for the time being. In fact, there is the distinct prospect that the INF Treaty, a signature achievement of the late–Cold War era, is at risk, with evidence that Moscow may decide to abrogate the treaty to deploy large numbers of ground-launched conventionally armed ballistic and cruise missiles. There is also the unresolved quantitative and qualitative asymmetry between the size of the residual NSNF of the United States and Russia, with the latter still possessing a larger and more diverse nuclear arsenal. Finally, there is the emergence of much more assertive rhetoric by the Russian political and military leadership about the possible role that the NSNF forces may play during any future military confrontation in Europe with NATO.

Until recently, the nuclear forces of China have evolved in a relatively slow fashion, both in quantity and quality. Over the last five years, Beijing appears to have stepped up investments in its nuclear forces and has developed both ground mobile and submarine-based solid propellant ICBM-class weapons. Evidence suggests that China may soon deploy MIRV warheads on these trans-oceanic range weapons, thereby rapidly increasing the number of operational nuclear weapons that can menace the United States. The United States has not engaged in any formal nuclear arms negotiations with Beijing. Although Beijing continues to declare a no-first-use policy, the prospect of more modern and diversified nuclear arsenal has to be a source of some concern to Washington and its key East Asian allies.

Although the P5+1 was able to negotiate a nuclear rollback and freeze agreement with Iran, the cause for global nuclear non-proliferation has not been helped by the continued modernization of the nuclear arsenals of the acknowledged nuclear states India and Pakistan. Of greatest immediate concern is the continued modernization and likely major expansion of the North Korean nuclear arsenal and its force of medium- and long-range missiles. At the present time, the Six Party Talks to denuclearize the Korean peninsula remain stalled, and the North Korean leadership appears fully committed to the expansion of its nuclear arsenal.

In light of these realities and the pending obsolescence of key portions of its nuclear forces, the United States will have little choice but to continue to modernize at least portions of its strategic nuclear forces (SNF), as well its inventory of air-delivered nuclear bombs, which constitute the totality of its NSNF arsenal. In the latter case, a portion of that arsenal is permanently deployed in NATO Europe.

Roles of U.S. Nuclear Weapons

The primary role of the U.S. nuclear arsenal is to deter a nuclear attack on the United States, its forces, or its allies by a nuclear-armed state. That purpose still has a clear application in the context of dealing with the nuclear arsenals of the Russian Federation and the PRC. Russia's military aggression in Europe, and NATO's response to it, underscores in particular the rationale that the deterrent power of the Triad should be supplemented with a forward-deployed NSNF posture, primarily to deter a decision by a Russian leader to use its NSNF in a limited fashion. Certainly the size of a future Triad and the U.S. NSNF posture in Europe will likely be defined by the future of U.S.–NATO–Russia relations.

Currently, the demands of deterring nuclear use by China are a lesser-included case of those called for by deterring Russia. That may change if the Chinese embark upon an ambitious effort to modernize and expand their nuclear forces. Another big change in the Chinese nuclear posture would flow from a decision by the Chinese political and military leadership to deploy a robust set of nonstrategic nuclear forces. Although the Beijing leadership has not signaled an intention to move in these directions, China's ongoing nuclear forces modernization program will provide that leadership with greater options by the early 2020s.

Within the next five years, the United States may face a severe nuclear deterrence and defense challenge from North Korea. Unlike the nuclear balance between the United States and its two near-peer competitors, Russia and China, U.S., and allied leaders will be loath to accept a relationship of mutual assured retaliation with Pyongyang. As discussed in Chapter Four, in the event of a future war between North and South Korea, there is the very distinct prospect that the former might use nuclear weapons for either coercive or military effect. In those circumstances, the non-nuclear active defense and counterforce capabilities of South Korea, the United States, and Japan would be put under enormous operational strain. Following a limited use of nuclear weapons by North Korea, the option will be on the table for the United States to employ accurate low-yield nuclear weapons as part of a comprehensive non-nuclear campaign to neutralize the North Korean nuclear arsenal and its means of delivery. Obviously, the limited use of nuclear weapons by the United States even in response to first use by North Korea is fraught with profound strategic and historic consequences. With the North Korean nuclear arsenal growing in sophistication and quantity, this option will have to be given due consideration.

A similar set of emerging nuclear challenges appears to have been postponed for at least fifteen years as a consequence of the negotiated nuclear infrastructure rollback agreement between the P5+1 powers and Iran.

As for the two-sided nuclear competition in South Asia between Pakistan and India, there is little role for the U.S. nuclear arsenal in this regard. Both India and Pakistan may choose to modernize and expand their respective nuclear arsenals. India's modernization will likely be prompted as much by the modernization of the Chinese nuclear forces as by those of Pakistan. This is not to say that the evolution of these South Asian nuclear arsenals is irrelevant to U.S. defense planning, especially if U.S. and Indian security ties thicken as a geo-strategic counter to China. On the other hand, Washington's strategic leverage on either nuclear-armed state is very limited.

U.S. Nuclear Forces Modernization Program

The Ohio-class SSBNs and the silo-based Minuteman ICBMs, which constitute two of the three "legs" of the U.S. strategic triad, will be approaching the end of their service lives by the late 2020s. Furthermore, there is the issue of whether the nuclear-capable portion of the strategic bomber force should be re-equipped with a new nuclear-capable long-range cruise missile—the long-range standoff missile (LRSO)—to replace the current AGM-86 air-launched cruise missile.

A new bomber, the B-21, is under development with plans to begin its deployment during the mid- to late-2020s. The primary motive behind the development of B-21 is the need to respond to the emerging A2/AD threats in East Asia and Europe. When operational, the B-21 should provide the capability to delivery fairly large numbers of precision-guided conventional weapons from long range and against targets defended by advanced air defenses. Giving this platform the capability to deliver nuclear weapons as well will add only marginally to its cost and will help ensure that U.S. forces have a wide range of options for responding to future nuclear challenges. The USAF is planning to field between 80 and 100 B-21 aircraft by the mid-2030s, with the ultimate size of that bomber fleet being determined by the retirement rate of the other three strategic bombers—the B-52, B-1B, and B-2.

