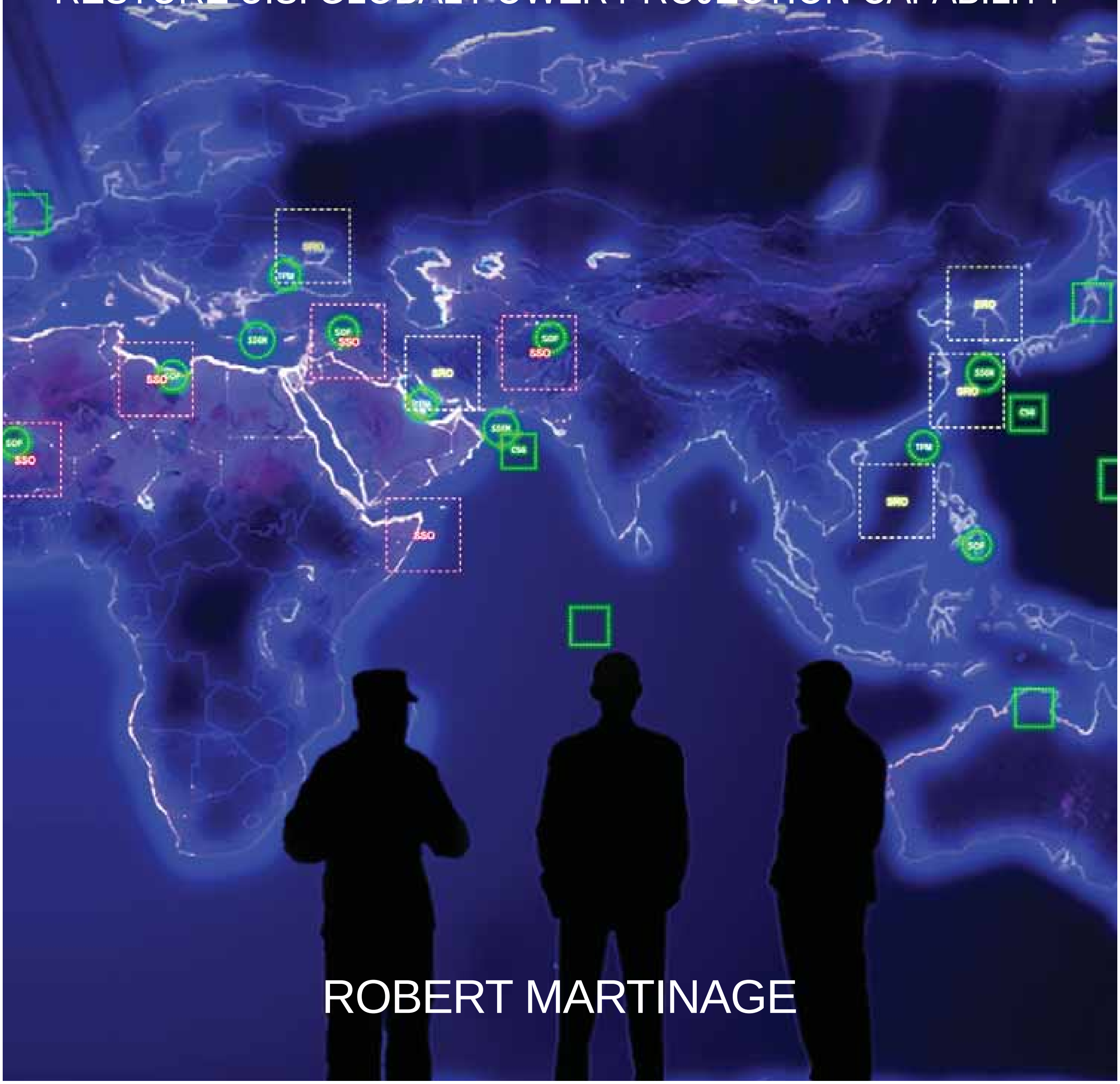
CSBA

Center for Strategic and Budgetary Assessments

TOWARD A NEW OFFSET STRATEGY

EXPLOITING U.S. LONG-TERM ADVANTAGES TO RESTORE U.S. GLOBAL POWER PROJECTION CAPABILITY



ROBERT MARTINAGE

TOWARD A NEW OFFSET STRATEGY

EXPLOITING U.S. LONG-TERM ADVANTAGES TO RESTORE U.S. GLOBAL POWER PROJECTION CAPABILITY

ROBERT MARTINAGE

CSBA
Center for Strategic and Budgetary Assessments

2014

ABOUT THE CENTER FOR STRATEGIC AND BUDGETARY ASSESSMENTS (CSBA)

The Center for Strategic and Budgetary Assessments (CSBA) is an independent, nonpartisan policy research institute established to promote innovative thinking and debate about national security strategy and investment options. CSBA's analysis focuses on key questions related to existing and emerging threats to U.S. national security, and its goal is to enable policymakers to make informed decisions on matters of strategy, security policy, and resource allocation.

ABOUT THE AUTHOR

Robert Martinage recently returned to CSBA after five years of public service in the Department of Defense (DoD). While performing the duties of the Under Secretary of Navy, he led development of the Department of the Navy's FY 2014/2015 budgets and represented the Department during the Strategic Choices and Management Review, as well as within the Defense Management Action Group (DMAG). From 2010–2013, Mr. Martinage served as the Deputy Under Secretary of the Navy, providing senior-level advice on foreign and defense policy, naval capability and readiness, security policy, intelligence oversight, and special programs. Appointed Principal Deputy Assistant Secretary of Defense for Special Operations, Low-Intensity Conflict, and Interdependent Capabilities in the Office of the Secretary of Defense (OSD) in 2009, Mr. Martinage focused on special operations, irregular warfare, counter-terrorism, and security force assistance policy. He also led a two-year, DoD-wide effort to develop an investment path for a future long-range strike "family of systems."

Prior to his government service, Mr. Martinage was employed at CSBA where he was responsible for carrying out a broad research program on defense strategy and planning, military modernization, and future warfare for government, foundation, and corporate clients. He has more than 14 years of experience designing, conducting, and analyzing over 40 wargames and numerous studies focused on conventional operations in high-end threat environments, special operations, irregular warfare, and strategic deterrence and warfare.

Mr. Martinage holds an M.A. from The Fletcher School of Law & Diplomacy with concentrations in International Security Studies, Southwest Asia, International Negotiation & Conflict Resolution, and Civilization & Foreign Affairs. Mr. Martinage earned his B.A. cum laude from Dartmouth College in Government with concentrations in International Relations and Political Theory & Public Law.

ACKNOWLEDGEMENTS

The author would like to thank the CSBA staff for their assistance with this report. Special thanks go to Kamilla Gunzinger and Ryan Boone for production support. The author would also like to thank several internal and external reviewers for their comments and suggestions, especially Andrew Krepinevich, Jim Thomas, Thomas Ehrhard, and Andrew May. The analysis and findings presented here are solely the responsibility of the author.

Contents

Foreword

On September 3, 2014, Secretary of Defense Chuck Hagel delivered a keynote speech on innovation that history may well look back upon as one of the most important of his tenure. While this speech, delivered to the Southeastern New England Defense Industry Alliance in Newport, Rhode Island did not attract extensive media coverage, it kicked off what could be a major course change for the DoD with strategic ramifications.

Secretary Hagel observed that while the United States is grappling with many intensifying national security challenges across the globe, DoD faces a period of fiscal austerity of unknown duration. He cautioned that "disruptive technologies and destructive weapons once solely possessed by only advanced nations" are proliferating widely, including to unsophisticated militaries and terrorist groups. Meanwhile, China and Russia are "pursuing and funding long-term, comprehensive military modernization programs," to include fielding an array of capabilities "designed to counter traditional U.S. military advantages—in particular, our ability to project power to any region across the globe by surging aircraft, ships, troops, and supplies."

To cope with this daunting, multifaceted challenge, Secretary Hagel stressed the need for innovation and announced that he had tasked Deputy Secretary of Defense Robert Work with crafting a new "game-changing offset strategy" akin to President Dwight Eisenhower's "New Look" strategy in the 1950s and Secretary of Defense Harold Brown's "Offset Strategy" in the 1970s. As Deputy Secretary Work explained at the National Defense University (NDU) on August 5, 2014, U.S. military planners during those periods "sought a technological edge over our adversaries, a means by which to 'offset' the enormous quantitative advantage the Warsaw Pact enjoyed in conventional forces." In the 1950s, that edge was a robust nuclear arsenal and associated delivery systems; in the 1970s, it was the application of "advanced digital microelectronics and the explosion in information technology" to a "new generation of smart weapons, sensors, targeting and control networks."

Deputy Secretary Work stressed that "a third offset strategy will require innovative thinking, the development of new operational concepts, new ways of organizing, and long-term strategies." He charged NDU students to think creatively about how the U.S. military might best retain its competitive edge in a "future where new and disruptive technological developments are continuously occurring" and, more specifically, how a numerically smaller U.S. military might best "maintain overmatch against any potential adversary."

The goal of this report is to provide one vision for a third offset strategy that takes advantage of enduring U.S. capability advantages to restore and maintain U.S. global power projection capability. Those advantages include unmanned operations, extended-range and low observable air operations, undersea warfare, and complex system engineering, integration, and operation. This report is not intended to provide a fully elaborated, comprehensive strategy, but rather to offer a springboard for discussion in the Pentagon and the defense community more broadly.

Executive Summary

After more than a decade of sustained, costly military operations in Afghanistan and Iraq, the American people are war-weary and seek justifiable reductions in defense spending as the country attempts to climb out of debt. Facing an uncertain period of fiscal austerity, the U.S. military nevertheless confronts a range of global security challenges. At the same time, traditional sources of U.S. military advantage are being undermined by the maturation and proliferation of disruptive technologies—most notably, anti-access/area denial (A2/AD) capabilities.

Since the end of World War II, the United States has faced similar periods during which it was necessary to address grave international security challenges while concurrently reining in defense spending. Two notable examples were President Dwight D. Eisenhower's "New Look" in the early 1950s and Secretary of Defense Harold Brown's "Offset Strategy" in the mid-1970s. In both instances, the mechanism for affordably "offsetting" the numerical conventional force imbalance relative to the Soviet Union was the same: leveraging U.S. technological advantage. In the 1950s, it took the form of increasingly numerous and varied nuclear weapons, long-range delivery systems, and active and passive defenses. Roughly a quarter-century later, it took the form of the application of information technology to a range of tactical systems and the advent of stealth.

While it is unlikely that a disruptive U.S. technological advantage comparable to that conferred by nuclear weapons in the wake of World War II is in the offing, five important lessons with contemporary applicability can be discerned from the "New Look." First, and importantly, is the need for a "balanced" strategy aligned against the full range of anticipated threats facing the nation. While this lesson may ostensibly seem at odds with the "massive retaliation" moniker often coupled with the "New Look," it should not be forgotten that NSC 162/2 also called for "ready forces of the United States and its allies suitably deployed and adequate to deter or initially to counter aggression." Nuclear weapons provided a cost effective "backstop" for outnumbered conventional forces—not a wholesale replacement for them. Second, a global air warfare capability can provide valuable strategic freedom of maneuver, complicate an adversary's defensive planning, and reduce basing vulnerability. Third, the threat of asymmetric punishment—striking wherever, whenever, and with flexible means rather than retaliation-in-kind in a theater of operations chosen by an adversary—can be an effective instrument of deterrence. Fourth, when used prudently, covert operations can provide an affordable option for achieving U.S. national security objectives. Lastly, alliances matter—not only for burden sharing, but also for complicating an adversary's operational planning and imposing costs upon them.

At least four key lessons can be drawn from the Secretary Brown's "Offset Strategy" with relevance for today. First, technology can multiply the combat effectiveness of a force such that it "offsets" the numerical advantage of a larger, but technically inferior force. Second, rather than competing "tank for tank" or "missile for missile," technology advantages can be used to shape the competition, shifting it into areas where the U.S. military can compete more effectively. Third, it is important to retain sufficient "low-end" capabilities to maintain a forward-deployed, combat-credible presence around the globe aligned to varying threat environments. The final lesson from this period is the importance of strategic continuity and institutional commitment. While DoD initiated several technology development programs in the late 1970s, they never would have been fielded if not for enduring bureaucratic support for them within the Pentagon, in successive White House administrations, and on Capitol Hill.

The U.S. military has enjoyed a near monopoly in the precision-strike revolution ushered in by the second offset strategy for nearly a quarter-century, but it is beginning to slip away. Prospective adversaries are fielding their own reconnaissance-strike networks to challenge the post-Cold War U.S. approach to power projection. More specifically, the U.S. military now faces four core operational problems:

1. Close-in regional bases (e.g., ports, airfields, and ground installations) are increasingly vulnerable to attack in a growing number of countries around the world;

2. Large surface combatants and aircraft carriers at sea are becoming easier to detect, track, and engage at extended range from an adversary's coast;

3. Non-stealthy aircraft are becoming more vulnerable to being shot down by modern integrated air defense systems; and

4. Space is no longer a sanctuary from attack.

These growing operational challenges have problematic strategic ramifications: heightened crisis instability; waning credibility of U.S. deterrence threats and allied confidence in the U.S. military's ability to meet its security commitments; and increasing cost imposition on the United States that will undermine its ability to compete with prospective rivals over time. As Secretary of Defense Hagel recently opined, "If we don't take these challenges seriously, now, our military could arrive in a future combat theater facing an arsenal of advanced, disruptive technologies that thwart our technological advantages, limit our freedom of maneuver, and put American lives at risk."[1]

Trying to counter these emerging threats symmetrically with active defenses or competing "missile for missile" and "fighter for fighter" is both impractical and unaffordable over the long run. The United States also cannot afford to simply scale up the current mix of joint power projection capabilities. Indeed, owing to ballooning personnel costs, especially with respect to medical care and retirement, manpower levels will likely *shrink* over the coming decades.

A third offset strategy, however, could counter adversarial investments in A2/AD capabilities in general—and ever expanding missile inventories in particular—by leveraging U.S. "core competencies" in unmanned systems and automation, extended-range and low-observable air operations, undersea warfare, and complex system engineering and integration in order to project power differently.

U.S. conventional deterrence credibility would also be ameliorated by adopting a strategy that is less dependent upon the threat to restore the *status quo ante* through the direct application of force. Instead, the United States should place more emphasis on *decreasing* an adversary's perception of the probability of achieving its war aims in the first place (i.e., deterrence by denial) and *increasing* the anticipated costs of attempting to do so by threatening asymmetric retaliatory attacks (i.e., deterrence by punishment). The former would require both a high degree of situational awareness and the ability to apply force quickly to derail an adversary's campaign in its opening phases regardless of the threat situation or basing availability. The latter would require the ability and willingness to identify and destroy high-value targets regardless of where they are located or how they are defended.

As part of a new offset strategy, the above-mentioned U.S. capability advantages (i.e., unmanned systems and automation, extended-range and low-observable air operations, undersea warfare, and complex system engineering and integration) could be leveraged to form a global surveillance and strike (GSS) network that would be:

1 Secretary of Defense Chuck Hagel, Defense Innovation Days, Opening Keynote Speech to Southeastern New England Defense Industry Alliance, September 3, 2014.

- *Balanced* in that it would comprise a mix of low-end and high-end platforms aligned to widely varying threat environments—including advanced A2/AD challenges;
- *Resilient* in that it would be geographically distributed with minimal dependence upon close-in bases, have greatly reduced sensitivity to enemy air defense capabilities, and be signficantly more tolerant of disruptions to space-based systems;
- *Responsive* in that a credible surveillance-strike presence could be generated within hours—perhaps minutes—of the direction to do so; and
- *Scalable* in that it could by expanded to influence events in multiple locations around the world concurrently.

While many elements of the U.S. military would have important roles to play in a future GSS network, it would rely disproportionately upon air and maritime forces in general and unmanned platforms in particular. To realize the GSS concept, implementation actions that merit additional consideration include the following:

- Hedge against the loss of space-based enablers by accelerating R&D on alternatives to GPS for precision navigation and timing, fielding a "high-low" mix of unmanned surveillance aircraft with long mission endurance and/or aerial refueling capability, and developing an "aerial layer" alternative to space for long-haul communications;
- Develop and demonstrate counter-space capabilities to deter prospective adversaries from attacking U.S. satellites;
- Expand the geographic coverage of the undersea fleet by accelerating development of key enabling technologies for unmanned undersea vehicles (UUVs) including high-density energy storage for speed and endurance, undersea navigation and communications, and autonomy;
- Expand undersea payload capacity and flexibility by fully funding the Virginia Payload Module program, accelerating development of seabed payload pods (building on the Defense Advanced Research Projects Agency's (DARPA's) "upward falling payload" program), initiating development of towed payload modules, modifying the Tomahawk land-attack cruise missile and Standard Missile family to address a wider array of target sets, and initiating development of a submarine-launched, conventional ballistic/boost-glide missile;

- Expand geographic coverage provided by fixed and deployable undersea sensor networks;
- Develop and field modern ground-, air-, and sea-deployed naval mines, as well as a long-range anti-submarine warfare weapon;
- Reverse the active defense versus missile attack cost exchange ratio through accelerated development and fielding of electromagnetic rail gun and directed-energy based systems (focused initially on carrier strike group and peripheral base defenses);
- Develop and field new counter-sensor weapons including directed-energy systems (e.g., high-power microwave payloads and high-energy lasers) and stand-in jammers/decoys;
- Accelerate fielding of an automated aerial refueling capability;
- Accelerate development and expand procurement of the LRS-B;
- Develop and field a penetrating, high-altitude, long endurance unmanned aerial vehicles (UAVs) as an analog to the RQ-4 *Global Hawk* for medium-high threat environments;
- Develop and field penetrating, air-refuelable land- and carrier-based UCAS platforms (MQ-X and N-UCAS) for geographically distributed surveillance-strike operations (i.e., mobile-relocatable target killers) across the threat spectrum, but especially in medium-high threat environments; and
- Develop expeditionary, ground-based, local “A2/AD” networks comprising short-to-medium range air defenses, coastal defense cruise missiles, defensive mines and UUVs, and mobile surface-to-surface missiles.

These initiatives would contribute to an effective offset strategy by affordably restoring U.S. power projection capability and capacity, bolstering conventional deterrence through a credible threat of denial and punishment, and imposing costs upon prospective adversaries as part of a long-term competition. To fund development and fielding of these and other high-payoff capabilities discussed in this report, it will be necessary to re-focus some ongoing efforts, rein in personnel and infrastructure costs, and divest legacy capabilities that are likely to depreciate over time.

Just as it took well over a decade to field all of the “assault breaker” capabilities envisioned in the mid-1970s, the GSS network would not attain an initial operational capability until the mid-2020s, at best, but only if focused R&D begins now and the Pentagon, the White House, and Capitol Hill stay the course over at least the next decade. Given finite and likely declining resources for defense, the nation can neither afford to continue the current "business as usual" approach to power projection, nor plan on having the resources and time to rectify the many operational and strategic problems with the current path once they fully manifest.

Introduction

After more than a decade of sustained, costly military operations in Afghanistan and Iraq, the American people are war-weary and seek justifiable reductions in defense spending as the country attempts to climb out of debt. Facing an uncertain period of fiscal austerity, the U.S. military nevertheless confronts a range of global security challenges. In Europe, Russia is resurgent and increasingly assertive in its near abroad. In the Middle East, the Syrian civil war smolders, Iraq is unstable, the Islamic State of Iraq and the Levant (ISIL) has risen to power, and Iran continues to expand its ballistic missile arsenal as it drives toward a nuclear weapons capability. In Central Asia, the security situation in Afghanistan remains tenuous and will likely deteriorate as U.S. forces withdraw over the coming year. In East Asia, an unstable, nuclear-armed North Korea remains as belligerent as ever, while China pursues hegemonic ambitions and has become increasingly confrontational in the South China Sea. The metastasizing radical Islamic threat has spread from the Middle East and Central Asia into Africa. At the same time, traditional sources of U.S. military advantage are being undermined by the maturation and proliferation of disruptive technologies—most notably, A2/AD capabilities.[2] As Secretary of Defense Chuck Hagel recently observed:

> Disruptive technologies and destructive weapons once solely possessed by only advanced nations, have proliferated widely, and are being sought or acquired by unsophisticated militaries and terrorist groups. Meanwhile, China and Russia have been trying to close the technology gap by pursuing and funding long-term, comprehensive military modernization programs. They are also developing anti-ship, anti-air, counter-space, cyber, electronic warfare, and special operations capabilities that appear designed to

2 “Anti-access” refers to the ability to slow or prevent the deployment of U.S. forces into a given theater of operation or cause them to base operations farther away than would be preferred. “Area denial” captures actions to restrict freedom of maneuver, reduce operational effectiveness, and increase the risks associated with friendly operations within a given theater.

A new "offset" strategy could help restore U.S. global power projection capability and capacity.

> counter traditional U.S. military advantages—in particular, our ability to project power to any region across the globe by surging aircraft, ships, troops, and supplies.[3]

The resulting erosion in U.S. power projection capability has cascading ramifications for crisis stability, allied confidence in U.S. security commitments, and conventional deterrence.

