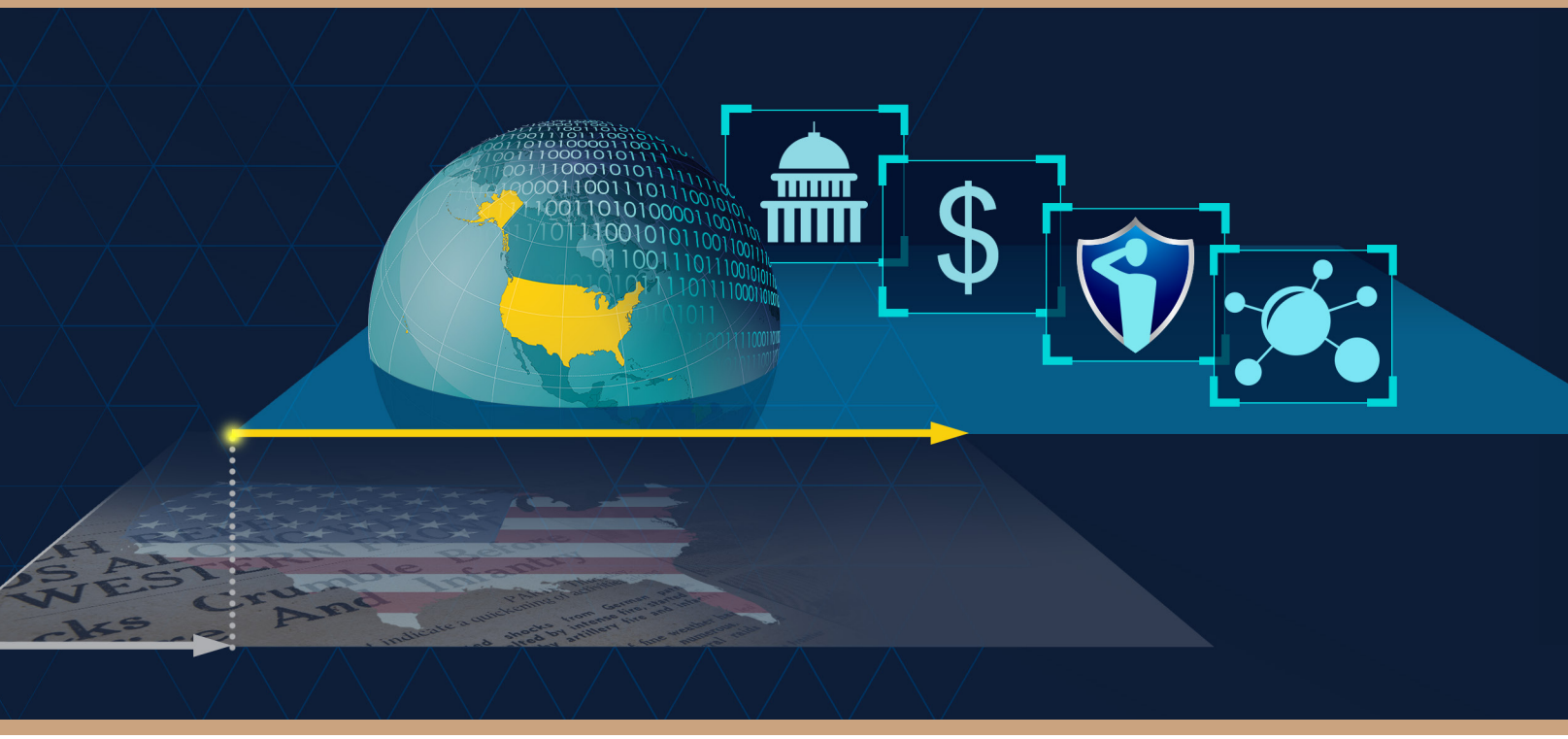
# A PREFACE TO STRATEGY: THE FOUNDATIONS OF AMERICAN NATIONAL SECURITY

**National Security Perspective**



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JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

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# Contents

## Foreword

It is with pride that the Johns Hopkins University Applied Physics Laboratory offers this preface to strategy to the national security community. APL has been an important contributor to our nation's well-being for more than seventy-five years. Throughout our rich history, we have continually created and fielded game-changing technological solutions, drawn from a broad spectrum of capabilities, to many of the most significant threats and challenges that our nation has faced.