Within the New START limits, the current plan is to replace the 12 remaining Ohio-class SSBNs, each armed with 24 Trident missile tubes, and the 400 Minuteman ICBMs based in their current fortified silos. Table B.1 provides a summary of the key provisions of the New START.

As the most survivable element of the triad, SLBMs have long been regarded as the foundation of the United States' assured retaliation capability. As such, there is little question that fielding a modern SSBN force will have a high priority in the U.S. defense program. The Ohio Replacement Program is the biggest ticket item of the special purpose nuclear forces modernization program, while the successor to the Minuteman ICBM—the Ground Based Strategic Deterrent (GBSD)—and the replacement of the AGM-86 with the long-range standoff weapon (LRSO) are much less expensive components. Table B.2 provides estimates of the cost of these replacement programs through FY 2023.

Although big in absolute terms, the relative cost of the U.S. nuclear arsenal and related infrastructure programs as a percentage of defense spending has declined dramatically since the major modernization programs of the 1980s. Figure B.1 summarizes spending levels as a

Table B.1
Aggregate Limits by 2018 on U.S. and Russian Federation Strategic Nuclear Forces

-
- 1,550 warheads: Warheads on deployed ICBMs and deployed SLBMs count toward this limit and each deployed heavy bomber equipped for nuclear armaments counts as one warhead toward this limit.
 - This limit is 74 percent lower than the limit of the 1991 START Treaty and 30 percent lower than the deployed strategic warhead limit of the 2002 Moscow Treaty.
 - A combined limit of 800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments.
 - A separate limit of 700 deployed ICBMs, deployed SLBMs, and deployed heavy bombers equipped for nuclear armaments.
 - This limit is less than half the corresponding strategic nuclear delivery vehicle limit of the START Treaty.
-

SOURCE: The White House, Office of the Press Secretary, "Remarks by the President on the Announcement of the New START Treaty," March 26, 2010.

percentage of the total defense budget for U.S. nuclear forces since 1962. In relative terms, it will nearly double during the 2020s, prompted by a future administration's decision to fully fund the current modernization program.

Another important component of this nuclear arsenal modernization program is the refurbishment of the inventory of B-61 nuclear bombs that can be carried by the strategic bombers and a select class of USAF fighter-bombers. Following a decision in the 2010 nuclear posture review, the United States, in consultation with its NATO allies, decided to maintain a forward deployed NSNF posture in Europe. This involved the forward deployment of some 200 B-61s at NATO airfields in five countries.¹ A decision has been made to modernize this nuclear bomb inventory with the B61-12 variant, which will have JDAM-like precision guidance.² The cost of this modernization program is estimated at \$8 billion over the course of the next decade.³ As discussed in Chapter Three, the salience of this forward deployed nuclear arsenal has increased after the Russian decision to seize the Crimea and destabilize southeastern Ukraine.

Few would argue that the United States and its allies, at least, would be safer and more secure in a world without nuclear weapons. Regrettably, there seems to be no prospect of that world emerging in the foreseeable future. With the recent deterioration in relations between Russia and the West, North Korea's acquisition of nuclear weapons, and other developments, the maintenance of an invulnerable large-scale assured retaliation capacity to deter any nuclear attack against the United States and its treaty allies will remain an essential part of the foundation of U.S. national security. The unpredictability of the North Korean leadership and its

¹ The bombs are stored in hardened vaults next to the aircraft, which are based in hardened aircraft shelters. Another 600 of these weapons are stored in the United States. See Emmanuelle Maitre, "NATO, the F35 and European Nuclear Dilemmas," Note No. 08/2016, Foundation pour la Recherche Stratégique, February 22, 2016; Justin Bronk, "The Forced Evolution of Europe's Tactical Nuclear Capability," *RUSI Defence Systems*, February 1, 2016; Robert S. Norris and Hans M. Kristensen, "U.S. Tactical Nuclear Weapons in Europe, 2011," *Bulletin of the Atomic Scientists*, January–February 2011.

² For a description of this modernization option and current status of the U.S. nuclear bomb posture, see Hans M. Kristensen, "B61-12: The New Guided Standoff Nuclear Bomb," Federation of American Scientists, 2015. The precision guided B61-12 will provide NATO with the option of conducting strikes with a weapon with an accuracy estimated to be about 30 meters circular error probable and a yield of 10 kilotons.

³ For a critique of the B61 nuclear bomb life extension program, see Barry Blechman and Laice Heeley, "B61 Life Extension Program: Costs and Policy Considerations," *Stimson Center*, August 2016.