Since the end of World War II, the United States has faced similar periods during which it was necessary to address grave international security challenges while concurrently reining in defense spending. Two notable examples were President Dwight D. Eisenhower's "New Look" in the early 1950s and Secretary of Defense Harold Brown's "Offset Strategy" in the mid-1970s. In both instances, the mechanism for affordably "offsetting" the numerical conventional force imbalance relative to the Soviet Union was the same: leveraging U.S. technological advantage. In the 1950s, it took the form of increasingly numerous and varied nuclear weapons, long-range delivery systems, and active and passive defenses. Roughly a quarter-century later, it took the form of the application of information technology to a range of tactical systems and the advent of stealth.

A new "offset" strategy could help restore U.S. global power projection capability and capacity. Like its antecedents, this strategy would also exploit existing and emerging U.S. technological advantages: in this case, in unmanned systems; extended-range and low-observable air operations; undersea warfare; and complex systems engineering, integration, and operation. This report argues that linkages among these areas of enduring advantage could provide the basis for a GSS network that provides a resilient, globally responsive power projection capability that could be tailored against a wide-array of anticipated threats. It should be stressed at the outset, however, that this strategy is focused primarily upon restoring U.S. conventional power projection capability in order to improve crisis stability, bolster allied confidence in U.S. security commitments, strengthen conventional deterrence, and reduce operational risk in the event of war. While the concepts and capabilities underpinning the strategy would certainly have applicability to other security challenges, it is not the intention to suggest that it would adequately address the entire range of threats facing the United States and its allies, most notably those posed by nuclear weapons, insurgencies, proxy wars, and "lawfare."

This report will sketch out the broad contours of a new offset strategy and the key steps toward implementing it with the GSS concept over the next 10–20 years. To that end, it will begin by examining and distilling lessons from the

---

3 Secretary of Defense Chuck Hagel, Defense Innovation Days, Opening Keynote Speech to Southeastern New England Defense Industry Alliance, September 3, 2014.

1950s "New Look" and the 1970s "Offset Strategy." It will then explore the operational and strategic shortcomings of the current U.S. approach to power projection. Building upon that foundation, it will explain why the capability advantages mentioned above are likely to prove enduring and how they could be leveraged as part of the GSS concept. It concludes with a brief consideration of how to rebalance the current defense investment portfolio, key near-term initiatives, and vectors for future research.

CHAPTER 1

Antecedents of a “Third” Offset Strategy

The two strongest historical parallels to today’s challenge of crafting a national security strategy to address a wide-range of intensifying security threats within flat or declining defense budgets are President Dwight D. Eisenhower’s “New Look” in the mid-1950s and Secretary of Defense Harold Brown’s “Offset Strategy” in the mid-1970s. In both cases, conventional Warsaw Pact forces significantly outnumbered U.S. and NATO forces. During the former period, the United States also faced the prospect of losing its dominant advantage in nuclear forces; in the latter, it had lost nuclear parity and was being outspent by the Soviet Union on defense by a considerable margin. This chapter explores both periods to distill lessons with contemporary relevance and concludes by considering key opportunities and challenges associated with crafting a “third” offset strategy.

The “New Look”

As President Harry S. Truman’s term drew to a close in January 1953, the trauma of World War II had not yet faded, and an armistice ending the inconclusive and costly Korean War had not yet been secured. Faced with mounting

"First, we must provide armed forces of sufficient strength to deter future Communist aggression and, secondly, such forces must be maintained without undermining the economic health of the Nation."
-Department of Defense, 1953

Soviet threats to the "free world," the departing Truman Administration issued NSC-141, which called for a significant increase in overall defense spending to meet the containment strategy objectives set forth in NSC-68 and NSC-135/3.[4]

Newly elected President Eisenhower, however, was apprehensive about the prospect of the Soviet Union exhausting the United States by instigating limited wars at a time and place of Moscow's choosing, and he felt uneasy about the ability of the U.S. economy to sustain large defense expenditures indefinitely. While on the campaign trail, he had stressed that national security was not limited to physical defense of the homeland, but also included safeguarding America's values, institutions, and economic system. "A bankrupt America," he remarked in 1952, "is more the Soviet goal than an America conquered on the field of battle."[5]

Accordingly, shortly after entering office in 1953, he commissioned a senior-level review of defense policy based on two principles: "First, we must provide armed forces of sufficient strength to deter future Communist aggression and, secondly, such forces must be maintained without undermining the economic health of the Nation."[6] Secretary of State John Foster Dulles shared the view that economic stability and military strength were inseparable. As he put it, "if economic stability goes down the drain, everything goes with it."[7] The centerpiece of this policy reexamination was an intensive, senior-level planning exercise dubbed "Project Solarium" conducted at the National War College in June–July 1953 that explored alternatives for containment and deterrence of the Soviet Union over the "long pull."[8]

For reference, during that time, the Central Intelligence Agency (CIA) estimated Soviet peacetime conventional ground force strength at about 175 army divisions, with another 125–145 reserve divisions that could be mobilized within a

4 This increase was focused mainly on "continental defense and civil defense programs and for economic and military aid on an expanded scale to countries in the Middle East and Far East." NSC-141 in Department of State, Office of the Historian, *Foreign Relations of the United States, 1952–1954*, National Security Affairs, Volume II, Part 1 (Washington, DC: Government Printing Office [GPO], 1979), Document 42.

5 As quoted in Robert McMahon, "US National Security Policy from Eisenhower to Kennedy," in Melvyn Leffler and Odd Arne Westad, eds., *The Cambridge History of the Cold War,* Volume I (New York: Cambridge University Press, 2010), p. 289.

6 DoD, *Semiannual Report of the Secretary of Defense and the Semiannual Reports of the Secretary of the Army, Secretary of the Navy, Secretary of the Air Force, January 1 to June 30, 1953* (Washington, DC: GPO, 1953), p. 3.

7 Secretary of State John Foster Dulles, Statement to Senate Foreign Relations and House Foreign Affairs Committees, May 5, 1953 as quoted in John Lewis Gaddis, *Strategies of Containment* (New York: Oxford University Press, 1982), p. 134.

8 The strategy review was named "Project Solarium" because the initial meeting authorizing it was held in the White House solarium. Gaddis, *Strategies of Containment*, pp. 145–147.

month.[9] By comparison, in 1953, the United States fielded an active Army with roughly 26 division equivalents and an additional three Marine divisions (or about 17 percent of the Soviet army), with reserve forces that might add, in time, roughly 25 percent to those figures.[10] The United States enjoyed a substantial lead in nuclear weapons, however, with 841 available at the end of 1952, as compared to an estimated 120 for the Soviets. More importantly, the United States was adding weapons to its nuclear arsenal at a rate of several hundred per year versus about 100 per year for the Soviets.[11] In addition, the United States conducted the first full-scale test of a thermonuclear device, dubbed Operation Ivy Mike, on November 1, 1952. The device had an estimated yield of over ten megatons of TNT—or roughly three orders of magnitude greater than contemporary fission weapons that had yields measured in tens of kilotons of TNT—which dramatically changed the character of the nuclear competition. The United States was also fielding more capable long-range bombers, such as the jet-powered B-47 *Stratojet* (pictured above) and the intercontinental-range B-52 *Stratofortress*, and had overseas bases in Europe, Asia, and North Africa to support nuclear-attack operations. In contrast, the Soviets had only lumbering medium-range, propeller-powered bombers and no bases close to the United States.

The "Solarium" study effort culminated in NSC 162/2, finalized in October 1953, which altered President Truman's defense strategy in two major ways. First, instead of attempting to deter Soviet aggression primarily through the conventional use of force (as in Korea), which would have required a substantial increase in defense spending, it threatened to inflict "massive retaliatory

9 This section draws upon Jon Hoffman, *The New Look Strategy*, OSD Historical Office Memo (Washington, DC: OSD, June 13, 2014). For additional details see: CIA, *Probable Developments in the World Situation Through Mid-1953*, Special Estimate (CIA, September 24, 1951); CIA, *Soviet Capabilities for Attack on the U.S. Through Mid-1955* (CIA, March 5, 1953); CIA, *Soviet Gross Capabilities for Attacks on the U.S. and Key Overseas Installations and Forces Through 1 July 1958*, National Intelligence Estimate No. 11-7-55 (CIA, June 23, 1955).

10 DOD, *Semiannual Report of the Secretary of Defense*, 1953, pp. 2, 104–106.

11 Robert J. Watson, *Into the Missile Age, 1956–1960* (Washington, DC: DoD, 2007), p. 457.

NSC 162/2 threatened to inflict "massive retaliatory damage by offensive striking power," including the use of strategic and tactical nuclear weapons in response to Soviet aggression.

damage by offensive striking power," including the use of strategic and tactical nuclear weapons in response to Soviet aggression.[12] Second, instead of responding directly in a specific theater of combat, it espoused "strategic asymmetry," meaning that the United States would impose costs by retaliating with means and at a place of its own choosing, including against the communist "heartlands" of the Soviet Union and China. More specifically, it stated:

> The risk of Soviet aggression will be minimized by maintaining a strong security posture, with emphasis on adequate offensive retaliatory strength and defensive strength. *This must be based on massive atomic capability,* including necessary bases; an integrated and effective continental defense system; ready forces of the United States and its allies suitably deployed and adequate to deter or initially to counter aggression…and an adequate mobilization base; all supported by the determined spirit of the U.S. people.[13]

As Eisenhower stated at a National Security Council meeting in December 1953: "Since we cannot keep the United States an armed camp or a garrison state, we must make plans to use the atom bomb if we become involved in a war."[14] Secretary Dulles promulgated this strategy publicly in a speech to the Council on Foreign Relations in New York in January 1954, from which the term "massive retaliation" was coined and took hold in the popular lexicon. In his speech, the linkage between long-term economic solvency and military strength was explicit. As Dulles put it, "we want for ourselves and the other free nations, a maximum deterrent at a bearable cost," and to achieve that, "local defenses must be reinforced by the further deterrent of massive retaliatory power."[15] To bolster the credibility of this declaratory policy, senior officials repeatedly asserted that atomic weapons would be treated no differently than "conventional" forces. "Where these things can be used on strictly military targets and for strictly military purposes," President Eisenhower remarked in early 1955 in the context of a Chinese confrontation with Taiwan over the Quemoy and Matsu Islands, "I see no reason why they shouldn't be used just exactly as you would use a bullet or anything else."[16]

Notably, the New Look also placed increased reliance on espionage, sabotage, and covert operations to achieve U.S. policy objectives at reduced cost. The

12 "Defense Against the Soviet Threat," in Executive Secretary James S. Lay, *A Report to the National Security Council on Basic National Security Policy*, NSC 162/2 (Washington, DC: NSC, October 30, 1953), Section 9. See also: Herman S. Wolk, "The 'New Look'," *Air Force Magazine*, August 2003.

13 Emphasis added. Lay, *A Report to the National Security Council*, Section 34, paragraph a.

14 Melvin P. Leffler, *For the Soul of Mankind: The United States, the Soviet Union, and the Cold War* (New York: Hill and Wang, 2007), p.139.

15 Secretary of State John Foster Dulles, "The Evolution of Foreign Policy," Speech to the Council on Foreign Relations, New York, NY, January 12, 1954.

16 Eisenhower press conference, March 16, 1955, as quoted in Gaddis, *Strategies of Containment*, p. 149.

CIA, then run by the Secretary of State's brother, Allen Dulles, was an oft-used instrument, toppling communist-leaning governments in Iran and Guatemala in 1953 and 1954, respectively.[17] Eisenhower also put more emphasis on the role of allies, strengthening existing bilateral and multilateral alliances and pursuing new ones such as the Southeast Asia Treaty Organization (SEATO) and the Baghdad Pact (later the Central Treaty Organization). Eisenhower hoped to gradually substitute U.S. manpower in Europe and Asia with allied forces, thereby reducing pressure on the defense budget. In broad terms, he envisioned a division of responsibility in which the United States would provide the nuclear umbrella required to deter Soviet aggression while allies would shoulder the burden of maintaining standing ground forces for regional defense.[18]

U.S. leaders sought to sustain and leverage U.S. advantages in deliverable nuclear warheads as long as possible.

Eisenhower, Dulles, and other senior decision makers recognized that the Soviet Union would eventually be able to hold the U.S. homeland at risk with atomic weapons, especially in the wake of the unexpectedly sudden Soviet hydrogen bomb test in 1953 and the static display of a prototype jet-propelled bomber, the M-4 Bison (pictured above), in the May Day parade in 1954. However, U.S. leaders sought to sustain and leverage U.S. advantages in deliverable nuclear warheads as long as possible to reduce U.S. defense expenditures, as well as to buy time for America's allies to build up their own armed forces and for the inherent weaknesses of the Soviet totalitarian regime to manifest.

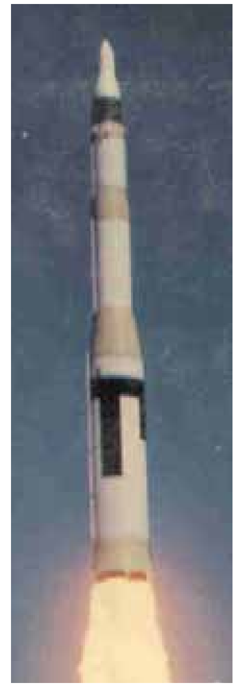
Reflecting that, the Eisenhower Administration took several steps early on to sustain the U.S. lead in the nuclear competition including the rapid fielding of the hydrogen bomb, first tested in 1952; accelerated introduction of the intercontinental-range B-52 heavy bomber as well as the liquid-fueled *Atlas* and *Titan* intercontinental range ballistic missiles (ICBMs); and expanded procurement of *Thor* intermediate-range ballistic missiles (IRBMs) for Western Europe.

As the U.S.-Soviet nuclear arms race heated up in the latter half of 1950s, the Eisenhower Administration abandoned the quest for outright nuclear supremacy as an unaffordable goal and shifted to sustaining an "adequate" nuclear

17 Covert operations in Syria in 1957 and Indonesia in 1958, however, were major failures.

18 McMahon, "US National Security Policy from Eisenhower to Kennedy," p. 294.

force for inflicting unacceptable damage upon the Soviet Union *after* absorbing a Soviet preemptive strike. Key investments during this period included:



- Expanding significantly the Air Force's aerial refueling capacity to support the retrograde of medium-range B-47 bomber squadrons from Europe to the continental United States where they we would be less vulnerable to a Soviet preemptive air and missile attack;
- Enhancing the U.S. integrated air and missile defense network, to include construction of the Distant Early Warning (DEW) line against Soviet bombers, and later the Ballistic Missile Early Warning (BMEW) radar system;
- Expediting development of solid-fueled ICBMs such at the LGM-30 *Minuteman* (pictured right), which was test launched in 1961 and became operational in 1963, and the submarine-launched *Polaris*, which was also test launched in 1961 and put to sea aboard the USS *George Washington* in 1963; and
- Investing in hardened ICBM silos, dispersed bomber bases, and other passive defenses.

To better inform both conventional and nuclear war planning against the Soviet Union, Eisenhower also supported development and fielding of the Lockheed U-2 "Dragon Lady" ultra-high altitude (70,000 feet) reconnaissance aircraft, which had its first flight in 1955 and became operational in 1957, and the Corona photo-reconnaissance satellite, which entered into development in 1956 and became operational in 1960.

To fund these and other "New Look" initiatives, the budget of the Air Force, principally Strategic Air Command (SAC), was increased, while the budgets of the Army and Marine Corps were reduced. As of the end of fiscal year 1952, the approved Air Force program called for a total of 95 wings, including 41 "strategic wings" assigned to SAC.[19] In formulating the fiscal year 1954–1957 defense program, the Air Force was slated to reach an objective force of 137 total wings by 1957, including 92 wings dedicated to SAC. During those three years, the

19 Of which six were heavy bomber wings and twenty were medium-bomber wings. Walton Moody, *Building a Strategic Air Force* (San Antonio, TX; Strategic Air Command, 1996), p. 391.

Air Force received an average share of 47 percent of total DoD appropriations as compared to 29 percent for the Navy and 22 percent for the Army.[20] Overall, between 1954 and 1961, the Army shrank by nearly 40 percent in end-strength as compared to 24 percent for the Marine Corps, and about 14 percent for the Navy and the Air Force.[21] Compounding the impact of those reductions, European allies fell short of their pledged ground force contributions to collective security, which compelled the United States to rely more heavily upon tactical nuclear weapons, as well as to retain larger forces than anticipated in Western Europe, leaving fewer available for other contingencies that broke out in such places as the Taiwan Strait in 1954–1955, the Suez in 1956, and Lebanon and the Taiwan Strait in 1958.[22]

The Air Force received an average share of 47 percent of total DoD appropriations as compared to 29 percent for the Navy and 22 percent for the Army.

Eisenhower's "New Look" strategy of leveraging the U.S. lead in atomic weapons, long-range air power, and ballistic missiles to deter the Soviet Union at an affordable cost was generally effective. He shaved roughly $7 billion off President Truman's draft defense budget for fiscal year (FY) 1954. Indeed, between FY 1954 and 1961, military expenditures as a percentage of the total Federal budget fell from 66 to 49 percent. As a percentage of gross national product, defense spending fell from 13 to 9 percent over the same period.[23] By the late 1950s, however, the credibility of the U.S. threat of "massive retaliation," especially in response to limited conventional attacks, was called into question by several developments:

- The growing size and sophistication of the Soviet nuclear arsenal (including thermonuclear weapons);
- The fielding of the intercontinental-range, turboprop-powered *Tupolev* Tu-95 "Bear" heavy bomber (pictured below); and
- An illusory "missile gap" publicized in the media in the wake of the successful test-launch of both the Soviet R-7 ICBM in August 1957 and the *Sputnik* satellite just two months later.

20 Alfred Goldberg, ed., *A History of the United States Air Force, 1907–1957* (Princeton, NJ: D. Van Nostrand, 1957), p. 117; David Alan Rosenberg, "The Origins of Overkill," *International Security*, Spring 1983; and Moody, *Building a Strategic Air Force*, p. 460.

21 Roger R. Trask and Alfred Goldberg, *The Department of Defense, 1947–1997: Organization and Leaders* (Washington, DC: Historical Office, OSD, 1997), p. 171.

22 In both Taiwan crises, the Eisenhower Administration felt compelled to make veiled threats of nuclear use. Watson, *Into the Missile Age*, p. 774; and Jerome Kahan, *Security in the Nuclear Age* (Washington, DC: The Brookings Institution, 1975), pp. 20–23.

23 Gaddis, *Strategies of Containment*, pp. 162–164; and Richard M. Leighton, *Strategy, Money, and the New Look, 1953–1956*, (Washington, DC: GPO, 2002), pp. 65–66.

Even though the U.S. nuclear warhead stockpile was roughly ten times larger than that of the Soviet Union as of 1960 and its intercontinental missile force roughly three times larger by 1962, U.S. nuclear forces were perceived by some as a "wasting" asset with respect to deterring conventional warfare.[24] As early as 1956, the Chief of Staff of the Army, General Maxwell Taylor, argued for a strategy of "flexible response," which called for deterring most crises with conventional forces to minimize the possibility of having to resort to nuclear warfare.[25] Taylor's argument resonated with incoming Kennedy Administration's officials, who later implemented the strategy in large part by increasing the size of conventional deterrent forces based in Western Europe.

While it is unlikely that a disruptive U.S. technological advantage comparable to that conferred by nuclear weapons in the wake of World War II is in the offing, five important lessons with contemporary applicability can be discerned. First is the need for a "balanced" strategy aligned against the full range of anticipated threats facing the nation. While this lesson may ostensibly seem at odds with the "massive retaliation" moniker often coupled with the "New Look," it should not be forgotten that NSC 162/2 also called for "ready forces of the United States and its allies suitably deployed and adequate to deter or initially to counter aggression." The latter was certainly born out by investment and overseas operations during the Eisenhower Administration. Even with a dramatic numerical disparity in nuclear weapons that ranged from a U.S.-Soviet ratio of 60:1 in 1950 to roughly 10:1 in 1960, the United States still expanded homeland defense capabilities, retained an active mobilization base, and deployed sizable conventional forces to deter and counter aggression around the world.[26] Nuclear weapons provided a cost effective "backstop" for outnumbered conventional forces—not a wholesale replacement for them. Secretary Dulles, for example,

24 As of 1962, the U.S. nuclear stockpile comprised over 27,000 warheads as compared to the Soviet stockpile of 3,300. The U.S. fielded 203 ICBMs and 144 SLBMs against 36 Soviet ICBMs and 72 SLBMs. David Halloway, "Nuclear Weapons and the Escalation of the Cold War, 1945–1962," in Leffler and Westad, eds., *The Cambridge History of the Cold War*, p. 387.