This paper is a different kind of contribution for us.

We commissioned our team of APL senior fellows to craft this preface to strategy in response to the desire of our engineers, scientists, and analysts to have greater context as they make critical choices within the current tsunami of scientific discoveries and technological innovations. That context has changed significantly since our founding in World War II, as we supported our nation throughout the Cold War, and during the more recent post–Cold War years when America enjoyed a period of unrivaled global leadership. Today's world does not resemble any of those prior periods. We now face new challenges within a changed and unsettling global environment that continues to evolve in unexpected ways and at an alarming pace. For that reason alone, we would benefit from thinking more systematically about the future that we can help shape, so that our nation will be able to achieve the promise—and avoid the pitfalls—of this complex period.

While this paper represents the opinions of our APL senior fellows, it gives all of us at APL and the entire national security community a lot to think about.

As this preface to strategy points out, we are living in a time when our strengths as a nation are more important than ever. We at APL are committed to continuing to help our nation maintain its strengths by pursuing our centennial vision to "create defining innovations that ensure our nation's preeminence in the twenty-first century." The ideas in this paper are helping us to focus our efforts more effectively on key areas that could profoundly and positively impact our nation and the world for generations to come.

I thank all of our senior fellows for their many years of trusted and dedicated service to our nation, their noteworthy contributions to APL, and their exceptional work on this important paper. A special note of thanks to Richard Danzig for being first author and so artfully capturing the ideas of all the senior fellows in this paper.

*Dr. Ralph D. Semmel, APL Director*

## Summary

Since the Cold War ended, there has been no shortage of reviews and pronouncements labeled strategic. We have found these efforts commonly unsatisfying, in part because they focus on inferring requirements for investment and operational concepts on the basis of current and projected threats. Such strategies are well intentioned but tend to be transitory and reactive, created by leaders in response to the demands of the day and unable to keep up with evolving challenges.

This paper takes a different approach. It focuses not on the strengths of our opponents but on our own strengths. It seeks to understand how an evolving global strategic environment is changing us—altering our country's relative strengths and the premises that once underpinned our strategies. In doing this, we seek to satisfy a hunger on the part of laypersons and professionals alike to have an enduring strategic framework that will advance American values and interests abroad and protect them at home.

We first identify transitory premises that served processes, institutions, and strategies from World War II through the Cold War, seeking to comprehend our inherited predispositions as predicate for rethinking them. We then identify changes that undermine many of these premises. To forge new premises, we specify foundational American strengths that must be protected and expanded amid and despite these changes. Finally, we suggest premises for a new age of strategic thought. In an appendix, we offer three examples to illustrate how the American national security establishment can build on these modern premises to develop new processes, programs, and structures.

Taken as a whole, this paper does not recommend a new strategy. Instead, it serves as a necessary preface to such a strategy by articulating how our national strengths and weaknesses must be understood as foundations for American security and by showing how the premises that have guided us from World War II to the present must be modified for the future.

*It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way—in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.*

So Charles Dickens began *A Tale of Two Cities* and so those who think about such things commonly regard their era. Professionals like us whose careers are devoted to American national security are hardly an exception. For a dozen years after the fall of the Soviet Union, many had illusions that we were at the start of an extended period of the best of times. America by that view was unrivaled and likely to be unchallenged. Nine months into the twenty-first century, 9/11 convinced most Americans that the second half of this proposition was not valid. By the end of the first decade of this century, the first half also seemed Pollyannaish. To the century's early worries about terrorism and "rogue states" (North Korea, Iran, and, for a time, Iraq), our national security agenda added concerns (probably greater concerns) about Russia as a dangerous declining nation and China as a competitive rising power. What looked like a road to heaven now feels like a roller-coaster.