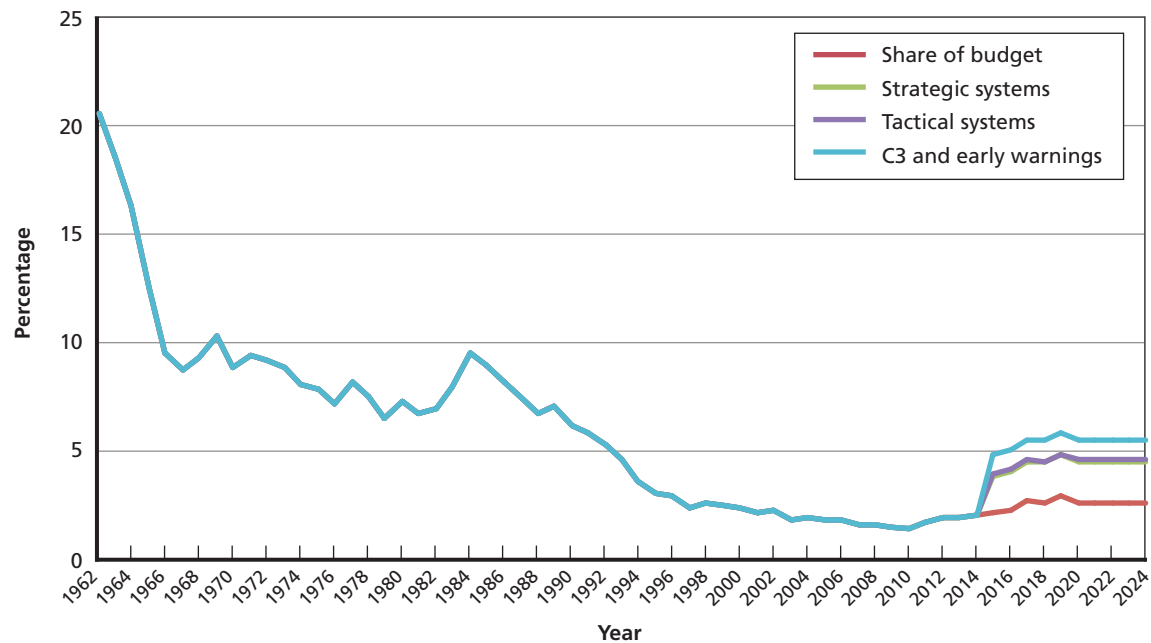
Table B.2
Cost Estimate for the Nuclear Arsenal Modernization from FY 2013 to FY 2023 (Billions in \$)

Type of Expenditure	SSBNs	ICBMs	Bombers	Other	Total
DoD Procurement	\$33	\$2	\$5	—	\$40
DoD RDT&E	\$14	\$7	\$12	\$3	\$36
DoE Weapons Activities	\$6	\$4	\$10	—	\$20
DoE Naval Reactors	\$4	—	—	—	\$4
Total	\$57	\$13	\$27	\$3	\$100

SOURCE: Congressional Budget Office, "Projected Costs of U.S. Nuclear Forces, 2014 to 2023," Washington, D.C.: U.S. Government Printing Office, Publication No. 4618, December 20, 2013.

NOTE: For SSBNs and ICBMs, the table reflects all of the costs expended on the programs during the period. Considerable additional costs will be incurred in the years beyond 2023. In estimating the costs associated with the bomber leg, all of the costs of nuclear weapons or systems, such as the LRSO, are included. However, for the bomber aircraft, a special rule is applied: "[Congressional Budget Office] included in its cost estimates 25 percent of the total anticipated budgets for the B-52 and the LRS-B because that is the fraction of B-52H aircraft that concentrate on the nuclear mission at a given time, in [Congressional Budget Office's] estimation; in contrast, [Congressional Budget Office] included 100 percent of the cost of the B-2 and the LRSO"; see Congressional Budget Office, 2013, p. 15.

Figure B.1
Sixty-Two-Year Cost History of U.S. Nuclear Strategic Forces



SOURCE: Congressional Budget Office, "Projected Cost of U.S. Nuclear Forces, 2015 to 2024," Washington, D.C.: U.S. Government Printing Office, January 22, 2015a.

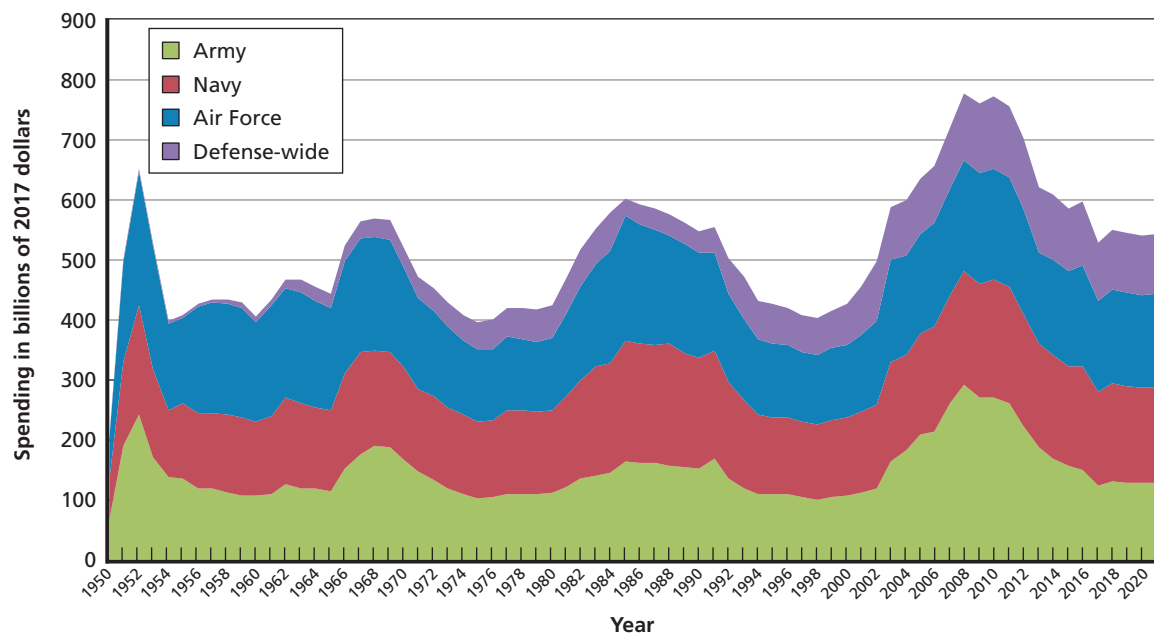
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vulnerability to conventional attack in the event of war further mean that the United States should be prepared to use a portion of its NSNF arsenal to supplement any non-nuclear counterforce campaign against North Korea's nuclear arsenal during a future conflict in Northeast Asia. There will be an ongoing debate whether the GBSD and the LSRO cruise missile should be developed and deployed. This report remains agnostic on this question, but notes that a decision to forego either option is not compelling as a means of providing budget resources for the larger non-nuclear forces investment portfolio.