25 Leighton, *Strategy, Money, and the New Look, 1953–1956,* p. 655.

26 Robert Norris and Hans M. Kristensen, "Global Nuclear Weapons Inventories, 1945−2010", *Bulletin of the Atomic Scientists*, July 1, 2010.

spoke of the need to preserve a varied arsenal of "air, sea, and land power based on both conventional and atomic weapons" that could be applied on "a selective or massive basis as conditions may require."[27] Second, a global air warfare capability can provide valuable strategic freedom of maneuver, complicate an adversary's defensive planning, and reduce basing vulnerability. Third, the threat of asymmetric punishment—striking wherever, whenever, and with flexible means rather than "tit for tat" retaliation in a theater of operations chosen by an adversary—can be an effective instrument of deterrence. Fourth, when used prudently, covert operations can provide an affordable option for achieving U.S. national security objectives. Lastly, alliances matter—not only for burden sharing, but also for complicating an adversary's operational planning and imposing costs upon them.

A global air warfare capability can provide valuable strategic freedom of maneuver, complicate an adversary's defensive planning, and reduce basing vulnerability.

The Offset Strategy

Roughly two decades later, in the mid-to-late 1970s—with DoD still reeling from the Vietnam War, struggling to keep pace with the Soviet Union's rapidly growing nuclear arsenal, concerned about the ongoing buildup and modernization of conventional Warsaw Pact forces in Europe that outnumbered NATO forces by roughly three fold, and facing an economy in the doldrums—Secretary of Defense Harold Brown and his Under Secretary of Defense for Research and Engineering, William Perry, adopted what they termed an "offset strategy."[28] As Secretary Brown explained in his 1981 report to Congress:

> Technology can be a force multiplier, a resource that can be used to help offset numerical advantages of an adversary. Superior technology is one very effective way to balance military capabilities other than matching an adversary tank-for-tank or soldier-for-soldier...[29]

27 John Foster Dulles, "Foreign Policy and National Security," Statement before the Senate Committee on Foreign Relations, March 19, 1954, *Department of State Bulletin*, Volume 30, April 1954, p. 465.

28 Harold Brown, "Technology and National Security: Risks and Responsibilities," remarks at France-Stanford Center for Interdisciplinary Studies, April 7–8, 2003, p. 2.

29 Harold Brown, *Department of Defense Annual Report Fiscal Year 1982* (Washington, DC: DoD, January 19, 1981), p. x. In assessing the U.S.-Soviet military balance, Secretary Brown later reflected, "If the United States looks for comparative advantages against a potential Soviet adversary with superior numbers of forces, one of the most obvious is the relatively lower cost of incorporating high technology into U.S. military equipment." Harold Brown, *Thinking about National Security: Defense and Foreign Policy in a Dangerous World* (Boulder, CO: Westview Press, 1983), pp. 229–230.

The Offset Strategy featured four core thrusts: the development of new intelligence, surveillance, and reconnaissance (ISR) platforms and battle management capabilities; the fielding of improved precision-strike weapons; the application of stealth technology to aircraft; and the tactical exploitation of space for ISR, communications, and precision navigation and timing.[30] Much of the critical enabling technology for these thrusts was developed through the late 1960s and into the early 1970s. By 1975, DARPA had formulated a detailed, long-term R&D plan focused on improving weapon delivery accuracy; enhancing mobility and firepower of battlefield vehicles; improving communications, including with jam-resistant tactical data-links and "packet communication" networks pioneered with ARPAnet; and new weapon delivery vehicles such as cruise missiles and remotely piloted vehicles (RPVs).[31] Building upon this strong technological foundation, Under Secretary of Defense Perry testified to Congress in 1978:

> Precision-guided weapons, I believe, have the potential of revolutionizing warfare. More importantly, if we effectively exploit the lead we have in this field, we can greatly enhance our ability to deter war without having to compete tank for tank, missile for missile with the Soviet Union. We will effectively shift the competition to a technological area where we have a fundamental long-term advantage. … The objective of our precision guided weapon systems is to give us the following capabilities: to be able to see all high value targets on the battlefield at any time; to be able to make a direct hit on any target we can see, and to be able to destroy any target we can hit.[32]

DARPA combined several technologies for "seeing deep" and "shooting deep" into a technology integration and system proof-of-concept program aptly dubbed "Assault Breaker" in 1978.[33] Key initiatives included:

30 For a brief history of this period see Michael Vickers and Robert Martinage, *The Revolution in War* (Washington, DC: Center for Strategic and Budgetary Assessments, 2004), pp. 8–14.

31 Donald Hicks, *ARPA/DNA Long Range Research and Development Planning Program*, Final Report of the Advanced Technology Panel (Washington, DC: DoD, April 30, 1975).

32 William Perry, Testimony to the U.S. Senate Armed Services Committee, Hearing on Department of Defense Appropriations for FY1977, Part 8: Research and Development, February 28, March 7, 9, 14, 16, and 21, 1978, p. 5598; and Ashton B. Carter and William J. Perry, *Preventive Defense* (Washington, DC: Brookings Institution Press, 2000), pp. 179–180.

33 Glenn W. Goodman, "Transforming the Warfighting Landscape," in DARPA, *DARPA: 50 Years of Bridging the Gap* (Tampa, FL: Faircount LLC, 2008).

- An airborne synthetic aperture radar (SAR) platform with ground moving target indication (GMTI) capability that could peer into enemy territory from a safe stand-off distance (about 300 km) to detect concentrations of armored vehicles, which evolved into the E-8 Joint Surveillance Target and Attack Radar System (pictured previous page);

- Terminally guided submunitions for identifying and destroying large numbers of armored ground vehicles over a wide area, which was later fielded by the Air Force as the BLU-108 Sensor Fuzed Weapon (SFW); and
- A road-mobile, long-range, very accurate surface-to-surface missile system, which became the Army Tactical Missile System or ATACMS (pictured right).

Other major capabilities developed as part of the offset strategy's "system of systems" included the Airborne Warning and Control System (AWACS), the Joint Tactical Information and Distribution System (JTIDS), the F-117A stealth fighter, unmanned reconnaissance aircraft, a family of more capable precision-guide munitions (PGMs), enhanced reconnaissance satellites, and the Global Positioning System. While conceived of in the 1970s, most of these new capabilities were not operationally fielded in quantity until the mid-to-late 1980s.[34] They became integral to what became know as the Air-Land Battle operational concept, or in NATO parlance, Follow-on Forces Attack, which sought to find second-echelon Warsaw Pact maneuver forces and destroy them with precision strikes early on in a conflict.[35] Recognizing that numbers matter and that it would unaffordable to incorporate advanced technology into all legacy forces, Brown and Perry adopted what they referred to as a "high-low" mix to maintain a capable and affordable level of forward presence, most especially in Europe and Asia.

Fortunately, with the fall of the Soviet Union, U.S. forces were never tested in combat against Warsaw Pact forces in Central Europe. When used against

34 The then "black" F-117 program, which entered into full-scale development in the fall of 1977, achieved an initial operational capability in 1981.

35 The basic Air-Land Battle concept was for NATO ground forces to hold-off Warsaw Pact front-line forces, and meanwhile NATO ISR aircraft would "look deep" to locate Warsaw Pact operational reserves or "follow-on forces," which could be interdicted by airpower and ground-based precision-strike weapons before reaching the front.

During Operation Desert Storm in 1991, information technology proved to be a highly effective "force multiplier."

the 500,000-man strong, Soviet-modeled Iraqi army during Operation Desert Storm in 1991, however, information technology proved to be a highly effective "force multiplier." The lopsided U.S. victory was widely considered to be evidence of an ongoing revolution in war.[36] Soviet observers, for example, concluded soon after the war that "the integration of control, communications, reconnaissance, electronic combat, and delivery of conventional fires into a single whole" had been realized "for the first time."[37]

At least four key lessons can be drawn from the Brown-Perry offset strategy with relevance for today. First, technology can indeed multiply the combat effectiveness of a force such that it "offsets" the numerical advantage of a larger, but technically inferior force. Second, rather than competing "tank for tank" or "missile for missile," technology advantages can be used to shape the competition, shifting it into areas where the U.S. military can compete more effectively. Third, it is important to retain sufficient "low-end" capabilities to maintain a forward-deployed, combat-credible presence around the globe aligned to varying threat environments. The final lesson from this period is the importance of strategic continuity and institutional commitment. As mentioned above, while Brown and Perry initiated several technology development programs in the late 1970s, they never would have been fielded if not for enduring bureaucratic support for the "offset strategy" within the Pentagon, in successive White House administrations, and on Capitol Hill. Absent the Reagan Administration's defense buildup in the 1980s, in particular, many of the "offset" technologies showcased in Operation Desert Storm during the first Bush Administration would not have been available.

Toward a "Third" Offset Strategy: Opportunities and Challenges

Today, the U.S. military faces a period of fiscal austerity of uncertain duration. Meanwhile the United States simultaneously confronts a complex array of mounting security challenges around the world. The United States cannot afford to simply scale up the current mix of joint power projection capabilities. Indeed, owing to ballooning personnel costs, especially with respect to medical care and

36 Most notably by Secretary Perry. See William Perry, "Desert Storm and Deterrence," *Foreign Affairs*, Fall 1991. For OSD's net assessment of the military-technical revolution in 1992, see: Andrew Krepinevich, *The Military-Technical Revolution A Preliminary Assessment* (Washington, DC: Center for Strategic and Budgetary Assessments, 2002).

37 Some Soviet assessments characterized Operation Desert Storm as more of a transitional war bridging the old and new military regimes. See *Soviet Analysis of Operation Desert Storm and Operation Desert Shield*, LN 006-91, translated by the Defense Intelligence Agency (DIA) (Washington, DC: DIA, October 28, 1991), p. 32; and Mary C. FitzGerald, *The Soviet Image of Future War: "Through the Prism of the Persian Gulf"* (Alexandria, VA: The Hudson Institute, May 1991).

retirement, manpower levels will likely *shrink* over the coming decades. At the same time, the prevailing U.S. approach to power projection since Operation Desert Storm—which typically entails a protracted buildup of large concentrations of combat forces (e.g., carrier strike groups, manned fighter squadrons, and mechanized Marine battalions and Army brigade combat teams), as well as accompanying logistical support infrastructure and personnel, in secure forward areas as a prelude to a high-tempo, combined arms campaign—is becoming increasingly untenable for a number of operational and strategic reasons, which will be detailed below.

The United States cannot afford to simply scale up the current mix of joint power projection capabilities.

What is needed, therefore, is a new offset strategy that exploits enduring sources of U.S. advantage to maintain cost-effective, persistent forward presence and project power rapidly, including against adversaries armed with robust A2/AD capabilities in general, and ever-expanding conventional missile arsenals in particular. The strategy should:

- Harness innovative concepts of operation that leverage both new and legacy U.S. capabilities—or in Brown-Perry parlance, a "high-low mix"—to hold adversary targets at risk in multiple theaters concurrently;
- Reduce dependence on close-in theater land and sea bases;
- Hedge against the loss or degradation of space-based capabilities;
- Take advantage of the "global reach" of U.S. air and naval forces, the responsiveness of air power and missiles, and the on-station endurance and low life-cycle cost of unmanned platforms;
- Exploit "strategic asymmetry" to hold targets at risk outside of the immediate combat zone;
- Shape the competition, shifting it to areas advantageous to the United States (e.g., the undersea domain) while imposing costs upon rivals; and
- Take advantage of alliance relationships to gain positional advantage and, in some cases, share financial burdens.

Crafting an offset strategy today may be a more daunting task than it was during the late 1970s for at least three reasons. First, according to CIA estimates at the time, Soviet gross national product (GNP) between 1960 and 1980 varied between 50 and 60 percent of U.S. GNP, and Soviet economic growth *rates* had been declining for a decade. While the Soviets spent more on defense than the United States in absolute terms in the mid-to-late 1970s, the defense burden on its economy was at least two times higher.[38] Accordingly, from a financial perspective, it appeared that time was on America's side. Today, the U.S. economy is less vibrant, and the defense budget is expected to remain flat or decline over the next decade, at least. In contrast, the economy of one of America's principal rivals, China, is expanding at a real rate of over 7 percent and its under-stated "official" defense spending has grown at an average of nearly 10 percent annually over the past decade.[39] There appears to be a growing consensus that China's economy will surpass that of the United States by 2024.[40] Barring a significant down turn in the Chinese economy, it will likely prove difficult for the United States to "buy its way out" of poor near-term decisions down the road. That said, given a number of structural problems and the need to transition from an export-dominated growth model, there is a good chance that the Chinese economy may slow significantly over the coming decade.[41] If that occurs, Beijing will face difficult choices among investment in its services sector and supporting infrastructure, domestic spending, and military modernization.

Second, the Brown-Perry offset strategy was focused primarily upon using a garrison force to deter and, if necessary, defeat a Warsaw Pact invasion of Western Europe. Pre-deployed to an impressive network of geographically distributed, hardened bases, the Cold War U.S. military was, in effect, playing a defensive "home game" along with its NATO partners against Soviet forces threatening to project mechanized ground forces into Western Europe. Today, the situation is reversed. The U.S. military no longer has the home field advantage; it needs to be able to project power over great distances to a limited number of mostly unhardened forward bases that are increasingly at risk of attack by relatively short-range guided rockets, artillery, and mortars—as well as longer range ballistic and cruise missiles, and strike aircraft. While this challenge could be

38 As it turns out, CIA estimates at the time seriously over-estimated the size of the Soviet economy and under-estimated defense costs. Andrew Marshall, OSD Director of Net Assessment, letter to Mr. Richard Kaufman, Joint Economic Committee, September, 18, 1975; GAO, *Soviet Economy: Assessment of How Well the CIA Has Estimated the Size of the Economy*, report to Senator Daniel Patrick Moynihan (Washington, DC: GAO, September 1991); and Office of Soviet Analysis, Directorate of Intelligence, *A Comparison of Soviet and U.S. Gross National Products, 1960–1983* (CIA, August 1984). Available at: http://www.foia.cia.gov/sites/default/files/document_conversions/89801/DOC_0000498181.pdf.

39 World Bank data: http://www.worldbank.org/en/publication/global-economic-prospects/regional-outlooks/eap; OSD, *Military and Security Developments Involving the People's Republic of China 2013,* Annual Report to Congress (Washington, DC; DoD, 2014), p.45; and Daniel Kliman, "Is China the Fastest-Rising Power in History?" *Foreign Policy*, May 16, 2014.

40 "China to Become World's Largest Economy in 2024 Reports IHS Economics," IHS Economics press release, September 7, 2014, available at http://press.ihs.com/press-release/economics-country-risk/china-become-worlds-largest-economy-2024-reports-ihs-economics. Using another metric—GDP on a purchasing power parity (PPP) basis—China will surpass the United States as soon as the end of 2014. "Crowning the Dragon," *The Economist*, April 30, 2014.

41 World Bank, *China Economic Update*, June 2014. Available on-line: http://www.worldbank.org/content/dam/Worldbank/document/EAP/China/China_Economic_Update_June2014.pdf.

mitigated by significant U.S. and allied investment in base dispersion and hardening, it will be difficult to overcome political hurdles to such spending both overseas and domestically.

Third, the Brown-Perry offset strategy was focused on a relatively narrow operational problem (i.e., a numerical imbalance in Soviet-NATO conventional forces, especially ground forces, in Central Europe) and a specific adversary, the Soviet Union. Today, the operational challenge to U.S. power projection capability is more multifaceted, and the number of prospective adversaries, as well as the scope of their respective military capabilities, is far greater. On the positive side, however, the United States also has a wide array of regional friends and allies aligned with it against commonly perceived threats. This advantage is magnified by the fact that several prospective U.S. adversaries (e.g., Iran, North Korea, Russia, and China) not only have no such alliances, but also face regional rivals that seek to keep them in check.

Author: Dual Freq, http://commons.wikimedia.org/wiki/File:Germany_topo_Fulda_Gap.jpg

The operational challenge to U.S. power projection capability is more multifaceted, and the number of prospective adversaries, as well as the scope of their respective military capabilities, is far greater.

This report continues with a discussion of the mounting operational and strategic challenges associated with the current U.S. approach to power projection. It then proposes to "offset" adversarial A2/AD capabilities by exploiting enduring U.S. advantages in unmanned operations; extended-range and low-observable air operations; undersea warfare; and complex systems engineering, integration, and operations. The centerpiece of that strategy is the development and fielding of a GSS network for projecting U.S. military power rapidly, in multiple locations, and with dramatically reduced reliance upon vulnerable forward bases and significantly increased reliance upon unmanned systems that promise significant life-cycle cost savings.

To minimize costs, this new offset strategy also adopts a high-low mix approach, leveraging legacy force structure and capabilities as much as possible. As with both the "New Look" and the Brown-Perry offset strategy, however, it would require near-term investments in a handful of new capabilities:

- Stealthy, high-altitude, long-endurance (HALE) unmanned air vehicles for ISR operations in mid-to-high threat environments in both peacetime and in combat;

- Stealthy land- and carrier-based variants of an unmanned combat air system (UCAS) optimized for finding and destroying mobile and relocatable targets in mid-to-high threat environments;
- A family of new undersea platforms and payloads, including long-endurance, multi-mission UUVs, seabed payload pods, and towed payload modules; and
- An array of new networking, communications, and battle management systems.

Given fiscal constraints, it will be necessary to scale back force structure and modernization of selected "sunset" capabilities (e.g., non-stealthy ISR aircraft both manned and unmanned; short-range, manned strike fighters; and heavy, mechanized ground forces) that are likely to wane in operational utility, especially in mid-to-high threat environments, to fund these higher priorities.

CHAPTER 2

Shortcomings with the Current U.S. Approach to Power Projection

The recently completed *Quadrennial Defense Review* (QDR) asserts that the DoD "will 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."[42] In the event that deterrence fails, the QDR states that the U.S. military must be able to "defeat a regional adversary in a large-scale multi-phased campaign, and deny the objectives of—or impose unacceptable costs on—another aggressor in another region."[43] While the QDR refers briefly to several emerging operational challenges, it does not explore how the U.S. military might project power differently given the ongoing proliferation and maturation of A2/AD threats. Those investments that the QDR does recommend (e.g., advanced air and missile defenses, fifth-generation fighters, and "updated models of critical naval assets") are emblematic of a business-as-usual approach to power projection. Reflecting that, the "rebalanced" 2019 U.S. military described in the QDR, while smaller in some areas (e.g., ground forces and fighter squadrons) is nearly identical in overall composition to the one fielded today.

Beginning with the *Bottom Up Review* in 1993, every force-planning construct has called for a minimum capacity to fight and win two major regional wars in

42 OSD, *Quadrennial Defense Review 2014* (Washington, DC: DoD, 2014), p. 22.

43 Ibid.

Given the array of potential security challenges around the world, the United States must be able to deny opportunistic aggression by more than a single prospective adversary.

overlapping timeframes.[44] The 2014 QDR, however, departs from that metric, reducing the requirement to defeating one adversary while "denying" the objectives of a single opportunistic aggressor in a second theater of operations. While the distinction between "defeating" and "denying" is ambiguous, this shift appears to be a tacit acknowledgement that the U.S. military no longer has sufficient capacity to conduct two "large-scale, multi-phased campaigns" against different regional adversaries. Given the array of potential security challenges around the world, the United States must be able to deny opportunistic aggression by more than a single prospective adversary. As the independent National Defense Panel (NDP) review of the QDR concluded:

> The United States armed forces should be sized and shaped to deter and defeat large-scale aggression in one theater, preferably in concert with regional allies and partners, *while simultaneously and decisively deterring or thwarting opportunistic aggression in multiple other theaters by denying adversaries' objectives or punishing them with unacceptable costs*, all the while defending the U.S. homeland and maintaining missions such as active global counterterrorism operations.[45]

With the notable exception of operations in the Balkans in 1994–1995 and in Afghanistan in the fall of 2001—which both showcased the operational effectiveness of extended-range, precision-strike operations with a small ground-force "footprint"—the *de facto* U.S. preference when projecting power since Operation Desert Storm has been to gradually build up combat power and "iron mountains" of logistical support in a given theater of operations, maximize airpower sortie generation from close-in land and sea bases, and employ large mechanized ground forces to "defeat" adversaries directly through force of arms. As we have learned over the past quarter-century, however, this manpower-intensive approach depends upon political access to forward bases, lacks responsiveness, is very costly, and is not easily scalable to multiple theaters.

How might the United States better deter and, if necessary, defeat aggression in *multiple* regions given emerging threats and anticipated funding levels? In addition to the scale issue raised by the QDR and highlighted by the NDP, there are at least two other problems with persevering with the current U.S. approach to power projection: growing operational and strategic risk (e.g., heightened crisis instability, reduced credibility of U.S. deterrence commitments, and unaffordable, long-term cost imposition upon the United States).

44 Mark Gunzinger, *Shaping America's Future Military: Toward a New Force Planning Construct* (Washington, DC: Center for Strategic and Budgetary Assessments, 2013), pp. 3–13.

45 Emphasis added. William Perry and John Abizaid, co-chairs, *Ensuring a Strong U.S. Defense for the Future: The National Defense Panel Review of the 2014 Quadrennial Defense Review* (Washington, DC: United States Institute of Peace, 2014), p.2.