In such an environment, laypersons and professionals alike ask where we are headed, how we can improve our security, and what we can do to increase our control of international events and advance our values and interests. There is not only a demand for answers to these questions but also a hunger for an enduring strategic framework from which these answers and subordinate strategies might be derived.

This hunger is reinforced by widespread desire for the clarity that accompanied America's national security successes in the half century from 1940 to 1990. Our predecessors made mistakes and did not by any means always agree among themselves, but throughout this period they articulated their objectives and methods and by and large adhered to them. Laypersons and security specialists feel the absence of such an articulated strategy in a tumultuous world.[1] We crave a replacement.

This paper responds to that desire but does not aim to satisfy it. We focus on only one set of problems, the relation between the United States and autocratic states in an era when changes in technologies and in wealth are remaking competition, sovereign cooperation, and international conflict. We believe these issues must be the first concern for American security strategists, that they require rethinking, and that this rethinking should promote a significant reorientation. Our ambition is to meet that challenge.

We call this paper *A Preface to Strategy* because a complete strategy would be more comprehensive. A complete strategy would, for example, also address problems posed by adversarial groups below the state level and their use of terrorism; problems stemming from geographic areas with deficient governance; global demographic and environmental challenges, including disease, climate change, and competition for natural resources; opportunities for cooperation with an emergent India and with established allies in Europe and Asia; and market competitions only tangentially related to military conflict. Even within the domain of our focus, a strategy could say more about the balance of forces, potential loci of conflict, the requirements of preparation for and avoidance of

[1] Efforts, some of them implicit, to develop strategies between the Cold War and the present are thoughtfully assessed by Brands (*What Good Is Grand Strategy?* and *American Grand Strategy*).

that conflict, etc. We value such discussions. We aim here, however, simply to focus on the indispensable core of any strategy: the long-term challenge of enhancing our power and position for coping with the most potent nations that are our possible adversaries.

## Our past triumphs and our present difficulties combine to impede a clear-eyed view of our future.

Within the arena we have targeted, our approach has these characteristics:

- *Attending not so much to our opponents as to ourselves.* We do not attempt to assess our opponents or to consider scenarios that might involve conflict between them and the United States. In these pages, our attention is primarily directed to America: how American thinking about national security has evolved; how this evolution has conditioned American strategies, strengths, and weaknesses; and how our national security establishment must rethink its premises as a prerequisite to improving our performance.
- *Focusing on our advantages and opportunities more than on our risks.* Risk-based strategies have their merits and are frequently used to deduce "requirements" for national security investments. We aim here to describe the rewards of an approach from the opposite direction, one that assesses America's strengths. Considering how to increase and use these strengths can provide both an agenda and inspiration for America and for its allies.
- *Defining a new reality.* Our past triumphs and our present difficulties combine to impede a clear-eyed view of our future. Nothing seduces like success. America's triumphs in World War II and the Cold War set the foundation for modern American strategic thinking. A decade as an unchallenged superpower reinforced most aspects of that thinking. Twenty-one months into the twenty-first century, in response to the 9/11 attacks and subsequent events, a complicating factor emerged. America began what has become seventeen years of continuous warfare. In this state of war, immediate concerns dominate. Little energy is available for reconsidering, much less recasting, existing foundations.

  As a result, America's strategic repositioning to meet the challenges of the twenty-first century has been slow. In the near term, the United States can get away with this: inertia can sustain our short-term security. However, we seek to show that the central challenges of the next decades cannot be met with familiar tools used in largely familiar ways. Our aim is to identify and make a persuasive case for foundational change in America's national security premises and, consequently, in American strategic judgments, institutional arrangements and processes, budgetary priorities, etc.
- *Broadening concepts of US national security.* In our view, military, political,[2] economic, and technological capabilities, always intertwined, have become more extensively connected. Over the next decades, America's success is likely to be most determined by the US government's abilities to improve and coordinate developments in all four of these dimensions. We discuss how this effort transcends traditional tools and must engage actors outside the US government.
- *Simultaneously positioning for conflict, competition, and cooperation.* We do not prejudge the proportions of cooperation, competition, and conflict in America's relations with other nations over the next decades. Along with our intentions, chance, circumstances, and the choices of other nations will affect all interactions. Our emphasis is on preparing for relationships that undulate over time and in the context of different issues. This calls for a subtle, complicated, and unfamiliar flow of strategic options.