Estimating the Costs of Alternative Future Forces: Assumptions and Approach

Over the past 65 years, the DoD budget has had four spikes in spending (coinciding with the Korean War, the Vietnam War, the Reagan buildup during the Cold War, and the wars in Iraq and Afghanistan). The prior spikes were followed by a return to a baseline budget of approximately \$400 billion in 2016 dollars. As can be seen in Figure C.1, the current projections place the defense budget approximately 30 percent higher than this historic baseline and are closer to the amounts spent on defense during previous peaks than to peacetime troughs. In light of the demands being placed on U.S. forces by the factors outlined in Chapters Two through Five, this appendix traces recent trends in U.S. force structure and addresses the budgetary implications of DoD moving toward adopting the forces and capabilities that we outline in this report as being appropriate for our One Major War, One Major and One Regional War, and Two Major Wars planning criteria.

Figure C.1
DoD Budget, FY 1950 to 2017 with Projections to 2020



NOTE: DoD budget in 2015\$ FY 1950 to 2017 with projections to 2020.

RAND RR1782-C.1

The cost estimates described in this appendix are generally derived from the DoD's Defense Budget Materials for FY 2017.¹ Dollar values are in FY 2017 dollars unless otherwise specified.

USAF

The USAF has lost more than 40 percent of its combat aircraft force structure since the end of the Cold War.² This reduction has come from deep cuts across types, with the notable exception of Special Operations (which grew by 25 percent). In the resulting force structure, airlift and fighters are the only force elements that could offer significant additional cuts without risking the divestment of an entire capability. Likewise, given the lead times associated with developing new, major aircraft designs and the availability of active production lines, the only candidates for major near-term increases in force structure are the USAF's UAV and fighter aircraft forces.

Changes in the USAF's plans for fighter aircraft procurement should focus on fourth-generation aircraft, rather than the F-35. Cuts to F-35 acquisition may push the rate below the minimum economically efficient production rate, endangering an important capability for the future. On the other hand, given the ongoing problems with concurrent development of leading-edge subsystems in the F-35 program, it would also seem inadvisable to attempt a significantly higher acquisition rate.

The USAF has a significant role in each of the scenarios examined in this report, though the China and Russia scenarios are the drivers for force structure. For the One Major War force planning construct, the USAF could reduce its fighters by up to three squadrons. There would be a need for 13 additional fighter squadrons above currently programmed levels under the One and a Half Wars force planning construct, and 18 more under the Two Major Wars criterion. To transition to these alternative force mixes, squadrons of new aircraft would need to be purchased or divested. We did not assess the costs for divestment. The costs for purchases were taken to be the costs associated from the most recent F-15E acquisitions inflated to today's dollars (see Table C.1). To estimate the recurring cost changes resulting from changes in the number of fighter squadrons, we used F-16 total fleet cost estimates from a 2013 RAND report to estimate the military personnel and O&M costs associated with fighter squadrons.³ While this estimate is sufficient for a rough order of magnitude, these numbers are likely conservative because regardless of whether aircraft are purchased or divested, the average O&M costs would decline with the decline somewhat in the average age of the fleet.

While the more resource-intensive scenarios require an increase in the number of heavy bomber squadrons, no option exists for increasing the size of the bomber force until the B-21 reaches initial operational capability in the late 2020s. As such, we did not include cost changes associated with a change in the size of the bomber force, assuming that bombers in the existing fleet would have to plan to do double duty should they be called upon to participate in large-scale, overlapping conflicts.

¹ Office of the Under Secretary Of Defense Comptroller, "Defense Budget Materials—FY2017," Washington, D.C.: U.S. Department of Defense, undated.

² Air Force Historical Research Agency, "USAF Wing Force Structure," undated.

³ Albert A. Robbert, *Costs of Flying Units in Air Force Active and Reserve Components*, Santa Monica, Calif.: RAND Corporation, TR-1275-AF, 2013.

Table C.1
Force Mix for USAF With Different Scenarios

	QDR	One Major War	One and a Half Wars	Two Major Wars
Fighter squadrons	51	48	64	69
Heavy bomber squadrons ^a	9	9	14*	16*
Transition costs	—	—	\$11.7 billion	\$16.1 billion
Recurring costs	—	(\$0.5 billion)**	\$2.3 billion	\$3.1 billion

NOTE: QDR = Quadrennial Defense Review.

* Target number of squadrons, but because there is no feasible way to meet this target, the costs were estimated assuming no change.

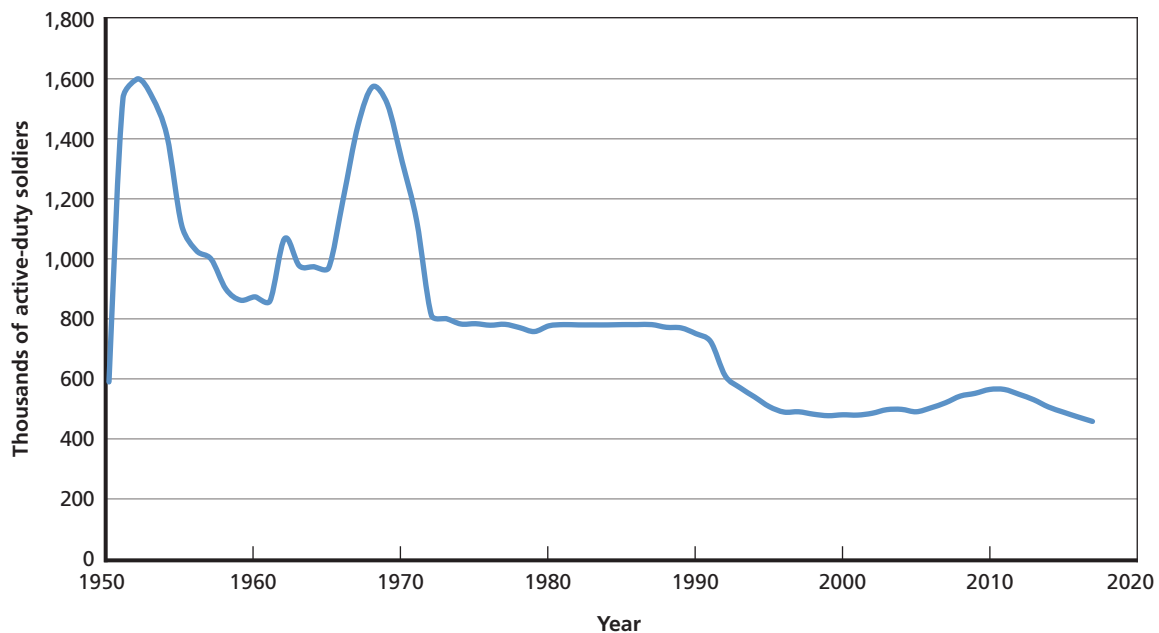
** Figures in parentheses indicate “negative costs” (i.e., savings).