Growing Operational Risk

The U.S. military has been exploiting and building upon the technological "offsets" demonstrated in Operation Desert Storm for nearly a quarter-century. As expected based on competitive reactions to previous "military revolutions" in history, prospective adversaries have studied how the U.S. military projects power, identified vulnerabilities, and are developing and fielding capabilities to exploit them. Put another way, the anticipated costs of projecting power along the lines currently pursued by the U.S. military are increasing. Absent effective efforts to address this challenge, current and programmed U.S. power projection forces will become a wasting asset. As Secretary of Defense Chuck Hagel recently remarked:

The anticipated costs of projecting power along the lines currently pursued by the U.S. military are increasing.

> …[W]e are entering an era where American dominance on the seas, in the skies, and in space—not to mention cyberspace—can no longer be taken for granted. And while the United States currently has a decisive military and technological edge over any potential adversary, our future superiority is not a given.[46]

More specifically, the U.S. military now faces four core operational problems:

1. Close-in regional bases (e.g., ports, airfields, and ground installations), in a growing number of countries around the world, are increasingly vulnerable to attack;

2. Large surface combatants and aircraft carriers at sea are becoming easier to detect, track, and engage at extended range from an adversary's coast;

3. Non-stealthy aircraft are becoming more vulnerable to being shot down by modern integrated air defense systems (IADS); and

4. Space is no longer a sanctuary from attack.

Land Base Vulnerability

From an adversary's perspective, planning strikes against major U.S. power projection "hubs" would be relatively straightforward in that their locations are well known, they are relatively few in number, and their precise geo-locations can be easily pre-determined in peacetime. Attack options run the gamut from unconventional delivery options (e.g., terrorist attacks, sabotage, and raids by special operations forces); to short-range attack by precision-guided rockets, artillery, mortars, and missiles (G-RAMM); to high-volume air strikes;

46 Secretary of Defense Chuck Hagel, Defense Innovation Days, Opening Keynote Speech to Southeastern New England Defense Industry Alliance, September 3, 2014.

Planning strikes against major U.S. power projection "hubs" would be relatively straightforward.

and most worrisome, to long-range precision strikes with ballistic and cruise missiles.[47] Given trends in missile proliferation, not only will the number of states armed with missiles steadily increase, but so too will the size, lethality, and accuracy of their respective arsenals. While China represents the pacing threat in this regard, Russia, North Korea, Iran, and Syria have, to varying degrees, significant and growing conventional missile forces, as well as other base-denial capabilities.

Doctrine for China's People's Liberation Army's (PLA) Second Artillery Corps, which is responsible for conventional and nuclear missile operations, calls specifically for strikes on American and allied forward bases and infrastructure. Fully consistent with China's overarching strategy of "active defense" and concepts for "counter-intervention" and "anti-air raid" campaigns, the *Science of Second Artillery Campaigns* directs, for instance, that:

> When the powerful enemy uses allied military bases in our periphery and aircraft carriers as aircraft launch platforms to implement various forms of military intervention; and when the powerful enemy's allied military bases around our periphery are beyond our air arm's firing range, and when the carrier battle groups are far away from our shores…conventional missiles can be used to implement harassment strikes against the military bases of the enemy's allies around our periphery as well as the carrier battle groups.[48]

Putting combat muscle onto those doctrinal bones, the Second Artillery Corps has formed at least seven short-range ballistic missile (SRBM) brigades, three medium-range ballistic missile (MRBM) brigades, and three ground-launched cruise missile (GLCM) brigades over the past two decades.[49] It currently fields:

47 For a dated, but detailed consideration of air base vulnerability to missile attacks, see John Stillion and David Orletsky, *Airbase Vulnerability to Conventional Cruise-Missile and Ballistic-Missile Attacks* (Washington, DC: RAND, 1999).

48 PLA Second Artillery Corps, *The Science of Second Artillery Campaigns* (Beijing: PLA Press, 2004), p. 401.

49 Ron Christman, "China's Second Artillery Force," in Peter Dutton, Andrew Erickson, and Ryan Martinson, eds., *China's Near Seas Combat* Capabilities, China Maritime Studies (Newport, RI: Naval War College Press, February 2014), pp. 31–34.

- Over 1,000 SRBMs capable of reaching every major base in South Korea and Taiwan;

Author: Max Smith, http://en.wikipedia.org/wiki/DF-21#mediaviewer/File:DF-21A_TEL_-_Chinese_Military_Museum_Beijing.jpg

- Scores of MRBMs, including DF-21s and its variants (pictured right), and air-, sea-, and ground-launched land-attack cruise missiles (LACMs) that can strike key installations on Okinawa as well as major airfields and ports in mainland Japan, the Philippines, and Southeast Asia; and
- A limited capability to strike Apra Harbor and Andersen Air Force Base on Guam with H-6K fighter-bombers armed with CJ-10/20 LACMs (see Figure 1).[50]

The PLA is also developing a conventional IRBM with a range of 3,000–5,000 km, "increasing its capability for near precision strike out to the second island chain," running from Japan, through the Marianas and Guam, to Indonesia.[51] As the U.S.-China Economic and Security Review concluded in 2013: "The PLA is rapidly expanding and diversifying its ability to strike U.S. bases, ships, and aircraft throughout the Asia-Pacific region, including those that it previously could not reach, such a U.S. military facilities on Guam."[52] According to some PLA experts, China is striving to extend its conventional precision-strike capability out to 8,000 km by 2020.[53]

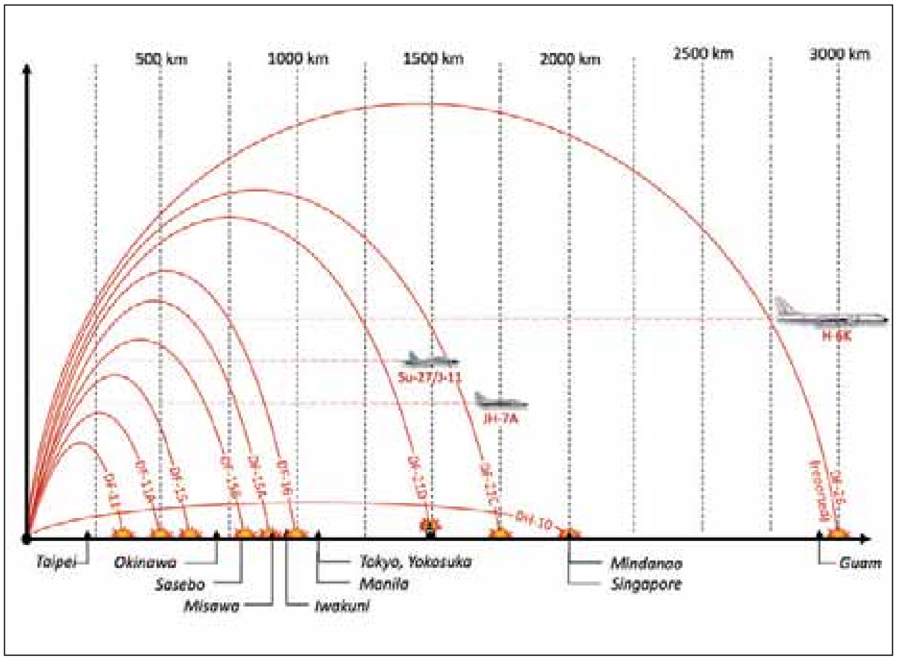
50 For a detailed discussion on PLA thinking regarding the operational requirement to strike Japanese naval bases, especially Yokosuka and Sasebo, see: Toshi Yoskihara, "Chinese Missile Strategy and the U.S. Naval Presence in Japan: The Operational View from Beijing," *Naval War College Review*, Summer 2010.

51 OSD, *Military and Security Developments Involving the People's Republic of China 2013,* p. 37; and Andrew Erickson, "Beijing's Aerospace Revolution," in Andrew Erickson and Lyle Goldstein, eds., *Chinese Aerospace Power* (Annapolis, MD: Naval Institute Press, 2011). p. 7.

52 U.S.-China Economic and Security Review Commission, 2013 Report to Congress (Washington, DC: GPO, 2013), p. 233.

53 Mark Stokes, *China's Evolving Conventional Strategic Strike Capability* (Arlington, VA: Project 2049, September 2009), p. 2.

FIGURE 1: PLA AIR AND MISSILE ATTACK RANGES IN THE WESTERN PACIFIC



The denial of close-in bases by prospective adversaries around the world—whether by unconventional attacks, G-RAMM strikes, or waves of long range air and missile attacks—would have profoundly detrimental implications for U.S. power projection. First, without access to secure ports, it would be impractical to insert and sustain large ground forces of any kind—but especially, heavy mechanized ground forces such as the Army's Stryker and Armored "Heavy" Brigade Combat Teams—at least early on in a campaign. Logistically sustaining high tempo air operations would also be problematic. Second, without access to close-in air bases (i.e., within 500–1,000 miles of target areas), the majority of U.S. land-based airpower would either be sidelined, owing to insufficient combat radius, or require extensive (and potentially vulnerable) aerial refueling support. U.S. land-based air power is currently comprised mainly of manned fighters, which generally have a combat radius of 300–600 miles depending on the aircraft, its weapons loading, and its flight profile. As of 2019, combat-coded, short-range, manned fighters will outnumber long-range bombers by roughly 10:1.[54] With the medium-altitude, long-endurance (MALE) MQ-9 *Reaper* air

54 In terms of current inventory (active and reserve), the disparity between long- and short-range aviation is roughly 3,300 fighters versus 159 bombers—or a ratio of more than 20:1. As of 2019, the Air Force will have 971 combat coded fighters and 96 heavy bombers of all types. DoD, *Annual Aviation Inventory and Funding Plan: Fiscal Years (FY) 2014–2043* (Washington, DC: DoD, May 2013); and OSD, *Quadrennial Defense Review 2014*, p. 40.

vehicle factored in, the ratio between long- and short-range aircraft is still roughly 3:1. Third, U.S. naval power projection is also heavily reliant upon forward logistics support facilities ashore at which ordnance, marine diesel fuel and aviation gas are stored. Without resupply from combat logistics force (CLF) ships (picture below) shuttling back and forth between the fleet and these facilities, which are typically undefended, typical carrier strike operations in wartime would cease within a few days.

Surface Ship Vulnerability

Finding, tracking, and attacking a moving ship far out at sea requires not only a wide-area ISR network, but also a command, control, and communication (C3) system to collect, process, fuse, and disseminate accurate targeting data to missile "shooters" in a timely fashion. Finally, the missile itself must be able to self-correct for target location error that accumulates during its time in flight (or receive in-flight targeting updates), discriminate the intended target from amongst "clutter" on the ocean's surface (e.g., commercial traffic) and then penetrate the target's defenses. While developing an ISR-strike network required to step through this "kill chain" successfully is a daunting challenge, several prospective adversaries have made steady progress over the past two decades. In the case of China, for example, the ISR portion of its network comprises land-, surface-, undersea-, airborne-, and space-based nodes and employs both passive sensors (e.g., electro-optical [EO]/infrared [IR], signals and electronic intelligence [SIGINT/ELINT], and acoustic arrays) and active sensors (e.g., over-the-horizon radar, synthetic aperture radar [SAR] and sonar). It now has an operational capability to find and track U.S. surface combatants far out into the Western Pacific and South China Sea.

The ISR and networking technologies enabling future "sea denial" networks are widely available and proliferating. Russia and China both market a variety of very capable active and passive sensor systems. As one naval expert aptly summarized, "Probably by 2030 we would have to accept that ships are visible, *The maturation and proliferation of "anti-navy" reconnaissance-strike networks over the coming decades will make it increasingly risky for the United States to operate large surface combatants, including aircraft carriers, within several hundred miles of an adversary's coast.*

identifiable, and trackable within a few hundred or a few thousand miles off-shore of anyone willing to make the effort to do so."[55]

The precision-strike portion of "anti-navy" networks being developed and fielded by prospective adversaries include advanced torpedoes; air-, sea-, and ground-launched anti-ship cruise missiles (ASCMs); and in the case of China and Iran, anti-ship ballistic missiles (ASBMs). China's operational ASBM with a reach exceeding 1,500 km, referred to as the DF-21D, gives "the PLA the capability to attack large ships, including aircraft carriers, in the Western Pacific."[56] According to some experts, the PLA may endeavor to extend its ASBM reach out to 3,000 km by the end of its "12th Five-Year Plan" in 2015.[57] Iran is working on an ASBM-variant of the *Fateh*-110 missile, dubbed the *Khalij Fars,* with an estimated range of 300 km and an EO/IR terminal seeker.[58]

Taking advantage of the dramatic growth in computational power and data processing capability over the past two decades, prospective adversaries are also fielding "fire-and-forget" weapons (e.g., advanced ASCMs and wake-homing torpedoes) that can compensate for targeting inaccuracy and be successfully employed by relatively low-skilled personnel.

The maturation and proliferation of "anti-navy" reconnaissance-strike networks over the coming decades will make it increasingly risky for the United States to operate large surface combatants, including aircraft carriers, within several hundred miles of an adversary's coast. In the Western Pacific and South China Sea, this stand-off distance could exceed 1,500 miles within a decade, which is about 500 miles greater than the range of *Tomahawk* land-attack missile (TLAM) and roughly three times the unrefueled combat radius of the F/A-18E/F *Super Hornet* multirole fighter. Early on in future campaigns, when an adversary's anti-navy network is likely to be at or near full operational readiness, U.S. guided-missile destroyers (DDGs) and cruisers (CGs) will be at risk if and when they close to within effective TLAM range. Similarly, if aircraft carriers honor the anti-navy threat posed by ASBMs, embarked fighters will require multiple air-to-air refueling cycles during both the ingress and egress from designated target areas.

55 Norman Friedman, "The U.S. Navy of 2030," *Defense*, Spring 2012.

56 OSD, *Military and Security Developments Involving the People's Republic of China 2013*, pp. 5–6; and Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities*, RL33153 (Washington, DC: CRS, February 2014), pp. 5–6.

57 Amy Chang and John Dotson, *Indigenous Weapons Development in China's Military Modernization*, Staff Research Report (Washington, DC: U.S.-China Economic and Security Review Commission, April 5, 2012), p. 23; and Mark Stokes, *China's Evolving Conventional Strategic Strike Capability*, p. 2.

58 Jeremy Binnie, "Iran Rolls Out Ballistic Missiles," *IHS Jane's Defence*, March 6, 2014.

Aircraft Vulnerability

The principal "area denial" threat to deployed U.S. aircraft, and to a lesser extent air- and sea-launched cruise missiles, are land- and sea-based IADS. Not only are modern IADS spreading widely around the globe, they are also growing more lethal owing to several compounding, interrelated trends: more sensitive radars operating over wider frequency bands, increased resistance to electronic attack (e.g., jamming and spoofing), increased interceptor range, more advanced signal processing, and high-speed networking. Variants of the Russian-made S-300 (SA-10/20, pictured above), for example, are already in service in about a dozen countries, including Algeria, Armenia, Azerbaijan, Belarus, Bulgaria, China, Slovakia, and Venezuela. Both Iran and Syria have repeatedly attempted to procure the S-300 from Russia. While current variants have a kinematic engagement range of over 100 nm, which is the maximum range of the interceptor, and reportedly have some ability to track and engage "stealthy" aircraft and cruise missiles, follow-on systems are expected to have considerably longer range.[59] China has developed an indigenous version of the S-300, dubbed the HQ-9 (pictured directly below), which will likely become available for export soon.

Not only are modern IADS spreading widely around the globe, they are also growing more lethal.

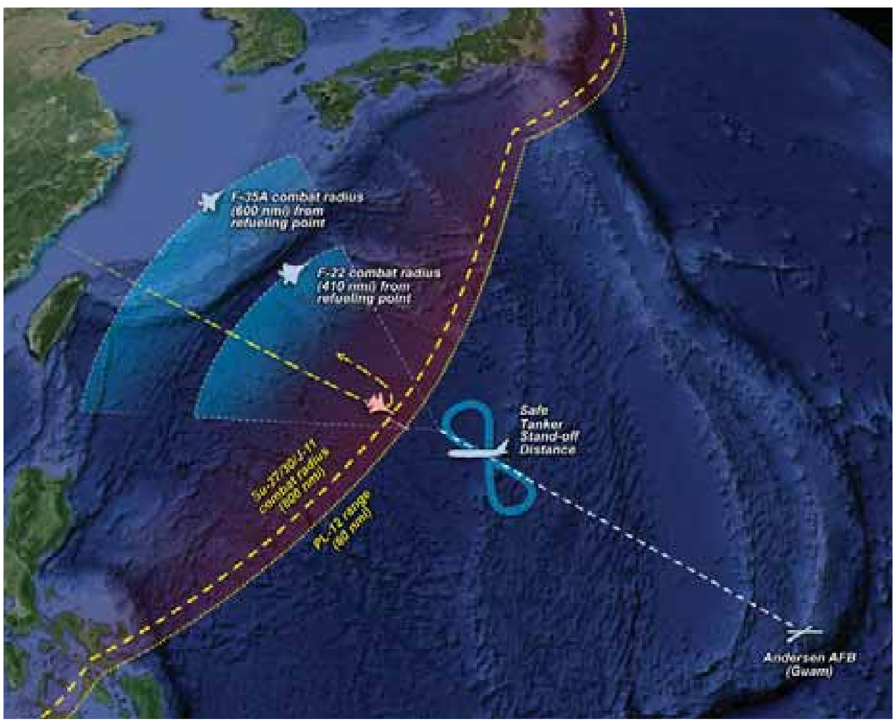
Author: Jian Kang, http://commons.wikimedia.org/wiki/File:Chinese_S-300_launcher.jpg.

Prospective adversaries are also investing in more capable air superiority fighters, outfitted with modern sensor systems and armed with beyond-visual-range (BVR) air-to-air missiles. These aircraft can be vectored—in some cases, in large numbers—to intercept U.S. aircraft based on rough targeting tracks developed by ground-based, low frequency, early warning radars. This has major consequences for U.S. airpower, which is currently

59 "S-30/Favorit (SA-10 'Grumble'/SA-20 'Gargoyle')," *Jane's Strategic Weapon Systems*, July 18, 2013.

dominated by fighter aircraft whose limited unrefueled radius keeps them on a short tether from aerial refueling aircraft. U.S. tankers will need to honor both the unrefueled radius of adversary fighters, and also the range of their BVR missiles, when maintaining aerial refueling "tracks" (rendezvous points) for penetrating U.S. aircraft. Against a nation such as China, which has a growing force of air interceptors with unrefueled combat radii between 600 and 900 nautical miles, this would require U.S. tankers to stand off as much as 750–1,000 nautical miles. It is critical to note that this standoff distance exceeds the unrefueled radii of the F/A-18E/F, F-22, and F-35A/B/C and thus would effectively preclude an offensive strike role for the entire U.S. fighter force (see Figure 2). Strike aircraft in the future will either need significantly longer unrefueled range or a new concept for defending the tanker.

FIGURE 2: THE FIGHTER "TANKER TETHER" PROBLEM



The diffusion of advanced IADS is problematic for traditional U.S. power projection because the overwhelming majority of U.S. surveillance and strike aircraft are short-range, as discussed above, and non-stealthy. Today, stealthy aircraft (i.e., the B-2, F-22, and RQ-170 *Sentinel*) account for less than one-tenth of the joint force. With the exception of the B-2, even those "stealthy" aircraft lack RCS reduction across the full threat radar frequency range and from all viewing aspects. The ongoing fielding of the "semi-stealthy" F-35 *Lightning II* multirole fighter, as well as the introduction of the Long-Range Strike Bomber (LRS-B) in the mid-2020s, will enhance the fleet's overall survivability.[60] A serious imbalance, however, will remain between stealthy and non-stealthy aircraft under the current DoD program of record. Redressing this imbalance should be an essential component of any new offset strategy.

Loss of Sanctuary in Space

For power projection, the U.S. military relies heavily upon space for precision navigation and timing, which is provided by GPS; near-global ISR coverage with a constellation of SAR, EO/IR, and ELINT/SIGINT satellites; long-haul communications; and meteorology. Unfortunately, recognizing this dependence, numerous countries around the world have invested in GPS and satellite communications (SATCOM) jammers, which are widely available on the world market. A smaller but growing number of states can "dazzle" or blind EO/IR satellites in low-earth orbit with ground-based laser systems. Russia and China are developing capabilities to mount lethal laser attacks; conduct hit-to-kill, direct-ascent anti-satellite (ASAT) intercepts; and execute co-orbital attacks.[61]

Although other countries, Russia and China included, also rely upon space for commercial and military purposes, U.S. dependence is far higher. As former Director of National Intelligence James Clapper observed, "Chinese and Russian military leaders understand the unique information advantages afforded by space systems and are developing capabilities to disrupt U.S. use of space in

60 Carlo Kopp, "Evolving Technological Strategy in Advanced Air Defense Systems," *Joint Forces Quarterly*, Issue 57, 2nd Quarter 2010, p. 93; and "Interview with Congressman J. Randy Forbes," *The National Interest*, June 9, 2014.