[2] We use this term in a broad sense to encompass competition between forms of government, information warfare, and diplomacy.

- *Arguing for more risk-taking in the cause of peace.* We observe that military conflict entails risks. We argue that America should be willing to take comparable risks for peace. We point to how that might be done.

To develop our argument, in the first section, we identify premises that we believe animated our predecessors and that underlie processes, institutions, and strategies the American national security establishment inherited from World War II and the Cold War. We think these premises were well suited for protecting Americans and furthering our interests and values during the middle decades of the last century. However, in the second section, we record our observations of changes that undermine many of these premises. In the third section, we dig deeper and identify American strengths that we think are foundational for any future American national security strategy. We believe America should strive above all to protect, expand, and use these strengths. We emphasize that the risks that would undermine these strengths are not so much external as they are in ourselves. If our strengths erode, it is more likely to be from our own malnutrition than from the malevolence. In this light, in section four we suggest new premises for a new age. The final section provides a brief conclusion.

We follow this main part of the paper with an appendix that provides three illustrative examples of how the American national security establishment can build on new premises to develop new processes, programs, and structures. The first offers an assessment of our national security establishment's capabilities for innovation that may surprise many critics but provides a blueprint for change that will strike some as radical, but us as necessary. The second example discusses America's inadequate cyber defense system as an illustration of a failure to grasp some of the twenty-first-century imperatives we discuss. We outline how the present system should be changed. The third example discusses the imperatives for expanded international cooperation and offers recommendations for moving in that direction.

We anticipate that the three examples in the appendix will interest different readers to different degrees. We hope that readers will study at least one to help them understand that our arguments in the body of this paper are not just discussions about theory but can be—and in our view must be—translated into everyday practice.

## Premises from Our Predecessors

Study of the past is often discussed as a method of anticipating aspects of the future. We place a premium on it for a different reason: it helps us to understand ourselves at present. Comprehending the American national security establishment's inherited predispositions is a predicate for rethinking them.

American thought about national security strategies has naturally and powerfully been shaped by this country's victories in the Second World War and the Cold War. The challenges of both were immense. In response to the Axis powers, the United States abandoned its isolationist thinking, shook off its economic depression, harnessed its immense industrial capabilities to national needs, modernized and immensely expanded its military forces, built alliances, fought an "axis" of opponents, and forged a unified national commitment to military success even at great personal sacrifice. This five-year achievement was succeeded by forty-five years that first contained and then defeated communism by means that included military strength and skill, a network of global alliances, new international organizations, and the success of capitalist markets that contrasted with the economic failures of communism.

This half century of struggle both shaped and was shaped by important suppositions—we will call them premises. Not all of these were recognized at the outset; many were developed incrementally, through trial and error; some strengthened and others eroded over the decades; but all, we believe, were formative

in shaping the national security strategies and institutions we have inherited. Here are more than a score of premises we have reason to revisit:[3]

## About the International Security Environment

- America's risks were primarily from militaries maintained by other nations.
- The domains of warfare were land, sea, under the sea, and air.
- Conflict in these domains would be in defined geographic areas.
- America was, in words first used in Jesus's Sermon on the Mount and then adopted by Ronald Reagan, a "shining city on a hill." Our values would resonate for nearly everyone who had free access to information.
- Outside the United States, the center of world power and likely future conflict was, as in World War II, preponderantly in Europe. Issues and conflicts elsewhere were second-order surrogates for struggles in this arena. These struggles would largely be determined by the strength and strategic skills of European and American competitors.
- America could not remain outside major conflicts as it had sought to do before the First and Second World Wars, but America would rarely be at war.
- Nations could generally identify the boundaries of their own and others' sovereign territory; in times of peace, except for the mutually accepted practice of espionage, they generally respected each other's sovereignty;[4] physical violations of sovereign territory were the hallmarks of a transition from peace to conflict involving military forces.
- Physical combat in a "cold war" would primarily be fought on the territory of surrogates.