^a While the force structure recommendations suggest additional heavy bombers, the industrial base is not prepared to meet this demand.

Army

While USAF is a capital-intensive service, the Army is a manpower-intensive one. This means that the force size is a useful measure of the Army’s capacity. As can be seen in Figure C.2, there was a nearly 40-percent drop in force size at the end of the Cold War. Unlike during the Vietnam War when the force size doubled, the operations in Iraq and Afghanistan saw only a modest increase in the force size. This relatively small increase has been reversed in recent years, and the size of the Army may continue to decrease under the current budget trends. In a 2011 report, RAND researchers examined historic budget trends and found that the force

Figure C.2
Number of Soldiers in U.S. Army



levels could fall to 360,000 to 400,000 soldiers by the end of the decade, if previous approaches to apportioning budget cuts were repeated.⁴

The Russia scenario imposes the most stressing qualitative demands on the Army, while the North Korea scenario imposes the highest quantitative demand (see Table C.2). In the One Major War case, the active Army could accommodate a decline of three BCTs. A One and Half Wars force would return the Army to its currently programmed number of BCTs (30), and a Two Major Wars force would require one additional BCT. To estimate the costs associated with these alternative force sizes, we scaled the relevant O&M, relevant procurement, and military personnel spending, according to the change in the size of the force.

USN

The USN is more capital intensive than even the USAF and its major platforms (ships) are designed with operational lives measured in decades. This means that changes in the acquisition rate, either increases or decreases, will take a long time to manifest in either operational capabilities or capacities. The USN of today operates roughly half as many ships as it did in 1991, though it has seen only a 40-percent reduction in the number of surface warships.⁵ Auxiliary ships and ballistic missile submarines have been disproportionately retired (each of these has been cut by about 60 percent from their 1991 numbers). Unlike the Army's force size and manpower, which has experienced considerable volatility, the decline in the USN's fleet size has been gradual and less subject to cyclical patterns. Figure C.3 shows this decline in the Navy's fleet size from 1950 to the present. As with the USAF, the USN has tended to maintain quality over quantity in its post-Cold War force structure.

The ability to maintain naval presence is a primary factor in setting a floor for the fleet size, though the need to provide a surge capacity for the China and Iran scenarios also drives requirements. For the changes to the number of aircraft carriers (CVN) and the fleet size, we scaled the military personnel and relevant O&M costs (see Table C.3). For the procurement of the fleet, we used a cost assessment from a 2015 CBO study.⁶ For the procurement of CVN, we scaled the CVN procurement by the number of CVN in the plan. While for the purpose of a rough order of magnitude estimate, in reality, the way in which the Navy changes the number

Table C.2
Force Mix for the U.S. Army Under Different Scenarios

	QDR	One Major War	One and a Half Wars	Two Major Wars
BCTs	30	27	30	31
Recurring costs		(\$5.9 billion)	—	\$2 billion

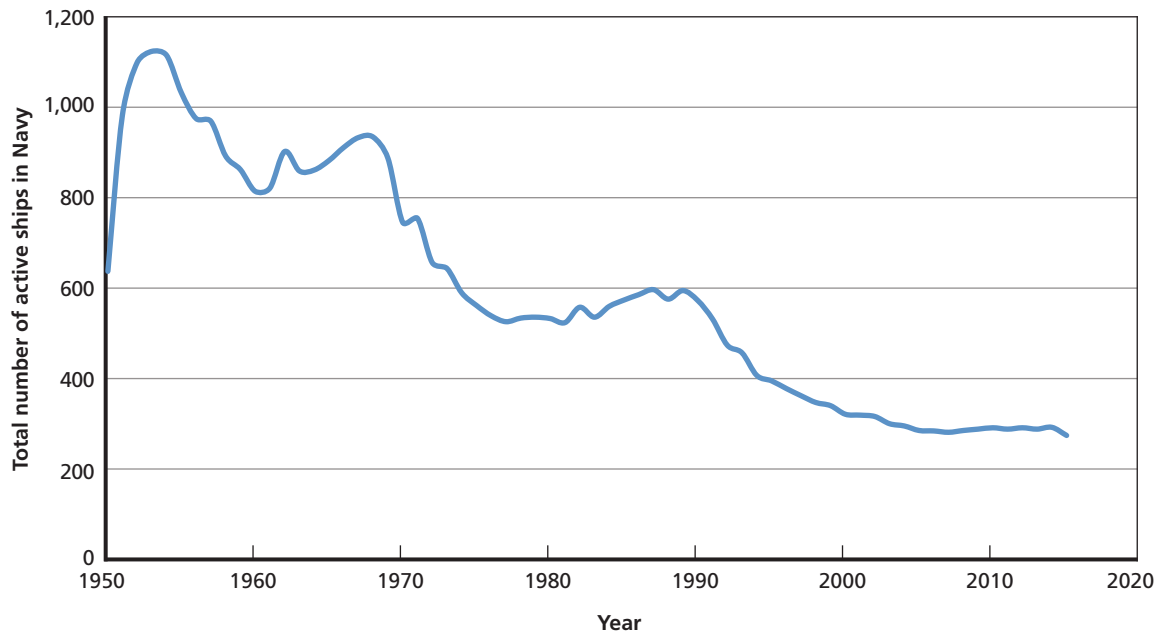
NOTE: QDR = Quadrennial Defense Review.