61 China reportedly demonstrated a co-orbital ASAT capability in LEO in August and November 2010 and possibly in 2008. Andrea Shalal-Esa, "China's Space Activities Raising U.S. Satellite Concerns," *Reuters*, January 14, 2013; and Brian Weeden, "China's BX-1 Microsatellite: A Litmus Test for Space Weaponization," *The Space Review*, October 20 2008.

a conflict."[62] In the case of China, counter-space attacks figure prominently in their doctrinal writings. According to DoD:

> PLA writings emphasize the necessity of "destroying, damaging, and interfering with the enemy's reconnaissance … and communications satellites," suggesting that such systems, as well as navigation and early warning satellites, could be among the targets of attacks designed to "blind and deafen the enemy."[63]

Based on current trends, future power projection operational concepts should assume that:

- GPS-precision navigation and timing signals will be frequently degraded, disrupted, or unavailable, especially around high-value installations;
- Unprotected commercial and military SATCOM will be severely degraded, and jam-resistant "protected" SATCOM (i.e., Advanced Extremely High Frequency satellites) capacity will be over-subscribed;[64]
- Adversaries will know when EO/IR satellites are passing overhead and may engage them with low- to high-power lasers; and
- SAR and ELINT satellites will be subject to terrestrial and on-orbit jamming.

Future power projection concepts should also hedge against the complete loss of high-value satellites, including protected SATCOM.

The combination of growing close-in base vulnerability, surface combatants' mounting susceptibility to attack at standoff ranges, the proliferation of increasingly lethal adversary IADS, and the potential loss or degradation of key space-based enablers threatens to upend the "traditional" U.S. approach to power projection. This will only be exacerbated by other A2/AD threats such as aggressive electronic and cyber attacks focused on disrupting U.S. C4ISR networks.

62 James Clapper, Director of National Intelligence, "Worldwide Threat Assessment of the U.S. Intelligence Community," statement for the Senate Select Committee on Intelligence, January 29, 2014, p. 7.

63 OSD, *Military and Security Developments Involving the People's Republic of China 2013,* p. 33.

64 For a detailed discussion of the current and planned U.S. military SATCOM architecture and threats to it, see: Todd Harrison, *The Future of MILSATCOM* (Washington, DC: Center for Strategic and Budgetary Assessments, 2013).

Mounting Strategic Risk

These operational challenges have at least three problematic strategic ramifications: heightened crisis instability; waning credibility of U.S. deterrence threats and allied confidence in the U.S. military's ability to meet its security commitments; and increasing cost imposition on the United States that will undermine its ability to compete with prospective rivals over time.

Continued reliance upon a relatively small number of major U.S. power projection hubs could be strategically destabilizing in two ways: prompting regional arms races and encouraging preemption.

Heightened Crisis Instability

Continued reliance upon a relatively small number of major U.S. power projection hubs could be strategically destabilizing in two ways: prompting regional arms races and encouraging preemption. Recognizing the growing vulnerability of U.S. bases, regional friends and allies may increasingly question the ability of the United States to defend them. Wrestling with such doubt and facing mounting threats to their security, they may take more aggressive steps to provide for their own defense, including developing or acquiring new offensive weapon systems. The resulting "security dilemma" dynamic could potentially fuel regional arms racing and, at the extreme, nuclear proliferation.[65] This dynamic would be mostly likely to occur in East Asia, which is a critical economic engine for the world economy, and the Middle East, which is already beset by a volatile brew of economic, demographic, political, religious, and sectarian tensions. While one might argue that having U.S. allies and partners invest more in their own defense would be a positive development, it could come at a high cost in terms of reduced U.S. influence, increased regional instability, and escalatory risk. As will be discussed below, waning confidence in the ability of U.S. forces to mount an effective defense could also induce some countries to abandon their security arrangements with Washington and "bandwagon" with U.S. regional rivals.

Rather than signaling U.S. resolve and deterring future adversaries, the buildup of U.S. combat power on vulnerable forward bases (e.g., Okinawa) in a crisis may inadvertently precipitate conflict. Consistent with the emphasis given to

65 For an explanation of the security dilemma, see: Robert Jervis, "Cooperation Under the Security Dilemma," *World Politics*, January 1978, pp. 167–214.

maximizing surprise and seizing the initiative in PLA doctrine, China would have a strong incentive to neutralize forces deployed to close-in regional bases preemptively before they could mount damaging strikes against Chinese forces or territory. The doctrine of the Second Artillery Corps recommends, for example, that: "It is necessary to strike the enemy at the first opportunity, before the enemy has discovered our campaign intentions and actions, surprise the enemy, act before the enemy, strike rapidly, catch the enemy by surprise."[66] A similar "use them or lose them" mindset would likely apply to Iranian and North Korean missile forces as well.

Waning Deterrence Credibility and Allied Confidence

At the heart of deterrence is the perceived ability and willingness of the United States to make the costs of aggression by a prospective adversary unacceptably high.[67] A critical part of that calculation, however, is the anticipated costs to the United States of following through on its threatened actions. To be credible, the U.S. military must not only have the physical wherewithal to carry out threatened attacks, but also the ability to do so at an acceptable risk and cost to the United States.

If prospective adversaries perceive that their maturing A2/AD capabilities could significantly elevate the probable costs of U.S. power projection efforts, conventional deterrence would be weakened. Chinese doctrinal writings stress that deterrence requires "real capability" to backstop threats, the will to use it, and "measures to ensure that the opponent can perceive both the capability and the willingness to use the deterrent force."[68] As the PLA deploys *and* exercises progressively more capable "anti-intervention" capabilities over the coming decades expressly designed to elevate the anticipated costs of American involvement in a conflict in Asia, there is a growing risk that Chinese political leaders—as well as other prospective adversaries—may conclude, perhaps mistakenly, that the United States would be unable and/or unwilling to project power in response to regional aggression. Absent convincing demonstrations of countervailing U.S. power projection capability, this outcome would be even more likely.

66 PLA Second Artillery Corps, *The Science of Second Artillery Campaigns,* pp. 139–141, 326, 401. For additional insight on PLA missile doctrine, see: Peng Guangqian and Yao Youzhi, eds, *The Science of Military Strategy* (Beijing: Military Science Press, 2005), pp. 459–461, 463–466; Yoshihara, "Chinese Missile Strategy and U.S. Naval Presence in Japan"; and Wang Houqing and Zhang Xingye, *The Science of Campaigns* (Beijing: National Defense University Press, May 2000), pp. 312–330.

67 Understanding how prospective adversaries perceive and weigh relative costs and benefits, and thus what is most likely to deter them, merits additional research and analysis.

68 Larry Wortzel, "Deterrence and Presence after Beijing's Aerospace Revolution," in Andrew Erickson and Lyle Goldstein, eds., *Chinese Aerospace Power*, pp. 436–437; and Peng Guangqian and Yao Youzhi, eds., *The Science of Military Strategy* (Beijing: Military Science Press, 2005), pp. 213–216.

Similarly, American friends and allies may begin to question the credibility of U.S. treaty and other security commitments. Should they conclude that the United States lacks either the capability or the will to meet its obligations, America's Pacific allies and partners might "bandwagon" with an increasingly economically and militarily powerful China—undermining the U.S. geo-strategic position in the region and its reputation as a superpower.

The current cost of U.S. active missile defenses far exceeds that of the in-bound missiles, especially SRBMs and shorter-range LACMs.

Cost Imposition on the United States

With the requisite investment, it might be possible to better defend close-in air and sea bases. The problem, however, is that the current cost of U.S. active missile defenses far exceeds that of the in-bound missiles, especially SRBMs and shorter-range LACMs. For close-in airbases, the U.S. military could (and probably should) also invest in passive defenses (e.g., early warning networks, hardened shelters, underground fuel storage, dispersion fields, and active defenses). All of these investments, however, are costly and, at least for close-in bases, could be overwhelmed with high-volume missile salvos and air strikes. The *annual* cost for the Terminal High Altitude Area Defense (THAAD), Aegis Ballistic Missile Defense, and Patriot Advanced Capability systems, for example, is nearly $3 billion—and that only represents a small portion of the total cost associated with active missile defenses.[69]

For improved aircraft carrier survivability, the Navy is heavily investing in a wide range of layered capabilities for intercepting ASCMs and disrupting the DF-21D ASBM "kill chain," from degrading wide-area, over-the-horizon surveillance systems, to intercepting the missiles in various stages of flight, to terminal sensor jamming and spoofing.[70] As Chief of Naval Operations, Admiral Jonathan Greenert, explained in 2012:

69 Excludes the ground-based midcourse defense system, O&M costs associated with the Missile Defense Agency, and the supporting ISR and communications architecture for theater missile defense. OSD Comptroller, *Program Acquisition Cost by Weapon System for FY 2015 Budget Request* (Washington, DC: DoD, March 2014), pp. 4.2–4.6.

70 O'Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities*, p. 55.

> Navy forces will defeat ASBMs by countering each link in the operational chain of events required for an adversary to find, target, launch, and complete an attack on a ship with a ballistic missile. The Navy is fielding new systems that jam, decoy, or confuse the wide-area surveillance systems needed to find and target ships at long range. To shoot down an ASBM once launched the fleet will employ the Aegis ballistic missile defense systems and SM-3 missile. And, to prevent an ASBM from completing an attack, the Navy is fielding new missiles and electronic warfare systems over the next several years that will destroy, jam, or decoy the ASBM warhead as it approaches the ship.[71]

First, these defensive investments are expensive. Each SM-3 Block IB interceptor costs about $10–12 million (pictured previous page), and each Block IIA interceptor costs $20–24 million.[72] In a typical DF-21D engagement scenario, multiple SM-3s would be launched. The aggregate cost of those interceptors, therefore, would far exceed that of a single DF-21D, which is variously estimated at about $5–10 million per missile.[73] Second, several defenses have a limited "shelf life" before adversaries introduce counter-measures. U.S. fielding of electronic warfare systems that can "jam, decoy, and confuse" adversary sensors, for example, will inexorably lead to counter-measures designed to reduce their effectiveness from shifting sensor frequency bands, to integrating multi-mode sensors, to more capable electronic self-protection techniques. Third, the more the Navy invests in missile interceptors to defend the fleet, the more it reduces the fleet's offensive punch. Every defensive SM-3 or SM-2/6 missile that fills a vertical launch system (VLS) cell aboard a DDG or cruiser necessarily means one less Tomahawk LACM or other offensive missile.

Continuing in the current symmetric competition with adversaries amassing ever larger ballistic and cruise missile arsenals is to engage in a cost-imposing strategy with the United States on the wrong end of the cost equation. In the short run, however, the U.S. military appears to have few options other than to continue making such investments to defend critical forward bases of operation. Two promising options for reversing the current offense-defense cost balance are electromagnetic rail guns and directed-energy based terminal defenses (e.g., high-energy, solid-state lasers).[74] Both offer dramatically lower cost per

71 Jonathan Greenert, "Sea Change, The Navy Pivots to Asia," *Foreign Policy*, November 14, 2012. See also: "Interview: Adm. Jon Greenert," *Defense News*, January 14, 2013, p. 30.

72 The Missile Defense Agency plans on spending approximately $1.7B annually on sea-based Aegis BMD efforts. Ronald O'Rourke, *Navy Aegis Ballistic Missile Defense (BMD) Program: Background and Issues for Congress*, RL33745 (Washington, DC: CRS, April 8, 2014)), pp. 5, 14.

73 Andrew S. Erickson, "Ballistic Trajectory: China Develops New Anti-ship Missile," *Jane's Intelligence Review*, January 4, 2010.

74 Mark Gunzinger with Chris Dougherty, *Changing the Game: The Promise of Directed-Energy Weapons* (Washington, DC: Center for Strategic and Budgetary Assessments, 2012)), pp. 25–52.

engagement "round," a very deep magazine, and could prove costly to counter effectively. Rail guns could focus on defense against heat-shielded, high-speed ballistic missile re-entry vehicles, while high-energy lasers (above left) could focus on cruise missiles, manned and unmanned aircraft, and other air-breathing threats. Even with such new defenses, high offensive salvo density will likely remain an enduring problem for very close-in land and sea bases (i.e., within 500–700 nm of the enemy). Thus, an important element of any new offset strategy must be transitioning to a military force that is far less reliant upon close-in bases.

An important element of any new offset strategy must be transitioning to a military force that is far less reliant upon close-in bases.

CHAPTER 3

Key Elements of a New Offset Strategy

To reduce operational risk, improve crisis stability, strengthen conventional deterrence, and reverse long-term cost imposition on the United States, DoD needs to craft and adopt a new offset strategy that:

1. Exploits enduring sources of U.S. advantage to maintain persistent forward presence and project power when and where necessary, including against adversaries with robust A2/AD networks, with reduced dependence upon increasingly vulnerable forward land and sea bases; and

2. Shifts from a conventional deterrence strategy premised upon the threat of direct attack though "traditional" combined arms campaigns to restore the *status quo ante* to one that places relatively more emphasis on deterrence by denial and punishment.

As with the New Look in the 1950s, the United States should take advantage of the strategic flexibility afforded by extended-range air operations and the coercive value of "strategic asymmetry," or threatening to strike high-value targets outside the immediate theater of combat operations. As with the Brown-Perry approach in the late 1970s, the United States should leverage broad sources of technological advantage—not to compete jet-for-jet or missile-for-missile with prospective adversaries, but rather to multiply the overall effectiveness of a smaller joint force, shift the competition into advantageous areas, and impose costs upon prospective adversaries as part of a long-term competition. In addition, for affordable scalability, it should also embrace a balanced "high-low" mix of capabilities aligned against the diverse array of threats that the U.S. military

A new offset strategy could take advantage of enduring U.S. technological, operational, and human capital advantages to project power credibly when and where necessary.

will likely confront globally over the coming decades.[75] For example, in most areas of the world, persistent ISR presence could be generated with non-stealthy Air Force RQ-4 *Global Hawk* HALE UAVs, Navy MQ-4 *Triton* broad-area maritime surveillance UAVs, and MQ-9 *Reaper* MALE UAVs as opposed to somewhat more costly "stealthy" versions of those aircraft, which would be required in mid-to-high threat areas concentrated in Eastern Europe (Russia), the Middle East/Levant (Syria and Iran), and the Western Pacific (China, Russia, and North Korea). Similarly, while offshore long-range strike capacity could be provided more affordably by DDGs than submerged platforms in most areas, additional undersea strike capacity will likely be needed when projecting power against adversaries with the ability to locate and target surface combatants at extended range (e.g., China, increasingly Russia, eventually Iran, and possibly Syria). Finally, as with both its antecedents, a "third" offset strategy should take full advantage of U.S. alliance and security relationships.

Leverage Enduring U.S. Advantages to Project Power Differently

Just as the United States exploited its lead in information technology to "look deep" and "shoot deep" into Warsaw Pact territory in the late 1970s and 1980s, confounding Soviet war plans by threating to slow the movement of and weaken reinforcing ground units, a new offset strategy could take advantage of enduring U.S. technological, operational, and human capital advantages to project power credibly when and where necessary, reduce the effectiveness of adversarial investments in A2/AD capabilities, enhance crisis stability and conventional deterrence, and impose costs on rivals as part of a long-term competition. Based on current trends, it appears that enduring sources of U.S. military advantage include unmanned operations; extended-range air operations; low-observable air operations; undersea warfare; and complex systems engineering, integration, and operations.

Unmanned Operations

The United States is on the forefront of unmanned system development and operations, especially with respect to advanced autonomous air vehicles such as the RQ-4 *Global Hawk* and X-47B UCAS-D. With over a decade of experience operating hundreds of UAVs around the world—most especially in Iraq, Afghanistan, Pakistan, and Yemen—the U.S. military has established a

75 In 1981, for example, Secretary Brown asserted, "even with the most sophisticated weapon systems, however, we cannot allow the numerical disparities between us and the Soviets to widen further. Thus, we continue to plan our forces on the basis of a "high-low" mix of high performance, high technology systems with less complicated, less expensive systems. Brown, *Department of Defense Annual Report Fiscal Year 1982*, p. x.

recruitment and training program, developed battle management tools, and gained operational proficiency that will be difficult for competitors to duplicate quickly.

No other country in the world can conduct sustained, high tempo ISR and strike operations over global distances.

The Army and Marine Corps have gained years of technical and practical experience operating unmanned ground vehicles (UGVs) in Iraq and Afghanistan, mainly for tactical reconnaissance and defeating improvised explosive devices. The Navy has developed and experimented with a wide-range of unmanned surface vessels (USVs) and UUVs. While most of this effort has focused on maritime ISR, seafloor mapping, and counter-mine applications, the Navy is actively exploring USVs and UUVs for anti-submarine warfare, payload delivery, information operations, and time-critical strike.[76] Industry, meanwhile, is making important strides in key UUV-enabling technologies including high-density energy storage and undersea communications.

The United States is also a world leader in artificial intelligence and machine-learning technologies, which will enable all unmanned systems to become more autonomous over time, and thus, less dependent upon potentially vulnerable data-links. Scaled-up unmanned operations—including in the sea, undersea, land, and space domains—could leverage U.S. practical experience, its technical competence in automation-related enablers, and a deep-seated U.S. advantage in complex systems engineering and integration. Since refuelable or "rechargeable" unmanned systems offer extended mission endurance with a relatively low life-cycle cost compared to manned platforms, they could potentially provide an affordable means of providing scalable, persistent coverage over multiple areas of interest at once. Indeed, as a harbinger of what might be possible in the future, simultaneous unmanned air vehicle operations—albeit in some locations on a limited scale—are already being conducted in multiple "hot spots" in Afghanistan and Pakistan, the Middle East, and Africa.

Extended-Range Air Operations

No other country in the world can conduct sustained, high tempo ISR and strike operations over *global* distances. A core enabler of this intercontinental reach is air-to-air refueling (AAR). While the U.S. Army Air Corps experimented with

76 Antoine Martin, "U.S. Expands Use of Underwater Unmanned Vehicles," *National Defense*, April 2012, pp. 34–35; and DoD, *Unmanned Systems Integrations Road Map FY2013–2038* (Washington, DC: DoD, 2013), p. 8.

AAR as early as 1929, it was SAC that nurtured it into an operational capability in the early 1950s by developing and fielding the piston-engine KC-97 *Stratotanker* equipped with a "flying boom" for high-volume fuel transfer, and later, the jet-powered KC-135 *Stratotanker*—of which more than 700 were eventually built. With more than a half-century of AAR experience, the Air Force now operates a fleet of 456 tankers, roughly split between the active and reserve components. The Air Force intends to recapitalize its aging tanker fleet, mostly KC-135s, with a total of 179 KC-46A tankers by 2027.[77]

In the near term, in addition to the tanker fleet, the backbone of the extended-range air operations force will comprise manned bombers (B-2s, B-52s, and B-1s); hundreds of MQ-1/MQ-9 *Reaper* variants; and more than 30 HALE ISR UAVs such as the RQ-4 *Global Hawk*.[78] In the future, the joint fleet will become increasingly unmanned with the procurement of over 60 long-endurance MQ-4 *Triton* broad-area maritime surveillance UAVs. The fleet will also become more survivable as the stealthy LRS-B initially replaces the B-1 and then, in theory, the B-52 bomber.

Hard-learned competence in extended-range air operations will allow the United States to project power without access to increasingly vulnerable close-in forward bases, which will enhance crisis stability and conventional deterrence. To sustain this capability in mid-to-high threat environments, however, it is essential to develop and field low-observable ISR-strike aircraft with sufficient combat radius to project power while tankers remain outside of adversary IADS range, to include the enemy's air defense fighters. The marriage of unmanned operations and global aerial refueling capability could also enable ultra-long mission endurance, quite possibly measured in days rather than hours, making it possible for a relatively small number of unmanned aircraft to provide persistent ISR-strike coverage over wide geographic areas. The latter would be very

77 DoD, *Annual Aviation Inventory and Funding Plan*: *Fiscal Years (FY) 2014–2043*, pp. 20–21

78 The Air Force plans to procure roughly 400 MQ-9 Reapers. The procurement will be split between standard versions, with an endurance of 30 hours in ISR-only and roughly 23 hours when armed with Hellfire missiles, and extended range variants, with 42 hours and 35 hours in those mission profiles, respectively. It also will field 3 RQ-4 Block 20s, 21 Block 30s, and 11 Block 40s—all with 30-plus hours of endurance. Aaron Mehta, "U.S. Air Force Plans for Extended-Range Reaper," *Defense News*, March 3, 2013.

useful—if not indispensible—for finding and attacking mobile and re-locatable targets over wide areas. It would also provide global responsiveness in that land- and carrier-based unmanned aircraft could surge to a given theater of operations regardless of their initial basing location.