## About America

- The American economy was and for the foreseeable future would be the largest and most innovative in the world.
- America was and would remain, as it had been since World War I, a creditor nation. Our national debt, slightly exceeding gross domestic product (GDP) at the end of World War II, would return to normal prewar levels—that is, to less than half of GDP.
- American productivity and growth would support both American military investments and real economic gains for an expanding middle class.
- Manufacturing capabilities on the continental United States provided an unrivaled foundation for our military capabilities.[5]
- American companies controlled and would continue to control these manufacturing assets. Their primary markets would be in the United States.
- Whatever our domestic differences, the nation would unite and vigorously respond if attacked.

[3] This list distills the bottom lines from debates and qualifications that accompanied the crystallization of these premises in the late 1940s. We will observe, in the next section, that while most were reinforced, some were qualified, by the Cold War experience. Brands, in *What Good Is Grand Strategy?*, provides a book-length discussion of aspects of this history. Brands et al., in *Critical Assumptions*, offer their distillation of global and regional assumptions that presently guide American security policy.

[4] A shared understanding of what this meant could be traced back as far as the 1648 agreement among European powers at the Treaty of Westphalia.

[5] "Before 1942 was out, the United States was producing more war materiel than all three Axis powers—Germany, Italy, and Japan—combined." Herman, *Freedom's Forge*, 200. "We won because we smothered the enemy in an avalanche of production, the like of which he had never seen, nor dreamed possible." Somers, in *Presidential Agency OWMR*, quoting William S. Knudsen, the head of World War II military production. As one measure of this remarkable achievement, in 1944 America delivered close to one hundred thousand airplanes to our armed forces. Angelucci, *Rand McNally Encyclopedia*.

- Congress and the American public would generally support budgetary, military, diplomatic, intelligence, and economic actions in support of national security policies set by the executive branch, regardless of party, in collaboration with senior congressional leaders.

## About Our Power

- While other nations had to deal with threats immediately at their borders, our neighbors to the north and south did not pose security risks, and great oceans to the east and west created an enduring security buffer.
- Nuclear weapons could protect the United States either through threats of massive retaliation or (a 1960s evolution) as a means of "flexible response." Their proliferation could be prevented.
- So long as they were robustly maintained, intelligence capabilities could prevent a surprise attack like Pearl Harbor from occurring ever again.
- With these advantages, American military power could prevent attack on the continental United States.
- Even if surprised, in all scenarios short of nuclear holocaust, America would have time to recover, and its industrial might and the qualities of its citizens would give this country the resilience to regroup, respond, and prevail.
- Alliances, inherited from the Second World War, generally could be preserved and expanded around shared values and interests, with America as orchestrator, indispensable instrument, and, in many instances, a guarantor. Allies could be induced to make military investments that complemented American capabilities and facilitated our operations (for example, by providing overseas bases). Similarly, they could be dissuaded from some kinds of investments (for example, in nuclear weapons) and from some kinds of activities (as when, in 1956, the United States successfully pressed Britain, France, and Israel to halt their invasion of Egypt).
- America's alliances would be complemented by an array of international organizations with governance systems likely to further American values and interests. These organizations would create rules and adjudicate disputes that would constrain and shape other nations' behavior.
- America's alliances were backstopped by real and apparent American capabilities to mobilize and project massive military power abroad, as this nation did in the Second World War.
- To ensure its desired outcomes, the United States needed to train and equip large forces organized around the perceived land, sea, undersea, and air domains of military operations. Though these forces had elements that were interdependent, they could be funded, employed, and commanded with distinct budgets, personnel, and doctrines.
- Air and sea forces required speed of deployment, mobility, and readiness; land forces would operate from large fixed installations and needed to focus on the ability to sustain a long war in which they would be buttressed by national mobilization.
- As demonstrated by our successes in occupied Germany and Japan, we could rebuild nations after conflict and lead them to embrace democracy and the rule of law.
- Capabilities to develop new technologies relevant to warfare were overwhelmingly funded and largely controlled by the US government, not by other governments or by commercial enterprises.
- The proliferation of these technologies could be prevented or at least long delayed. The Soviet Union could rival America with occasional breakthroughs (as, for example, with Sputnik) or massive investments (as hypothesized in the 1960 rhetoric of "missile gap"), but America could persistently enjoy technological superiority and avoid technological surprise.