⁴ Carter C. Price, Aaron L. Martin, Edward Wu, and Chris G. Pernin, *Where Might the U.S. Army Budget Go, and How Might It Get There?*, Santa Monica, Calif.: RAND Corporation, OP-331-A, 2011.

⁵ Naval History and Heritage Command, "U.S. Ship Force Levels, 1886–Present," undated, updated as of December 6, 2016.

⁶ Congressional Budget Office, "Preserving the Navy's Forward Presence with a Smaller Fleet," Washington, D.C.: U.S. Government Printing Office, March 2015b.

Figure C.3
USN Fleet Size, 1950 to 2015



RAND RR1782-C.3

Table C.3
Force Mix for the USN under Different Scenarios

	QDR	One Major War	One and a Half Wars	Two Major Wars
Aircraft carriers	11	7	10	11
Carrier air wings	10	6	9	10
Amphibious ships	33	33	45*	48*
Recurring costs	—	(\$7.7 billion)	(\$0.1 billion)	\$5.4 billion

NOTE: QDR = Quadrennial Defense Review.

* Target number of ships, but because of their expense and the ability to swing ships between theaters, costs were estimated assuming no change to the programmed force.

of CVN (e.g., retire carriers early or pause new construction) has significant cost implications.⁷ To estimate the costs associated with the change in the number of carrier air wings, we scaled the relevant O&M and military personnel costs by the change in the number of air wings. For the purposes of these estimates, we ignored the cost for divestment.

The USN's Budget Material notes that O&M has been underfunded historically in both the Navy's base budget and with OCO funding. To improve the USN's readiness for each

⁷ John F. Schank, James G. Kallimani, Jess Chandler, Mark V. Arena, Carter C. Price and Clifford A. Grammich, *Changing Aircraft Carrier Procurement Schedules: Effects That a Five-Year Procurement Cycle Would Have on Cost, Availability, and Shipyard Manpower and Workload*, Santa Monica, Calif.: RAND Corporation, MG-1073-NAVY, 2011.

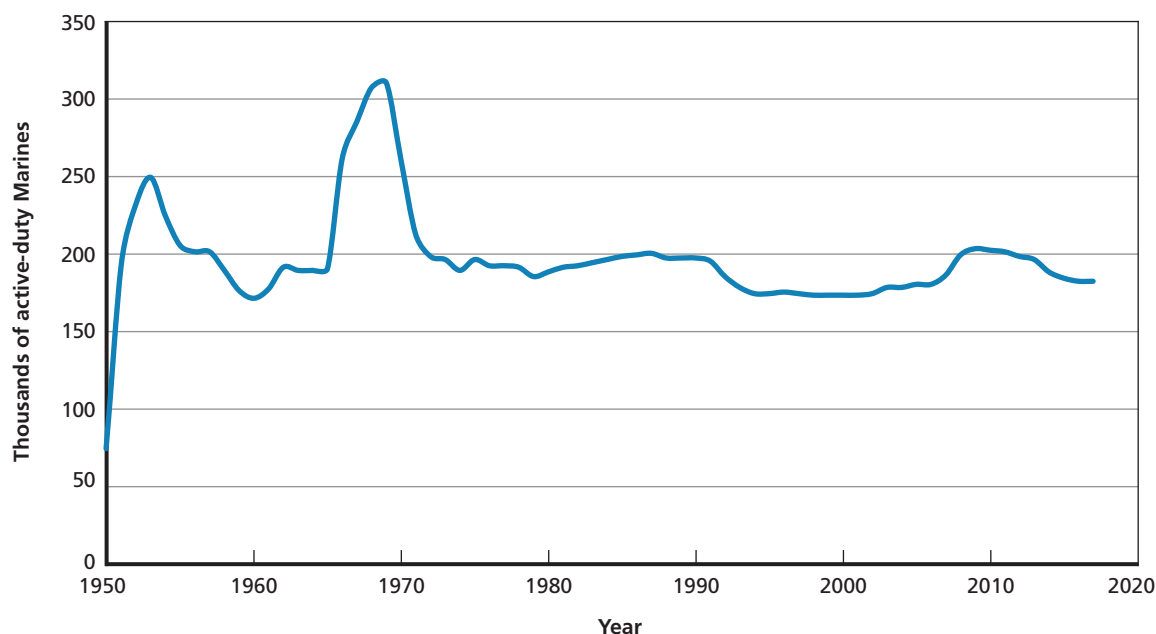
force mix, we increased O&M spending to meet the requirements specified in Volume 2 of the USN's Operations and Maintenance Data Book scaled by the change in the fleet size.⁸

Marines

The Marines are more capital intensive than the Army because of their aircraft and amphibious vessels, but not as capital intensive as USAF or USN because of the size of the ground forces. As can be seen in Figure C.4, the USMC's end strength is roughly 9 percent below the peak personnel levels during the recent wars in Iraq and Afghanistan but nearly 7 percent above the level that prevailed during most of the 1990s.

In the One Major War case, the Marines could accommodate a reduction of three infantry battalions and four fighter squadrons (see Table C.4). For the One and a Half Wars mix, Marine infantry battalions return to the programmed level, while fighter squadrons rise to 20, or two less than currently programmed. The Two Major Wars case has three additional infantry battalions and one fighter squadron above programmed levels. To estimate the infantry battalion cost changes, we used the same approach as with the Army: scale the military personnel, relevant O&M, and relevant procurement by the change in the force size. The approach to estimating the fighter squadron cost changes was similar to that of the USN. We scaled the relevant O&M and military personnel costs by the change in the number of fighter squadrons.