While this section has focused on air power, a similar U.S. advantage—albeit less responsive—arguably exists with respect to the global reach of maritime operations made possible by the combination of nuclear-powered ships (e.g., aircraft carriers, SSNs, and SSGNs); a dedicated CLF comprising dry cargo/ammunition ships (T-AKE), fast combat support ships (T-AOE), and fleet replenishment oilers (T-AO); and ashore logistics facilities. As discussed in Chapter 2, however, this advantage is growing increasingly fragile and, in some respects, has atrophied over the past two decades. At some 30 ships, the CLF is arguably too small to adequately support the fleet in wartime; it is civilian crewed; and the ships themselves lack any self-defense capability. In addition, ashore infrastructure is typically undefended. The Navy no longer has an operational capability to reload VLS cells while underway.

"Low Observable" Air Operations

Although multi-static radars and passive infrared detection systems may increase the detectability of "stealth" aircraft in the future, it will take considerable time and resources for competitors to field reliable, wide-area ISR-strike networks that can find, track, and engage state-of-the-art, low-observable (LO) systems such as the LRS-B on a consistent basis. To sustain the significant U.S. operational advantages conferred by low-observable aircraft, however, it will become increasingly important to harness the synergy between very low passive radar signatures and

The ability of U.S. submarines to project power from under-the-sea is almost certain to endure—and will be costly and time-consuming for adversaries to counter effectively.

advanced electronic attack in the radio-frequency domain, as well as to enhance signature management in the infrared portion of the electromagnetic spectrum. While some prospective adversaries (e.g., Russia and China) are beginning to develop and field stealth aircraft of their own, the United States retains a significant qualitative lead in the design and manufacture of LO aircraft. Furthermore, Air Force personnel have over three decades of practical experience planning, conducting, and sustaining combat operations with LO aircraft. Operationally, it will be very difficult for competitors to match that level of proficiency. The U.S. advantage in LO aircraft operations, in combination with stand-in electronic attack and new weapons, could enable high-volume, precision strikes against defended targets, including strikes against A2/AD nodes; deep inland strikes; persistent surveillance and strike of mobile and relocatable targets; and attacks against hardened and deeply buried targets (HDBTs) with large, earth-penetrating weapons.

Undersea Warfare

Taking advantage of the stealth made possible by operating deep beneath the ocean's waves and their very low acoustic signature, U.S. submarines can penetrate into high-end A2/AD environments to conduct unique ISR missions, anti-submarine (ASW) and anti-surface warfare (ASuW) operations, clandestine insertion and recovery of special operations forces (SOF), and unwarned, precision land attack. While prospective adversaries are investing in the development and fielding of ASW technologies (e.g., seabed-arrays, low-frequency active sonar, UUVs, and non-acoustic sensors) that may make it more challenging for U.S. submarines to operate in shallow littoral waters and chokepoints, the ability of U.S. submarines to project power from under-the-sea is almost certain to endure—and will be costly and time-consuming for adversaries to counter effectively. The United States could more fully leverage this advantage by expanding undersea strike capacity and flexibility, to include the ability to conduct electronic attack as well as counter-sensor and counter-air operations. To preserve the U.S. ability to reach into well-defended, close-in littoral waters, it will likely be necessary to field:

- A family of increasingly autonomous, difficult-to-detect, long-range UUVs, which could be supported forward by manned SSNs;

- Seabed payload modules that could be deployed by submarines or surface ships in peacetime, or by low-observable aircraft during hostilities; and
- Large-capacity, towed payload modules (TPMs) that can be pre-deployed by SSNs.[79]

While many undersea-warfare related technologies will inevitably proliferate over time, it will be difficult for rivals to match the experience, skill-level, and ingenuity of American submariners in their practical application.

Complex Systems Engineering, Integration, and Operations

The U.S. military and defense industry have a demonstrated track record of designing, building, operating and maintaining very complex weapon systems as well as "system of systems" architectures. This competence requires a depth and breadth of technical understanding, along with a considerable measure of "art" gleaned from years of practical experience, which will likely remain difficult for most competitors to duplicate. The United States could exploit this advantage by linking heterogeneous, geographically distributed platforms—especially those referenced previously (e.g., long-endurance UAVs, long-range and low-observable aircraft, and undersea systems)—into a global surveillance and strike network.

To borrow from business strategy lexicon, all five of the capability areas discussed above could be considered "core competencies" of the Department of Defense. A core competency is a complex combination of technology, industrial base, skilled manpower, training, doctrine, and practical experience that enables the U.S. military to conduct strategically useful operations that are difficult for rivals to duplicate or counter.[80] It is worth noting, moreover, that some platforms exploit multiple core competencies. The B-2 and LRS-B combine global reach and stealth. SSGNs and SSNs exploit U.S. advantages in undersea warfare, and arguably, global reach provided by nuclear power. Future air-refuelable, carrier- and land-based UCAS could build upon core competencies in unmanned, extended-range, and low-observable operations.

79 Seabed pods could be pre-deployed years in advance in depths of 4–6 km, each containing 3–4 weapons or other payloads. A notional TPM with 12 large-diameter tubes might be about 200 feet long, 30–40 feet in hull diameter, and displace 3,000–4,000 tons. It could be towed into position by SSNs and remain on station for months at a time, anchored or moored to the continental shelf seabed.

80 W. Cockell, J. J. Martin, and G. Weaver, *Core Competencies and Other Business Concepts for Use in DoD Strategic Planning* (McLean, VA: SAIC, February 7, 1992). This report was done for the Directors of Net Assessment, OSD, and the Defense Nuclear Agency.

The United States should place more emphasis on decreasing an adversary's perception of the probability of achieving its war aims.

Increase Emphasis on Deterrence by Denial and Punishment

In addition to projecting power differently by taking more advantage of the U.S. core competencies described above, concerns about U.S. conventional deterrence credibility would also be ameliorated by adopting a strategy that is less dependent upon the threat to restore the *status quo ante* through the direct application of force. Instead, the United States should place more emphasis on *decreasing* an adversary's perception of the probability of achieving its war aims in the first place (i.e., deterrence by denial), and *increasing* the anticipated costs of attempting to do so by threatening asymmetric retaliatory attacks against highly valued targets (i.e., deterrence by punishment). The former would require both a high degree of situational awareness and the ability to apply force quickly to derail an adversary's campaign in its opening phases, regardless of the threat situation or basing availability. The goal would be either to sow doubt about the feasibility of achieving a rapid *fait accompli* that would be costly and difficult for the United States to reverse, and/or increase fears that a conflict with the United States would become protracted with all the attendant domestic political and economic ramifications. Deterrence by denial would place a premium on survivable, combat-credible forward presence and global responsiveness. Persistent forward presence need not, and indeed should not, be provided primarily by forces based in close proximity to the adversary, but rather by offshore naval platforms and long-range air forces that can be repositioned quickly and remain on-station for extended periods. Deterrence by punishment, which strategist Thomas Schelling refers to as the ability to "hurt," would require the ability and willingness to identify and destroy high-value targets regardless of where they are located or how they are defended.

A future U.S. military that is better sized, shaped, and postured to reduce an adversary's confidence in their ability to achieve their objectives through the use of force (denial), as well as to elevate their assessment of the probable costs of attempting to do so (punishment) would bolster conventional deterrence. To deter adversaries and reassure allies, combined exercises could be conducted routinely in peacetime to demonstrate the U.S. capability to disrupt what are believed to be critical lines of operation associated with prospective adversaries' offensive campaign plans—and to do so quickly and at a cost tolerable to the United States. Increased reliance upon unmanned platforms that do not put human crews at risk could, for example, enhance their perceived usability in the minds of potential adversaries who view American leaders as casualty averse. The U.S. military could also craft exercises to demonstrate the ability to neutralize targets previously presumed to be safe (e.g., hardened and deeply buried facilities).

In the event this expanded deterrence framework failed, the U.S. military would be ready to stymie an adversary's offensive operations through rapid strikes, blunting damage to regional friends and allies, as well as hopefully preventing a *fait accompli*. It could also attempt to induce adversary compliance (e.g., ceasing hostilities) by meting out calculated, escalating punishment.[81]

For example, in response to an attempted Chinese seizure of the Spratly or Senkaku Islands, or an amphibious assault against Taiwan, however unlikely, the U.S. military would be postured to begin interdicting the movement of troops and supplies quickly (i.e., deterrence by denial). Key elements might include local A2/AD capabilities such as coastal defense cruise missiles and surface-to-air missile batteries operated by allies; pre-deployed "smart" mines on the seabed augmented by mines rapidly delivered by the LRS-B, land- and carrier-based UCAS, and forward-deployed UUVs; torpedo attacks by SSNs and possibly UUVs; air-launched ASCM strikes by LRS-B and UCAS; and offensive and defensive counter-air operations with low-observable, land- and carrier-based aircraft, both manned and unmanned. The goal would be to prevent a successful lodgment of PLA forces, which would likely be more difficult and costly to "reverse" directly. While fraught with more escalatory risk, the U.S. military could also conduct strikes against Chinese airfields and mobile missile forces to limit the damage U.S. allies/partners would otherwise have to absorb, as well as to reduce the threat to relatively distant U.S. "rim" bases, outside the range of most of the Second Artillery's missile forces. In parallel, as part of a punishment campaign, the U.S. military could begin sinking the PLA's surface and submarine fleets, regardless of their geographic location. Since China's senior leaders have a neuralgic sensitivity about protecting critical sea lines of communication from disruption by other regional powers such as India and Japan, the progressive loss of high-cost, difficult-to-replace warships would almost certainly influence their cost-benefit calculation.[82] Offers of "face saving" options for Beijing to comply with U.S. demands to cease hostilities and return to the *status quo ante* could be backstopped by the credible threat of escalating asymmetric "punishment" attacks.

81 Thomas Schelling refers to the latter as "compellence." While "brute force" attempts to overcome an adversary's defenses directly to seize something of value, occupy territory, or disarm him, compellence is "inducing his withdrawal, or his acquiescence, or his collaboration by an action that threatens to hurt, often one that could not forcibly accomplish its aim but that, nevertheless, can hurt enough to induce compliance." Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 1966), pp. 2–3, 70–71, and 79–80.

82 Approximately 80 percent of the crude that China imports—over 3 million barrels per day—passes through the Strait of Malacca. Gabriel B. Collins and William S. Murray, "No Oil for the Lamps of China?" *Naval War College Review*, Spring 2008, p. 1. For additional information on Chinese fears of interdiction of its energy lifelines to the Middle East, see: Ling Yun, "The Dragon's Arteries," *Modern Ships*, October 2006, pp. 8–19; Lei Wu and Shen Qinyu, "Will China Go to War over Oil?" *Far Eastern Economic Review*, April 2006, p. 38; Gabe Collins, Andrew Erickson, and Lyle Goldstein, "Chinese Naval Analysts Consider the Energy Question," in *Maritime Implications of China's Energy Strategy* (Newport, RI: Chinese Maritime Studies Institute, 2006); and Andrew Erickson and Lyle Goldstein, "Gunboats for China's New 'Grand Canals'," *Naval War College Review*, Spring 2009, pp. 43–75.

CHAPTER 4

Implementing a New Offset Strategy:

The Global Surveillance and Strike Concept

As part of a new offset strategy, U.S. advantages in the five capability areas summarized in Chapter 3 could be leveraged to form a joint GSS network to deter by the credible threat of denial and asymmetric punishment. If necessary, this same network could be used to "roll back" an adversary's A2/AD network or otherwise set the conditions for a more traditional U.S. power projection campaign. The GSS network would be:

- *Balanced* in that it would comprise a mix of low-end and high-end platforms aligned to widely varying threat environments—including advanced A2/AD challenges;
- *Resilient* in that it would be geographically distributed with minimal dependence upon close-in bases, have a greatly reduced sensitivity to enemy air defense capabilities, and be signficantly more tolerant of disruptions of space-based systems;
- *Responsive* in that a credible surveillance-strike presence could be generated within hours—and perhaps minutes—of the direction to do so; and
- *Scalable* in that it could by expanded to influence events in multiple locations around the world concurrently.

While many elements of the U.S. military would have important roles to play in a future GSS network, it would rely disproportionately on air and maritime forces in general, and upon unmanned platforms in particular (see Table 1). The U.S. military would continue to exploit space in peacetime, as well as in low-medium threat scenarios, but would hedge against the likely degradation of space enablers in medium-high threat environments. Computer network defense, computer network attack, and computer network exploitation would be prominent across the spectrum of conflict. Given the sensitive nature of such operations, however, they will be not explicitly addressed in this report.

Notably, while all GSS elements aligned against the medium-high threat environment could also operate in less threatening situations, the reverse would not be the case. The contribution of low-medium-threat GSS elements in more severe threat environments would be highly constrained, at least initially. They might, for example, focus on rearward security of peripheral land bases and aircraft carriers relied upon by higher-end systems or serve as airborne communications relays to compensate for the loss or degradation of SATCOM.

TABLE 1: PRIMARY AIR & MARITIME GSS NETWORK ELEMENTS & ROLES

GSS ELEMENT	LOW-MEDIUM THREAT	MEDIUM-HIGH THREAT
Global Positioning System	Precision navigation & timing	*Hedge—advanced INS and atomic clocks, airborne GPS pseudolites*
EO/IR, SAR, ELINT/SIGINT Satellites	Wide-area, real-time ISR (no overflight restrictions)	*Hedge—penetrating HALE ISR UAVs*
Communication Satellites	Inter-/Intra-theater C3	*Hedge—airborne layer network*
KC-46 / KC-135	Forward-/standoff-tanking	Standoff tanking
B-1 / B-52	High-volume precision strike Maritime mining ASuW	Stand-off precision attack (fixed targets)
B-2	*(If needed, as Medium-High Threat)*	High-volume precision strike Stand-off precision attack (including deep-inland targets) HDBT defeat Maritime mining
LRS-B	*(If needed, as Medium-High Threat)*	Local ISR High-volume precision strike Stand-off precision attack (including deep-inland targets) HDBT defeat Maritime mining ASuW Airborne electronic attack (stand-in)
Future Stealthy HALE ISR UAV	*Clandestine ISR* *(If needed, as Medium-High Threat)*	*Wide-area ISR* *Airborne electronic attack (stand-in)* *Light precision strike*
Future Land-based Stealthy UCAS (MQ-X) [83]	*(If needed, as Medium-High Threat)*	*Wide-area ISR* *Offensive/defensive counter-air* *Airborne electronic attack (stand-in)* *Medium-volume precision strike* *(Mobile target killer)* *Maritime mining & ASuW*
RQ-170 *Sentinel*	Local-area / clandestine ISR	Limited ISR
RQ-4 *Global Hawk / MQ-4C Triton*	Wide-area ISR Ground moving target indicator Broad-area maritime surveillance	Airborne Communications Relay GPS pseudolites
MQ-9 *Reaper / MQ-1C*	Wide area ISR Medium-volume precision attack	Airborne Communications Relay
P-3/P8 *Poseidon*	Broad-area maritime surveillance ASuW Forward ASW	ASW around CSG and peripheral bases
E-3 AWACS	Airborne early warning (AEW) and battle management	Peripheral base defensive counter-air / counter-ASCM

83 Scaled-up version of N-UCAS below. Notional specifications: 10–12 hours unrefueled endurance; 48–72 hours refueled mission endurance; 8,000-lb strike payload; and all-aspect, broadband RCS reduction.

TABLE 1: PRIMARY AIR & MARITIME GSS NETWORK ELEMENTS & ROLES CON'T

GSS ELEMENT	LOW-MEDIUM THREAT	MEDIUM-HIGH THREAT
E-2C/D Sentry	AEW and battle management	Carrier defensive counter-air/ counter-ASCM
E/A-18G Growler	Electronic attack / IADS suppression	--
F-35/F-18/F-22	Medium-volume precision attack Offensive/defensive counter-air	Offensive counter-air (F-22 only, with tanking) Defensive counter-ASCM Stand-off ASuW
UCLASS	Maritime surveillance Wide-area ISR Light strike	*Airborne Communications Relay*
Notional N-UCAS [84]	*(If needed, as Medium-High Threat)*	*Broad-area maritime surveillance* *Wide-area ISR* *Medium-volume precision attack (mobile target killer)* *Light-volume standoff attack* *ASuW* *Airborne electronic attack (stand in)*
MQ-8C Fire Scout	Local area ISR Maritime surveillance Persistent, distributed CT operations	*Airborne Communications Relay*
CG / DDG	Local-area ISR Medium-volume standoff attack Forward air and missile defense ASuW / ASW	Light-volume standoff attack Carrier and peripheral base air and missile defense
SSN / SSN with VPM	(If needed, as Medium-High Threat)	Local area, clandestine ISR Light-medium volume standoff attack ASW / ASuW Anti-high value aircraft Maritime mining Deep-inland strike / HDBT defeat Counter sensor / electronic attack SOF Support
SSGNs	(If needed, as Medium-High Threat)	See above—with higher volume
Seabed Payload Pods	*(If needed, as Medium-High Threat; could be pre-deployed)*	*Local area ISR* *Counter sensor / electronic attack* *ASW/ASuW* *Light standoff attack*
Towed Payload Modules	*(If needed, as Medium-High Threat; could be pre-deployed)*	*High-volume standoff attack* *Maritime mining* *SOF support*
Unmanned Undersea Vehicles	*Local area, clandestine ISR* *Maritime mining* *ASW/ASuW* *Counter sensor / electronic attack*	*Local area, clandestine ISR* *Maritime mining* *ASW/ASuW* *Counter sensor / electronic attack*

84 Notional N-UCAS specifications: 8–10 hours unrefueled endurance; 48-hours refueled mission endurance; 3,000–4,000-lb strike payload; and all-aspect, broadband RCS reduction.

The GSS network would have a significant amount of redundancy with respect to core, high-demand missions such as wide-area ISR, communications, and basic precision attack. For other missions, however, there would be more specialization. The missions to defeat deep HDBTs, for example, would reside primarily with the B-2, the LRS-B, and submarine-launched ballistic/boost-glide weapons. Similarly, while myriad platforms could engage mobile-relocatable vehicles as targets of opportunity, finding and neutralizing them would be the principal mission for proliferated fleets of MQ-9 *Reaper* and MQ-1C *Grey Eagle* UCAS, in low-medium threat environments, and for stealthy land- and carrier-based UCAS, in medium-high threat environments.

Ground forces could also support an increased strategic emphasis on deterrence through denial by establishing and operating land-based, local-area A2/AD networks in peacetime within the territory of threatened partners or allies.

Author: 玄史生, http://commons.wikimedia.org/wiki/File:Avenger_Air_Defense_System_in_Songshan_Air_Force_Base_20110813a.jpg

While not reflected in Table 1, ground forces could conduct small-scale, highly dispersed raids to seize and set up friendly bases for land-based ISR and strike systems, as well as to neutralize those of future adversaries. Ground forces could also support an increased strategic emphasis on deterrence through denial by establishing and operating land-based, local-area A2/AD networks in peacetime within the territory of threatened partners or allies linked into the broader GSS network. The division of labor for this effort might vary from technical assistance and advanced training, to combined operations, to U.S.-led operations with deep security force assistance. In the event that deterrence failed, these A2/AD networks could improve the self-defense capability of U.S. allies (complicating the offensive planning of prospective adversaries), interdict adversary sea and air lines of communication, provide a virtual "escort" for friendly maritime traffic in the region, and facilitate logistics operations (e.g., U.S. tankers could operate in air space defended by allies).[85] These A2/AD ground task forces might comprise, for example: coastal defense cruise missile systems linked to aerostat-borne radars; "smart" coastal mine networks; ground-launched, long-range ASW weapons linked to offshore active-passive acoustic arrays; short- to medium-range air defenses with associated sensor systems; and where appropriate, land-attack

85 For an assessment of how relatively inexpensive, commercially available, and mobile land-based anti-ship missiles might be effectively employed to interdict Chinese SLOCs in the Pacific, see: Terrence Kelly et al., *Employing Land-Based Anti-Ship Missiles in the Western Pacific* (Santa Monica, CA: RAND, 2013).

The GSS network could provide globally distributed, responsive support to SOF conducting global counter-terrorism (CT) and counter-proliferation (CP) operations.

ballistic and cruise missiles. The costs of developing and operating A2/AD systems could be shared to varying degrees between the U.S. and defended partners/allies.

These task forces would seek to survive in high-threat environments by staying as dispersed as possible; taking advantage of land and coastal mobility; employing camouflage, concealment, and deception (CCD); operating re-locatable active defenses (preferably a combination of high-energy laser and EM-gun based systems); and investing in selected hardening. They could exploit geography to generate operational- and strategic-level effects. In the Western Pacific, for example, the combination of forward-based U.S. and allied A2/AD units in the "first island chain" running from the Ryuku/Senkaku islands, through Taiwan, to the Philippines and Singapore could effectively "bottle up" PLA air and naval forces, cut off their lines of communication, support both blockade and counter-blockade operations, and provide forward-deployed forces access to the global fiber optic network through radio-frequency communication "gateways" to reduce U.S. dependence upon SATCOM for long-haul communications. A2/AD task force capabilities, especially mines and missiles, would be very difficult and costly for adversaries to defend or counter, and thus, could be a valuable component of a cost-imposing strategy.