Figure C.4
USMC Active-Duty End Strength



RAND RR1782-C.4

⁸ Operation and Maintenance, Navy, "Department of the Navy FY 2017 Budget Estimates: Justification of Estimates February 2016, Vol. 2 Data Book," Washington, D.C.: U.S. Department of the Navy, February 2016.

Table C.4
Force Mix for USMC under Different Scenarios

	QDR	One Major War	One and a Half Wars	2 Major Wars
Infantry battalions	24	21	24	27
Fighter squadrons	22	18	20	23
Recurring costs	—	(\$1.2 billion)	(\$0.1 billion)	\$0.6 billion

NOTE: QDR = Quadrennial Defense Review.

DoD

Defense-wide spending has grown substantially overtime as certain functions have moved from the services to the DoD as a whole. These activities include substantial administrative and management activities, joint operations, Special Operations Command, some health care and benefits costs, and a host of other spending items. Spending on these activities paused during the 1990s, but grew with the recent wars (see Figure C.5). After a peak in 2010, the spending has declined by roughly 20 percent in recent years.

In addition to the branch-specific changes, the proposed force mix changes had implications for DoD activities. These adjustments are described throughout the report and include changes in the SOF, increases in the stocks of munitions, more investment in ISR, differences in health spending according to the changes in the force size, basing costs associated with a different geographic distribution of the force, and other associated changes. Not all of these activities are technically part of the DoD-wide activities, but for our purposes we group them as such for ease of calculation and presentation. For each of these changes, we scaled the costs based on the proposed force mix alternative (see Table C.5).

Figure C.5
DoD Spending

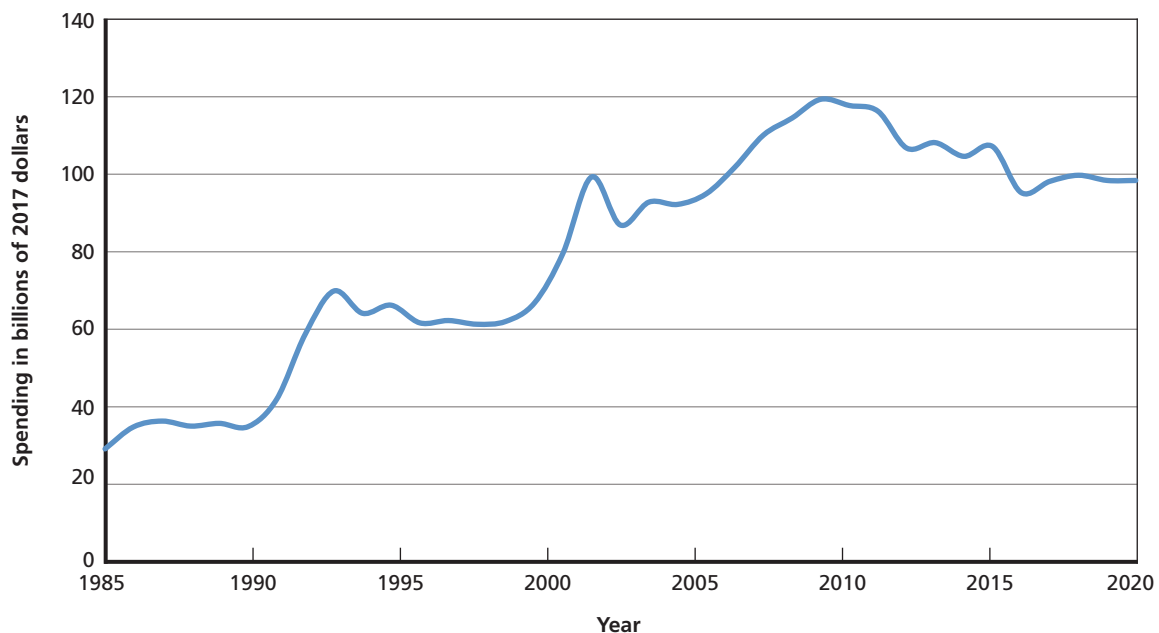


Table C.5
Recurring Costs for Defense-Wide Activities

	QDR	One Major War	One and a Half Wars	Two Major Wars
Recurring costs	—	\$7.8 billion	\$17.4 billion	\$37.1 billion

NOTES: QDR = Quadrennial Defense Review.

Conclusion

The three force-mix alternatives result in substantive differences from today's force mix. The cost associated with the different mixes result in different topline expenditures for DoD (see Table C.6).

Table C.6
Summary of Costs Changes Associated with Each Force Mix

	One Major War	One and a Half Wars	2 Major Wars
USAF	(\$0.5 billion)	\$2.3 billion	\$3.1 billion
Army	(\$7.8 billion)	—	\$2.0 billion
USN	(\$7.7 billion)	(\$0.1billion)	\$5.4 billion
USMC	(\$1.2 billion)	\$0.1 billion	\$0.6 billion
Defense-wide	\$7.8 billion	\$17.4 billion	\$25.9 billion
Total	(\$8.5 billion)	\$19.3 billion	\$37.1 billion

Sizing Force Elements for Alternative Force Planning Constructs

In order to estimate the size of selected elements of the joint force appropriate for each of our three force planning constructs, we first set the “base” for each force element by specifying the level of operations they will be expected to sustain as part of the global counterterrorism effort and whatever presence they are expected to provide beyond this in key regions. We then apply the demand signal for that force element that arises from the largest three of the remaining conflict scenarios. Generally, we assume that units are not deployed out of a region where they are providing presence in order to generate forces for a conflict outside of that region. By the same token, we avoid double counting by taking account of forces that may already be in the region of each conflict due to forward presence. So, for example, the four USAF fighter squadrons stationed in the Republic of South Korea are not added to the total demand for USAF fighters in a Korean conflict.

We assume that forces engaged in counterterrorism operations will require a rotation base of one unit for every one forward deployed. In time of major war, it is assumed that rotations cease and units engaged will remain engaged until the conclusion of the major war(s) and reconstitution of forces. Therefore, base demand equals forces stationed or deployed abroad for routine presence, plus forces conducting counterterrorism operations overseas, plus the counterterrorism rotation base. So, demand for a force element under the One Major War force planning construct will equal base demand plus the largest war demand minus the presence in the region of that war. The following is a summary of the results of this approach for the nine major force elements that we sized.

USAF

Fighter Squadrons

- counterterrorism: 5 (1 in Afghanistan; 2 in Iraq or GCC countries; 2 in Turkey)
- presence: 15 (5 in EUCOM, 4 in Japan, 4 in South Korea, 2 in GCC to deter Iran)
- base demand: $5 + 5 + 15 = 25$
- major conflict 1: 28 (Russia)
- major conflict 2: 25 (China)
- regional conflict: 24 (Korea)
- One Major War: $25 + 28 - 5 = 48$ squadrons
- One and a Half Wars: $25 + 28 - 5 + 24 - 8 = 64$ squadrons
- Two Major Wars: $25 + 28 - 5 + 25 - 4 = 69$ squadrons

Heavy Bomber Squadrons

- counterterrorism: 1 (GCC)
- presence: 1 (Guam)
- base demand: $1 + 1 + 1 = 3$
- major conflict 1: 7 (China)
- major conflict 2: 7 (Russia)
- regional conflict: 5 (Iran)
- One Major War: $3 + 7 - 1 = 9$ squadrons
- One and a Half Wars: $3 + 7 - 1 + 5 = 14$ squadrons
- Two Major Wars: $3 + 7 - 1 + 7 = 16$ squadrons

ISR Orbits (High-End)

- presence: 4
- major conflict 1: 10 (China)
- major conflict 2: 5 (Russia)
- regional conflict: 4 (SCS)
- One Major War: $4 + 5 - 1 = 8$ orbits
- One and a Half Wars: $4 + 5 - 1 + 4 = 12$ orbits
- Two Major Wars: $4 + 5 - 1 + 5 - 1 = 12$ orbits

USN

Surface Combatants. The information and analysis available to us on warfighting needs was not sufficient to support judgments on the number of surface combatants appropriate for our three force planning constructs.

Aircraft Carriers and Carrier Air Wings

- counterterrorism: 0
- presence: 2.0 globally
- major conflict 1: 5 (China)
- major conflict 2: 5 (Korea)
- regional conflict: 4 (Iran)
- One Major War: $2 + 5 - 1 = 6$
- One and a Half Wars: $2 + 5 - 1 + 4 - 1 = 9$
- Two Major Wars: $2 + 5 - 1 + 5 - 1 = 10$
- plus one carrier in major overhaul/refueling: 7/10/11

Amphibious Ships

- counterterrorism: 0 (subsumed within global presence)
- presence: 9 (3 ARG/MEUs with 3 amphibious ships each; 2 in PACOM AOR, 1 generally in CENTCOM or AFRICOM)
- major conflict 1: 30 (Korea)
- major conflict 2: 18 (Iran)

- regional conflict: 15 (China)
- One Major War: $9 + 30 - 6 = 33$
- One and a Half Wars: $9 + 30 - 6 + 15 - 3 = 45$
- Two Major Wars: $9 + 30 - 6 + 18 - 3 = 48$

Marine Infantry Battalions

- counterterrorism: 3 (Afghanistan)
- presence: 3 (3 MEU/SOCs; 2 in PACOM AOR, 1 generally in USCENTCOM or USAF-RICOM)
- base demand: $3 + 3 + 3 = 9$
- major conflict 1: 18 (Korea)
- major conflict 2: 6 (Iran)
- regional conflict: 6 (Russia)
- One Major War: $9 + 18 - 6 = 21$ battalions
- One and a Half Wars: $9 + 18 - 6 + 6 - 3 = 24$ battalions
- Two Major Wars: $9 + 18 - 6 + 6 = 27$ battalions

Marine Fighter Squadrons

- counterterrorism: 1 (Afghanistan)
- presence: 3 (3 MEU/SOCs; 2 in PACOM AOR, 1 generally in USCENTCOM or USAF-RICOM)
- base demand: $1 + 1 + 3 = 5$
- major conflict 1: 15 (Korea)
- major conflict 2: 8 (China)
- regional conflict: 6 (Iran)
- One Major War: $5 + 15 - 2 = 18$ squadrons
- One and a Half Wars: $5 + 12 - 2 + 6 - 1 = 20$ squadrons
- Two Major Wars: $5 + 12 - 2 + 8 = 23$ squadrons

Army

BCTs

- counterterrorism: 3 (Afghanistan, Iraq)
- presence: 6 (5 EUCOM, 1 PACOM)
- base demand: $3 + 3 + 6 = 12$ BCTs
- major conflict 1: 16 (Korea)
- major conflict 2: 9 (Russia)
- regional conflict: 3 (Iran)
- One Major War: $12 + 16 - 1 = 27$ BCTs
- One and a Half Wars: $12 + 16 - 1 + 3 = 30$ BCTs
- Two Major Wars: $12 + 16 - 1 + 9 - 5 = 31$ BCTs
- NB: The largest potential demand for Army BCTs could arise from a protracted post-conflict or post-collapse stability or counterproliferation operation in Korea. Ten or more BCTs might be called upon to conduct such an operation over a period of several years.

Two to three times this many units would be needed to provide for 12-month rotations. Units from the Army National Guard could provide many of these.

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This report evaluates the capabilities of current and programmed U.S. forces to meet the demands of conflicts that could arise involving any of five potential adversaries: China, Russia, North Korea, Iran, and Salafist-jihadi groups worldwide. The report finds that U.S. forces today are larger than necessary to fight a single major war, are failing to keep pace with the modernizing forces of great power adversaries, are poorly postured to meet key challenges in Europe and East Asia, and are insufficiently trained and ready to get the most operational utility from many of its active component units. The report recommends a host of enhancements to the capabilities and posture of U.S. forces and offers three alternative force planning constructs to help ensure that defense resources are, in the future, applied to the highest-priority needs.



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