The GSS network could provide globally distributed, responsive support to SOF conducting global counter-terrorism (CT) and counter-proliferation (CP) operations. Along with land-based MQ-9 *Reapers,* rotary-wing MQ-8C *Fire Scout* UAVs operating off a wide array of forward-deployed, air-capable ships (e.g., Littoral Combatant Ships, DDGs, and Afloat Forward Staging Bases) would provide much of the geographic ISR-strike coverage required to support global SOF operations. For CT and CP operations in denied or politically sensitive areas, stealthy HALE ISR UAVs and stealthy land- and carrier-based UCAS would be relied upon instead. As demonstrated in the opening phase of Operation Enduring Freedom, the combination of a small SOF "footprint" on the ground and responsive airborne ISR-strike capacity loitering overhead could enable very effective unconventional warfare (UW) and counter-UW campaigns. In some threat environments, special reconnaissance and direct action provided by SOF might also address gaps in the GSS network.

While not explicitly part of the GSS concept, U.S. strategic nuclear forces would continue to be critical for maintaining a credible deterrent against nuclear attack. They would provide the backstop required to project power with conventional GSS forces against nuclear-armed adversaries. Conversely, persistent surveillance provided by GSS forces would improve crisis management and escalation control in the nuclear realm. In addition, the electronic warfare, counter-IADS, counter-missile, and ASW capabilities of GSS forces would enhance the overall survivability and effectiveness of strategic nuclear forces.

The GSS concept would also leverage U.S. alliance and security partnerships around the world. In addition to providing base access in key areas outside of dense A2/AD threats, U.S. allies and partners could provide logistical and C3 support, including fuel and pre-deployed weapon stocks; "gateways" into the global fiber optic network; local A2/AD networks as described above; and forces that could "hold the line" as GSS assets are brought to bear.

Exploiting U.S. Advantages in Unmanned Operations

As reflected in Table 1, increasingly autonomous unmanned systems would form the core of the GSS network because of the advantages they offer in terms of long mission endurance, life-cycle cost, and aircrew casualty negation. Unmanned systems are unconstrained by the limits of human physiology not only in terms of tactical factors such as G-force loading, but mainly because they do not get tired and lose mental acuity. Today, the longest endurance air vehicles in the U.S. inventory, the RQ-4 *Global Hawk* and extended-range MQ-9 *Reaper*, have an unrefueled endurance between 30–40 hours, depending on mission configuration. In the future, once automated aerial refueling becomes available, unmanned aircraft could have twice that endurance while also incorporating high-subsonic cruising speeds.[86] Manned tactical aircraft, in contrast, typically have a maximum mission endurance of around 10 hours (with tanking support), while multi-man crewed aircraft such as bombers

Increasingly autonomous unmanned systems would form the core of the GSS network because of the advantages they offer in terms of long mission endurance, life-cycle cost, and aircrew casualty negation.

86 The two main drivers today are engine/propulsion path lubrication and mean time between critical failures for key components.

With ultra-long mission endurance enabled by tanking, a relatively small number of unmanned aircraft could affordably sustain persistent ISR-strike orbits.

can fly periodic 30-plus hour missions. In neither case, however, can such long missions be sustained owing to crew rest requirements. In the case of manned bombers, while B-2s have demonstrated the capability to fly long sorties, the vast majority of the mission time was spent in transit, during which the crew could take turns sleeping. Once a B-2 penetrates enemy airspace, both pilots are in their seats focusing actively on mission execution. As such, manned bomber "combat endurance"—the portion of the mission spent inside enemy airspace—should also be considered very limited, with even five hours "in the box" viewed as extreme. Air-refuelable unmanned aircraft, on the other hand, will be capable of generating on-station time measured in days per sortie by virtue of being able to cycle repeatedly off the mission tanker and back into enemy airspace (provided they have not exhausted onboard weapons).

With ultra-long mission endurance (e.g., 48-plus hours) enabled by tanking, a relatively small number of unmanned aircraft could affordably sustain persistent ISR-strike orbits. In peacetime, this capacity would complement space-based remote sensing, which can provide near-global coverage owing to the absence of over-flight restrictions. Unmanned aircraft, however, could provide a surveillance "stare" capability that cannot currently be provided by satellites. From international airspace, they could peer into the territory of prospective adversaries. In wartime, unmanned aircraft would provide a critical operational hedge against the loss of space both for ISR, precision navigation and timing (e.g., GPS "pseudolites"), and long-haul communications (airborne communication relays). An expanded, air-refuelable unmanned aircraft fleet could provide a responsive, geographically distributed, sustainable, scalable surveillance-strike capability.

To minimize costs, the GSS network would exploit a "high-low" mix of unmanned aircraft with lower end systems (e.g., *Global Hawk, Triton,* and *Reaper*) providing much of the global ISR-strike coverage in peacetime, as well as in low-medium threat combat environments. Although the intent of the GSS concept would be to take advantage of legacy force structure as much as possible, it does call for the development and fielding of three new stealthy, long-range unmanned aircraft to rectify the current imbalance in the fleet with respect to range and survivability.

The first would be a stealthy HALE ISR UAV to complement the RQ-4 *Global Hawk,* providing clandestine ISR support (and limited strike) in peacetime in denied or politically sensitive areas and critical wide-area ISR coverage in wartime in medium-high threat environments. While this aircraft might carry a limited strike payload—particularly useful in CT operations in defended or sensitive areas—it would be optimized for ISR and possibly electronic attack. The location of identified targets would be passed over secure, low probability of intercept/

low probability of detection (LPI/LPD) datalinks to the GSS battle management system, which would automatically determine the best "shooter" platforms available to engage them.

The remaining two aircraft would be closely related, but distinct platforms: land- and carried-based stealthy UCAS to perform persistent, wide-area attack in medium-high threat environments.[87] While different in appearance, to reduce costs, they could take advantage of many of the same subsystems (e.g., avionics, flight controls, sensors, communications), commercially derived engines, radar-absorbing edges and coatings, mission payloads, and mission management and control systems.

Unconstrained by the width of the carrier deck, for example, the land-based variant, MQ-X, would likely have a larger wingspan, as well as a more voluminous payload bay. The carrier-based variant, N-UCAS, would have more robust internal structures to accommodate the stresses of catapult launches and arrested landings. For ultra-long endurance, both would be capable of automated aerial refueling. For survivability in medium-high threat environments, both would have all-aspect, broad spectrum RCS reduction and possibly a limited beyond-visual range, air-to-air engagement capability for self-defense. In time, close-in self-protection against ground-, sea- and air-launched missiles might be provided by high-energy laser systems that could locate incoming missiles and destroy their terminal seekers. While the MQ-X and N-UCAS would contribute to the rapid destruction of fixed targets, their core mission would be to find and destroy mobile-relocatable targets over wide geographic areas in A2/AD environments. All three stealthy UAVs would play "anvil" to the manned LRS-B "hammer," which would be optimized for high-volume fires against primarily fixed targets. The critical enabling technologies for N-UCAS/MQ-X either have already been demonstrated in the UCAS Demonstration (UCAS-D) program or could be in the near-term through an extended and expanded UCAS-D effort.

87 The carrier-based air vehicle, N-UCAS, would replace the currently envisioned UCLASS, which suffers from two major design flaws: insufficient survivability and inadequate strike payload.

While UUVs and UGVs currently lag behind in terms of mission endurance owing to the limits of state-of-the-art, high-density energy storage, strides are being made with advanced batteries, fuel cells, and new energy sources (e.g., aluminum-salt water combustion), as well as diesel-electric hybrids. Like air vehicles, they could also be refueled/recharged in forward areas to provide longer mission endurance. As will be discussed below, UUVs could help offset limited SSN/SSGN capacity by taking on a number of additional missions. UUVs hosted by a nuclear-powered submarine would, in effect, expand its geographic footprint and extend its reach into more hazardous shallow and constricted littoral waters.

Significantly reduced life-cycle costs are possible with unmanned systems by obviating the need to procure large numbers of platforms for a training "pipeline," as well as reduced operations and maintenance costs associated with training and maintaining combat readiness in peacetime and personnel savings. The Navy, for example, currently buys roughly enough of a specific type-model series of aircraft to outfit all ten air wings so that pilots can train year-round, whether they are deployed or stationed ashore With N-UCAS, there would be no need to train pilots, so the Navy would only need to buy the number required to equip the maximum number of deployable carriers (typically 2-3 carriers are deployed on a steady-state basis and another 2-3 carriers can be "surged" in a crisis), and they would generally fly these aircraft only when deployed. As a result, compared to manned aircraft, the Navy could buy about half as many carrier-based UAS and fly them less than half as often, potentially generating billions of dollars in savings in procurement as well as operations and support.[88] The same basic cost-savings model would apply to the Air Force's family of unmanned systems as well.

88 Dan Burg, who is now an adjunct fellow at the Center for a New American Security (CNAS), has conducted an in-depth study of the potential savings generated by pursuing an unmanned aircraft to replace the F-18E/F in the late 2020s. His analysis shows that "cost avoidance" over the 25 year life of an unmanned fleet would likely range from about $16 billion in the most conservative case to $56 billion in the most aggressive case. The amount of annual savings generated early on (years 3–10 of production) ranged from $1.5 billion to $3 billion. Daniel Burg and Drew Martin, *Life-Cycle Cost Comparison of Manned and Unmanned Future Carrier-Based Strike Aircraft*, unpublished internal study (Northrop Grumman Systems Corporation, Strategic Studies Department, Navy UCAS Program, February 2012).

Exploiting U.S. Advantages in Extended-Range and Low-Observable Air Operations

A defining feature of the GSS network is that while legacy tactical aircraft like the F-18 *Super Hornet* and F-35 *Lightning II* would be flown when and where appropriate, most of the airborne nodes in the network would possess either extended range—owing to long unrefueled combat radius (e.g., B-1/B-52, B-2, LRS-B, RQ-4 *Global Hawk*, MQ-4 *Triton*, stealthy HALE UAV, and MQ-9 *Reaper*), or ultra-long mission endurance enabled by unmanned operations and air-to-air refueling (e.g., MQ-X and N-UCAS). These GSS aircraft could respond globally to short-notice aggression regardless of initial basing location—and they could do so quickly.

As noted above, the GSS concept calls for the fielding of three new stealthy UAVS, in part to bring the ratio of non-stealthy to stealthy aircraft in the inventory into better balance. Along with their manned counterparts (e.g., B-2 and LRS-B), in peacetime, these low-observable aircraft would periodically conduct clandestine operations and sensitive support activities (e.g., special reconnaissance operations). In the event of hostilities against an adversary equipped with a robust A2/AD capability, this family of manned and unmanned LO aircraft would form the airborne backbone of the GSS network and conduct a wide range of operations: wide-area ISR and broad area maritime surveillance; airborne electronic attack (stand-in); high-volume precision strike against fixed targets; stand-off precision attack (including deep-inland targets); persistent surveillance and attack against mobile and relocatable targets; HDBT defeat; maritime mining; and ASuW. Notably, all of these aircraft would possess sufficient unrefueled combat radius to range the depth and breadth of the battlespace from tankers standing off outside enemy surface-to-air missile and fighter coverage.

Exploiting U.S. Advantages in the Undersea Domain

Owing to their inherent stealth and extremely long endurance made possible by nuclear power, SSNs and SSGNs could remain on-station, undetected, for months at time. Within the GSS network, they would be relied upon to provide coastal, un-observed ISR coverage across all threat environments as well

as clandestine support to SOF. During conflict, if properly armed, they could not only conduct traditional ASW and ASuW operations, but also support airborne power projection operations through counter-sensor attacks (e.g., striking early warning radars), shooting down high-value early warning and battle management aircraft operating within an adversary's IADS umbrella and striking deep in-land and HDBT targets.

In terms of leveraging the U.S. advantage in undersea warfare, the Navy faces two pressing problems: declining force structure, and limited strike capacity and flexibility. *Los Angeles*-class submarines procured during the Reagan-era buildup are reaching the end of their service lives faster than they can be replaced with *Virginia*-class SSNs, resulting in a significant drop in force structure beginning in the mid 2020s. And the four in-service SSGNs, which were converted from *Ohio*-class SSBNs beginning in 2003, will all retire by 2028, resulting in a precipitous drop of more than 600 undersea VLS cells. When combined with the reduction in SSN force structure, the fleet's undersea strike capacity will plummet by more than 60 percent relative to today by 2028. A key enabler of the GSS concept, therefore, would be to restore, or ideally, expand undersea strike capacity and more fully exploit U.S. undersea superiority by fielding a more versatile array of submarine payloads.

The Navy's current plan to mitigate the looming drop in undersea VLS capacity is to integrate the Virginia Payload Module (VPM) into future *Virginia*-class submarines, beginning with Block V in 2019. The VPM would add about 70 feet to the hull aft of the sail to accommodate four 87-inch wide missile tubes, each capable of launching seven TLAMs or other strike weapons.[89] For a marginal increase of roughly 15 percent to the submarine's cost, the VPM would more than triple its strike capacity from 12 to 40 missiles.[90] Given the criticality of undersea strike and other payloads (e.g., sensors, decoys, electronic attack)

89 Karl Hasslinger and John Pavlos, "The Virginia Payload Module: A Revolutionary Concept for Attack Submarines," *Undersea Warfare*, Issue 47, Winter 2012.

90 Sean Stackley (Assistant Secretary of the Navy for Research, Development, and Acquisition), VADM Joseph Mulloy (Deputy Chief of Naval Operations for Integration of Capabilities and Resources), and LtGen Kenneth Glueck (Deputy Commandant Combat Development and Integration), "Department of Navy Seapower and Projection Forces Capabilities," Statement before the HASC Subcommittee on Seapower and Projection Forces, March 26, 2014, p. 9; and Less Hudson, "Virginia Payload Module Cost Estimate Down to $350 Million Apiece," *Inside the Navy*, July 22, 2013.

to the GSS concept, introducing the VPM upgrade as part of *Virginia*-class SSN Block V multiyear procurement beginning in 2019 would be a top priority.

The Navy should also give serious consideration to expanding capacity through development and fielding of *external* undersea payloads. Under its "Upward Falling Payloads (UFP)" program, for example, DARPA is developing "deployable, unmanned, non-lethal distributed systems that lie on the deep-ocean floor in special containers for years" until remotely signaled to activate and "fall upward" to the surface.[91] Although the program is currently focused on "non-lethal" payloads such as decoys and jammers, small ISR UAVs, and other sensors, the concept could be expanded to include strike weapons with either kinetic or non-kinetic payloads.[92] Designed to survive silently in waters four to six kilometers deep, prospective adversaries would be hard pressed to locate widely distributed, forward-deployed UFPs not only because of the staggering breadth of the required search area, but also because of their depth and their relatively small size. SSNs could also deploy much larger TPMs, which could remain on station, anchored or moored to the continental shelf seabed, for months at a time (pictured above). They could accommodate a wide-range of payloads: land-attack weapons, ASuW weapons, mines, UUVs, UAVs, and airborne and surface decoys and jammers. They might also be outfitted with power modules to recharge long-endurance UUVs operating in forward areas. Equipped with onboard passive acoustic sensors and a recoverable SIGINT/ELINT buoy, each TPM could also serve as node in the GSS persistent ISR network.

The GSS network would also benefit from a wider array of undersea weapons beyond just the standard TLAM (pictured below). To minimize costs, the goal should be to modify existing weapons rather than develop new ones. Several relevant target sets might be more effectively held at risk, for example, by equipping the TLAM with new payloads (e.g., anti-ship warheads, high-power microwave devices, micro-UAV jammers, and "smart" terminally guided submunitions). Similarly, surface-launched, VLS-capable missiles such as those in the Standard Missile family might be adapted for undersea launch and could, in

91 DARPA Strategic Technology Office, "Upward Falling Payloads (UFP)," available at: http://www.darpa.mil/Our_Work/STO/Programs/Upward_Falling_Payloads_(UFP).aspx.

92 Joey Cheng, "Pentagon Plans to Seed Ocean Floor with Payloads Waiting to Be Activated," *Defense Systems*, March 27, 2014.

theory, perform multiple missions (e.g., anti-radar, anti-ship, and anti-aircraft). A submarine-launched ballistic or boost-glide missile that could deliver a significant payload to a range of 1,000–1,500 nm very quickly would also be desirable for neutralizing deep-inland targets early on in a conflict, as well as for attacking some classes of HDBTs.

Photo: ROYAL NAVY IMAGE/MOD, http://commons.wikimedia.org/wiki/File:Tomahawk_Land_Attack_Missile_(TLAM)_being_fired_from_a_submarine._12-04-2000_MOD_45138114.jpg

The GSS network would also take advantage of America's asymmetric advantage in the undersea domain by fielding multi-mission, large-diameter UUVs launched from regional ports, surface ships, and SSN/SSGNs. UUVs could be a true "force multiplier" for the shrinking SSN fleet, which could be critical given that some 40 countries now operate well over 400 submarines around the world. In addition, UUVs could access shallow littoral waters beyond the physically reach of SSNs and SSGNs, or where they do not hazard to venture owing to ASW threats, to perform a wide-array of missions: littoral clandestine ISR, coastal electronic attack, seafloor mapping and counter-sensor operations, counter-mine operations, and ASuW and ASW. An important near-term investment in this regard is the Office of Naval Research's Large-Diameter UUV (LDUUV) program, which seeks to develop a reliable, autonomous UUV with an endurance of up to 60 days, GPS-independent navigation, and a modular payload system.

Exploiting U.S. Competence in Complex Systems Engineering and Integration

The GSS network would require linking myriad, globally distributed heterogeneous "nodes" into dynamic, *ad hoc* networks within a resilient C3 architecture. Given the quantity and different types of nodes, as well as the myriad data-link forms, the scale and complexity of this task would be daunting. The network would, for example, be orders of magnitude more complex than today's Cooperative Engagement Capability or Naval Integrated Fire Control-Counter Air systems. It would also have to be protected against adversary cyber and electronic attacks. GSS operations would need to be "overseen" by an advanced battle management system that could fuse and correlate ISR data, recognize relevant patterns of adversarial behavior, and allocate available ISR-strike resources efficiently and responsively. The United States has the complex systems engineering and integration competency required to pull off such a feat.

Given time and cost constraints, the GSS C3 architecture and battle management system might be developed with a "crawl, walk, run" approach. Initially, it could rely mainly on legacy communication paths and link only a portion of the total number of GSS nodes available worldwide. It might, for example, take the form of several loosely linked theater C4ISR networks with a modest set of centralized, automated decision tools for battle management. Over time, progressively more nodes could be added to the network along with more varied communication paths. Similarly, battle management systems might become increasingly automated, freeing up senior military officers to focus more of their attention on the operational and strategic levels of war.

Candidate GSS Concept Implementation Actions

The GSS concept would appear to provide a credible way to generate persistent U.S. presence in multiple regions and project power when needed, including in A2/AD environments, with dramatically less reliance upon increasingly vulnerable close-in bases. By doing so, it would enhance crisis stability and deterrence, as well as provide the United States with a wider range of response options in the event that deterrence fails. Some near-to-midterm GSS implementation actions that merit additional consideration include the following:

- Hedge against the loss of space-based enablers by accelerating R&D on alternatives to GPS for precision navigation and timing, fielding a "high-low" mix of ISR UAVs with long mission endurance and/or aerial refueling capability, and developing an "aerial layer" alternative to space for long-haul communications;
- Develop and demonstrate counter-space capabilities to deter prospective adversaries from attacking U.S. satellites;
- Expand the geographic coverage of the undersea fleet by accelerating development of key enabling technologies for UUVs including high-density energy storage (power and endurance), undersea navigation and communications, and autonomy;
- Expand undersea payload capacity and flexibility by fully funding the Virginia Payload Module program, accelerating development of seabed payload pods (building on DARPA's "upward falling payload" program), initiating development of towed payload modules, modifying the TLAM

and Standard Missile family to address a wider array of target sets, and initiating development of a submarine-launched, conventional ballistic/boost-glide missile;

- Expand geographic coverage provided by fixed and deployable undersea sensor networks;
- Develop and field modern ground-, air- and sea-deployed naval mines, as well as a long-range ASW weapon;
- Reverse the active defense versus missile attack cost exchange ratio through accelerated development and fielding of electromagnetic rail gun and directed-energy based systems (initially focused on carrier strike group and peripheral base defense);
- Develop and field new counter-sensor weapons, including directed-energy systems (e.g., high-power microwave payloads and high-energy lasers) and stand-in jammers/decoys;
- Accelerate fielding of an automated aerial refueling capability;
- Accelerate development and expand procurement of the LRS-B;[93]
- Develop and field a penetrating HALE ISR UAV as an analog to the RQ-4 *Global Hawk* for medium-high threat environments;
- Develop and field penetrating, air-refuelable, land- and carrier-based UCAS platforms (MQ-X and N-UCAS) for geographically distributed surveillance-strike operations (i.e., mobile-relocatable target killers) across the threat spectrum, but especially in medium-high threat environments; and
- Develop expeditionary, ground-based, local "A2/AD" networks comprising short-to-medium range IADS, coastal defense cruise missiles, defensive mines and UUVs, and mobile surface-to-surface missiles.

These initiatives would contribute to an effective offset strategy by affordably restoring U.S. power projection capability and capacity, bolstering conventional deterrence through a credible threat of denial and punishment, and imposing costs upon prospective adversaries as part of a long-term competition by devaluing large "sunk cost" investments as well as by channeling competition into areas where the United States can compete more effectively or that are less threatening from a U.S. perspective (see Table 2).

93 Mark A. Gunzinger and David A. Deptula, *Toward a Balanced Combat Air Force* (Washington, DC: Center for Strategic and Budgetary Assessments, 2014).

TABLE 2: POSSIBLE ADVERSARIAL COST IMPOSITION OF GSS INVESTMENTS

GSS Investment	Cost Imposition to Adversaries
Terrestrial alternatives to GPS for PNT	Devalue investment in GPS jammers and spoofers
Airborne line-of-sight communications bridge with terrestrial RF-to-fiber gateways	Devalue investment in SATCOM and tactical datalink jammers
Expand and diversify undersea payload capacity	Encourage expanded investment in, and modernization of, integrated air and missile defenses (IAMD) and passive defenses Encourage investment in wide-area, counter-mine and sea-bed surveillance/neutralization systems Encourage investment in counter-UUV and ASW capabilities
Active and passive undersea acoustic arrays linked to long-range ASW weapon	Devalue sunk cost investment in SSK/SSN fleets Virtual attrition to SSK/SSN capacity owing to disrupted operations
Multi-mission UUV networks	Devalue sunk cost investment in SSK/SSN fleets Encourage investment in counter-UUV and ASW capabilities
Modern air- and sea-delivered naval mines	Encourage investment in counter-UUV and ASW capabilities Reduce utility of SSK and surface fleets
Electromagnetic railgun and directed-energy missile defenses	Devalue sunk cost investment in large inventories of ballistic and cruise missiles Encourage investment in DE countermeasures and penetration aids
Counter-sensor weapons (ARH, DE, HPM), jammers, and decoys	Encourage investment in sensor “hardening,” counter-jamming capabilities, and advanced signal-processing algorithms Devalue sunk cost investment in sensor systems that cannot be easily upgraded to deal with ARH/DE/HPM threats
Stealthy HALE ISR UAV, LRS-B, MQ-X, and N-UCAS	Encourage adversary investment in expanding IADS network density and geographic coverage, improving radar performance/self protection, developing and fielding infrared detection systems, and active and passive defenses on land and sea
Land-based, local A2/AD networks	Encourage costly investment in ASCM defense, SEAD, aircraft signature reduction, active and passive missile defense, sea-bed surveillance/neutralization systems, and counter-mine capability

The current defense program is heavily skewed toward operations in low-medium threat environments even though threat trends clearly indicate that A2/AD challenges will proliferate and intensify over time.

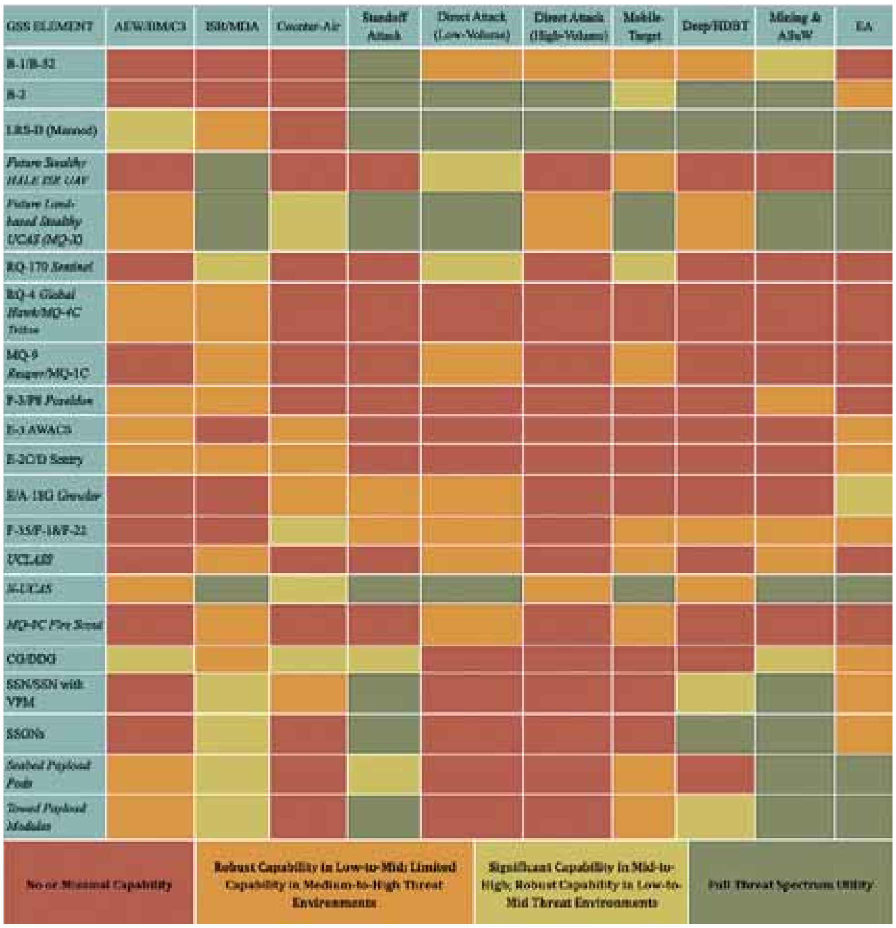
In addition to these R&D and procurement initiatives, it would also be useful to craft a series of field and fleet experiments—including extensive use of surrogate and prototype platforms—to "demonstrate" selected U.S. denial and punishment capabilities both to bolster deterrence and shape adversary investment decisions.

One of the more striking aspects of Table 1 summarizing primary GSS elements is that in terms of both force structure and procurement, the current defense program is heavily skewed toward operations in low-medium threat environment even though threat trends clearly indicate that A2/AD challenges will proliferate and intensify over time. As mentioned previously, the airborne fleet is severely lop-sided toward short-range and non-stealthy aircraft. Similarly, submarine capacity is shrinking relative to surface ship capacity, when the intensifying threat environment would suggest a growing need for the opposite. This is especially troubling because the platforms that are built today will remain in the force for 20–50 years—over which time, A2/AD and other threats will surely intensify and become more widespread. In addition, many of the potentially high pay-off, cost-imposing GSS investments enumerated in Table 2 immediately above are currently either unfunded or resourced at a relatively low level.

Rebalancing the Current Defense Portfolio to Enable the GSS Concept

Table 3 attempts to assess, albeit subjectively, the relative ability of many of the air-maritime GSS elements discussed above to carry out key missions across the range of threat environments anticipated for 2025 and beyond. Green indicates a capability relevant across the entire threat spectrum; yellow indicates a significant capability in higher-end environments that would be more robust in benign threat environments; orange reflects a capability that would be limited in A2/AD environments, but more robust in low-to-mid level threat environments; and red indicates essentially no capability for the relevant mission.

TABLE 3: SELECTED GSS NETWORK ELEMENTS & MISSION CAPABILITY ACROSS THREAT SPECTRUM



Several insights can be gleaned from this admittedly “first blush” assessment:

- Less detectable, and thus more survivable, capabilities are needed for airborne early warning, battle management, and C3 in high threat environments;
- New approaches to offensive and defensive counter-air operations are needed for medium-to-high threat environments owing mainly to the lack of survivable close-in bases, tanker vulnerability, and relatively short unrefueled range of current and programmed fighters;
- Until legacy bombers and the SSGNs retire, the U.S. military has significant standoff attack capability—but LRS-B, MQ-X, N-UCAS, SSN with VPM, and towed undersea strike modules will be critical for sustaining it in the 2020–2030s;

To fund development of these and other high pay-off capabilities for the GSS network, it will be necessary to re-focus some ongoing efforts, rein in personnel and infrastructure costs, and divest legacy capabilities that are likely to depreciate over time.

- Both low- and high-volume direct, precision attack capacity—as well as mobile target "hunter-killer" coverage—in high-end environments is critically dependent upon the fielding of LRS-B, MQ-X, and N-UCAS; and
- Deep-inland attack and HDBT-defeat missions in A2/AD environments are dependent upon the B-2/LRS-B and development of a submarine-launched, boost-glide missile.

More broadly, what is striking is that three out of the five candidate GSS elements with seemingly the highest cross-mission functionality are not currently under development: MQ-X, N-UCAS, and undersea towed payload modules. To fund development of these and other high pay-off capabilities for the GSS network, it will be necessary to re-focus some ongoing efforts, rein in personnel and infrastructure costs, and divest legacy capabilities that are likely to depreciate over time.

Developing the notional N-UCAS described in this report, for example, could be realized by re-orienting the currently funded UCLASS technology development program, which is focused on maritime domain awareness and ISR in low-to-medium threat environments. Procurement of 5-10 squadrons of N-UCAS could be achieved by using some of the funds currently earmarked for the F-35C procurement and/or the F/A-XX, which is intended to replace the F/A-18E/F in the late 2020s. As mentioned earlier, the N-UCAS would likely generate significant O&M cost savings relative to the manned aircraft (F/A-18, F-35C, and F/A-XX) it replaces in the carrier air wing. In essence, because of its dramatically lower life-cycle cost, it would pay for itself. The proposed MQ-X, which the Air Force has previously expressed interest in procuring in some form, would re-purpose as many of the sub-systems developed under the N-UCAS program as possible to minimize non-recurring development costs. MQ-X procurement costs could be covered by scaling manned fighter modernization and force structure. MQ-X O&M costs could be offset by reducing MQ-9 *Reaper* and/or manned fighter force structure.

While the Navy has funded non-recurring RDT&E for the VPM-upgrade to the *Virginia*-class SSN, the $300–400 million marginal cost per boat in procurement will need to be added to the already stressed shipbuilding program. In the undersea domain, funding would also be required for developing and procuring seabed payload modules and towed payload modules, as well as the fielding of new strike payloads and multi-mission UUVs. In the air domain, additional resources would need to be found for developing and fielding a stealthy HALE ISR UAV. To fund those efforts, as well as myriad "smaller ticket" items referenced above, the DoD should re-double efforts to reduce spending on "tail" as opposed to "tooth" by shedding excess basing infrastructure in the continental United States and restructuring the personnel system to reduce ballooning medical and retirement costs. In addition, selected allies (e.g., Japan, Australia, the United Kingdom) might be willing to share costs associated with the development, procurement, and operation of GSS capabilities.

Given the political and diplomatic challenges associated with those initiatives, however, DoD will likely also need to reduce force structure and scale back modernization plans for legacy forces that contribute primarily to operations in low-to-medium threat environments. While that necessarily means accepting increased risk for some contingencies, it is imperative to rectify the current imbalance between forces able to operate in permissive and non-permissive environments. The programmed joint force has excess capacity for ISR-strike operations in low-to-medium threat environments and a severe deficit for operations in medium-to-high threat environments. Given that, candidate divestments would include:

- Reduction in manned tactical aviation force structure across the Air Force, Navy, and Marine Corps to include scaled back procurement of all F-35 variants—including possible cancellation of the F-35C (replaced with Advanced Super Hornets and eventually N-UCAS);
- Elimination of at least one aircraft carrier;
- Scaled-back procurement of large surface combatants (DDG-51);
- Reduction in Army Brigade Combat Team force structure and planned modernization;
- Procurement of a mix of Afloat Forward Staging Bases and JHSVs in lieu of more expensive amphibious warfare ships (e.g., LX-R and LHAs); and
- Cancellation of the Amphibious Combat Vehicle.

Given finite resources, however, it is also important to transition away from modes of operation that are likely to impose costs upon the United States such as interceptor-based active missile defense and, to a lesser degree, defensive space control. Barring technological breakthroughs, the competition in both areas is currently heavily offense-dominant, and thus, ramping up expenditures in a likely futile attempt to actively defend it is a cost-imposing strategy on the United States. In both cases, passive defenses (e.g., selective hardening, dispersal/disaggregation, and deception) may provide a more cost-effective option for improving survivability. In both cases, the ability to retaliate-in-kind could also deter such attacks in the first place.

Vectors for Additional Research

Additional analysis and operational concept development is required to flesh out the preliminary GSS concept presented in this report. Important research vectors include:

- Composition of the global C3 architecture and battle management system required to support the GSS concept;
- Global basing posture for GSS network nodes;
- Role of allies/partners in the GSS concept;
- Cost-effective investment in space resiliency, especially "protected" SATCOM;
- Architecture and density of the aerial layer C3 network required to provide an effective hedge against the loss of SATCOM;
- The required number of steady-state and surge ISR-strike orbits, as well as offshore undersea and surface precision-strike capacity, in low-medium and medium-high threat environments, respectively;
- The optimal balance between land- and sea-based, manned versus unmanned, and short- versus long-range aircraft to generate the desired number of ISR-strike orbits across a range of power projection scenarios;
- The balance between surface and undersea force structure;
- The desired composition of the future carrier air wing;
- Passive and active defenses for peripheral bases and aircraft carriers;
- Future weapons inventory and mix; and
- Expanded roles and missions for SOF and general purpose ground forces in the GSS concept.

Conclusion

With his "New Look" at defense strategy in 1953, President Eisenhower was able to lower the defense burden on the U.S. economy by leveraging significant but fleeting advantages in intercontinental-range strike and nuclear weapons. While that strategy was successful for nearly a decade, the credibility of the U.S. threat of nuclear first-use to backstop outnumbered NATO conventional forces eroded as the Soviets demonstrated the wherewithal to hold the U.S. homeland at risk of nuclear attack. One can, however, draw several lessons with respect to a new offset strategy and the GSS concept in particular: the need for a balanced strategy to respond to both low- and high-end threats; the strategic value of U.S. global air operations—an advantage that still accrues today; the coercive value of asymmetric threats to "punish"—which are as applicable in the conventional realm as in the nuclear one; the potential utility of covert action as a complement to conventional power projection; and the strategic importance of allies.

During the mid-to-late 1970s, Secretary of Defense Brown and Under Secretary of Defense Perry crafted a strategy to offset the growing quantitative advantage of Warsaw Pact forces in Europe, as well as to impose costs on the Soviet Union as part of a long-term competition, with various applications of information technology to U.S. and allied forces. These investments not only stabilized the balance of forces in Europe and enabled a new concept of operation in the form of Air-Land Battle/Follow-on Forces Attack, they also set the stage for what many consider to be a "revolution in war" enabled by the exploitation of integrated reconnaissance and precision-strike networks. Several lessons can be drawn from this period: technology can serve as an effective "force multiplier" to offset numerical inferiority and shape military competitions in ways favorable to the United States; it is important to retain sufficient "low-end" capabilities to maintain an affordable, forward-deployed, combat-credible presence around the globe; and the necessity of strategic continuity and institutional commitment to effect meaningful change.

The U.S. military has enjoyed a near monopoly in the precision-strike revolution ushered in by the "second" offset strategy for nearly a quarter-century, but it is beginning to slip away. Prospective adversaries are fielding their own reconnaissance-strike networks to challenge the post-Cold War U.S. approach to power projection. They will increasingly be able to hold at risk close-in theater basing, large surface combatants and aircraft carriers at sea, non-stealthy aircraft, and space-based enablers. As Secretary of Defense Hagel recently opined, "If we don't take these challenges seriously, now, our military could arrive in a future combat theater facing an arsenal of advanced, disruptive technologies that thwart our technological advantages, limit our freedom of maneuver, and put American lives at risk.[94]

Trying to counter emerging threats symmetrically with active defenses or competing "fighter for fighter" is both impractical and unaffordable over the long run. A third offset strategy, however, could offset adversarial investments in A2/AD capabilities in general—and ever expanding missile inventories in particular—by leveraging U.S. core competencies in unmanned systems and automation, extended-range and low-observable air operations, undersea warfare, and complex system engineering and integration. A GSS network could take advantage of the interrelationships among these areas of enduring advantage to provide a balanced, resilient, globally responsive power projection capability. It could be scaled up or down, as needed, to maintain desired levels of persistent ISR-strike presence within multiple geographic locations across the threat spectrum by linking together new and legacy airborne, surface, undersea, and ground-based systems; enhancing their effectiveness with new weapons and sensor systems; and taking more advantage of increasingly autonomous unmanned platforms with ultra-long mission endurance and relatively low life-cycle costs. In the event that deterrence fails, GSS forces could quickly mount strikes against fixed, mobile, hardened, and deep inland targets to thwart an aggressor's war aims, conduct an asymmetric "punishment" campaign, and, if necessary, set the stage for a large-scale, multi-phased, combined arms campaign by "rolling back" an adversary's reconnaissance-strike network.

Just as it took well over a decade to field all of the "assault breaker" capabilities envisioned by Brown and Perry in the mid-1970s, the GSS network would not reach initial operating capability (IOC) until the mid-2020s, at best, but only if focused R&D begins now and the Pentagon, the White House, and Capitol Hill stay the course over the next decade, at least. Given finite and likely declining resources for defense, the nation can neither afford to continue

94 Secretary of Defense Chuck Hagel, Defense Innovation Days, Opening Keynote Speech to Southeastern New England Defense Industry Alliance, September 3, 2014.

the current "business as usual" approach to power projection, nor plan on having the resources and time to rectify the many operational and strategic problems with the current path once they become fully manifest.

GLOSSARY

A2/AD	anti-access/area denial
AAR	air-to-air refueling
AEW	airborne early warning
ARH	anti-radiation homing
ASAT	anti-satellite
ASBM	anti-ship ballistic missile
ASCM	anti-ship cruise missile
ASuW	anti-surface warfare
ASW	anti-submarine warfare
ATACMS	Army Tactical Missile System
AWACS	Airborne Warning and Control System
BMD	ballistic missile defense
BMEW	Ballistic Missile Early Warning
BVR	beyond-visual-range
C3	command, control, and communication
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
CCD	camouflage, concealment, and deception
CG	guided-missile cruiser
CIA	Central Intelligence Agency
CLF	combat logistics force
CNAS	Center for a New American Security
CP	counter-proliferation
CSBA	the Center for Strategic and Budgetary Assessments
CSG	carrier strike group
CT	counter-terrorism
DARPA	Defense Advanced Research Projects Agency
DDG	guided-missile destroyer
DE	Directed Energy
DEW	Distant Early Warning
DIA	Defense Intelligence Agency
DMAG	Defense Management Action Group
DoD	Department of Defense
ELINT	electronic intelligence
EM	electromagnetic

GLOSSARY

EO	electro-optical
FY	fiscal year
G-RAMM	guided rockets, artillery, missiles, and mortars
GLCM	ground-launched cruise missile
GMTI	ground moving target indication
GNP	gross national product
GPS	Global Positioning System
GSS	global surveillance and strike
HALE	high-altitude, long-endurance
HDBT	hardened and deeply buried targets
HPM	high power microwave
IADS	integrated air defense systems
IAMD	integrated air and missile defenses
ICBM	intercontinental ballistic missile
IRBM	intermediate-range ballistic missile
IOC	initial operating capability
IR	infrared
ISIL	Islamic State of Iraq and the Levant
ISR	intelligence, surveillance, and reconnaissance
JHSV	joint high speed vessel
JTIDS	Joint Tactical Information and Distribution System
LACM	land-attack cruise missile
LDUUV	Large-Diameter UUV
LHA	landing helicopter assault
LO	low-observable
LPI	low probability of intercept
LPD	low probability of detection
LRS-B	Long Range Strike Bomber
MRBM	medium-range ballistic missile
N-UCAS	Navy Unmanned Combat Air System
NATO	North Atlantic Treaty Organization
NDP	National Defense Panel
NDU	National Defense University
OSD	Office of the Secretary of Defense
PGM	precision-guided munition

GLOSSARY

PLA	People's Liberation Army
PPP	purchasing power parity
QDR	Quadrennial Defense Review
RPV	remotely piloted vehicles
SAC	Strategic Air Command
SAR	synthetic aperture radar
SATCOM	satellite communications
SEAD	suppression of enemy air defenses
SFW	Sensor Fuzed Weapon
SIGINT	signals intelligence
SLOC	sea lines of communication
SOF	special operations forces
SRBM	short-range ballistic missile
SSBN	ballistic missile submarine
SSGN	cruise missile submarine
SSK	diesel-electric submarine
SSN	nuclear submarine
T-AKE	dry cargo/ammunition ships
T-AO	fleet replenishment oilers
T-AOE	fast combat support ships
THAAD	Terminal High Altitude Area Defense
TLAM	Tomahawk land attack missile
TPM	towed payload module
UAV	unmanned aerial vehicle
UCAS	unmanned combat air system
UCAS-D	UCAS Demonstration
UGV	unmanned ground vehicle
UFP	Upward Falling Payload
USV	unmanned surface vessel
UUV	unmanned underwater vehicle
UW	unconventional warfare
VLS	vertical launch system
VPM	Virginia Payload Module

CSBA

Center for Strategic and Budgetary Assessments

1667 K Street, NW, Suite 900

Washington, DC 20006

Tel. 202-331-7990 • Fax 202-331-8019

www.csbaonline.org