Elements of this canon were sometimes questioned, as after Sputnik, during the Vietnam War, and at the peak of Japan's rise as a manufacturing power. We should also not lose track of the fact that, over the four decades before the collapse of the Soviet Union, along with major successes (for example, sustaining Berlin as a free city, keeping missiles out of Cuba, and drawing China away from alliance with the Soviet Union), our predecessors suffered major failures. In addition to the Vietnam War, these included acquiescence in decades of Soviet repression of Eastern Europe, the loss of China to communism in 1949, stalemate after a bloody war in Korea, manipulative postcolonial policies in Latin America and Africa, and continuous tension and frequent warfare in the Middle East. Also significant, the US position, though it remained central in the world economy, shifted from that of creditor to debtor. Nonetheless, what was broadly accepted in 1950 was still broadly accepted in 1975 and was apparently validated by our triumph as the Soviet Union disintegrated in 1989 and as an American-led alliance rapidly and effectively rolled back Iraq's invasion of Kuwait in 1990.

**Almost all of these propositions need revision; a majority should be discarded; some would argue that none can be sustained.**

Remarkably, for the balance of the twentieth century and a few years after that, the United States had no peer competitor. As the century ended, America was, in an echo of the end of World War II, the sole superpower. This encouraged ambitious uses of our high-quality military forces and our economic power as instruments for "shaping" the international environment, for containing "rogue regimes," for preventive war (thought to be less costly than reactive war), for encouraging democratic movements, and for protecting oppressed minorities in countries around the globe. A wave of democratization in the 1990s reinforced our sense of leadership and our inclination to engage when conflicts, previously suppressed by authoritarian states, emerged.[6]

## Undermining of Previous Premises

The twenty-first century has not been kind to this canon. Almost all of these propositions need revision; a majority should be discarded; some would argue that none can be sustained. We identify eight tectonic changes that alter the premises we have inherited. While emphasizing twenty-first-century manifestations, we also observe some harbingers and sources of these changes in the twentieth century.

### 1. Expansion of the Geography and Domains of Warfare

As early as the mid-twentieth century, the destructive reach of intercontinental ballistic missiles began to erode the security advantages conferred on America by the Atlantic and Pacific. After the Cold War, the rapid development of space and cyber systems made it increasingly anachronistic to presume that conflict would be confined to defined battlefields with front and rear lines and protected strategic depth. These changes affected all nations but have the greatest implications for America: they significantly diminish the value of our oceanic buffers. In fact, because America is the major nation whose military and civilian activities are most dependent on digital and space-based systems, this country has, as others have observed, transitioned from being the least vulnerable nation to being, in important respects, the most vulnerable nation.[7]

[6] The imposition of sanctions on China after its massacre of democratic activists in Tiananmen Square in 1989 and NATO's protection of the Muslim populations of Bosnia in the early 1990s exemplified this engagement. Genocide in Rwanda in 1994 provided a vivid example of the consequences of America's failure to engage.

[7] The foreign activities of our corporations and our citizens increase America's exposure. Some nine million US citizens live abroad. Each day more than two hundred thousand Americans depart this country to travel abroad. Centers of research, supply, manufacture, and services for the US economy are located around the globe.

These developments challenge American armed forces and intelligence agencies. Within these forces and agencies, new technologies are acknowledged (sometimes even enthusiastically acquired), equipment added, and some new offices and commands created. But the American military mind-set and resulting institutions developed in the mid-twentieth century still center power around land, sea, undersea, and air operations; the focus of these operations remains abroad; and the primary claimants for resources and planning are organized geographically.[8] Long-standing premises and the institutions they enfranchise privilege twentieth-century capabilities and priorities. The result is that the United States Department of Defense is ill organized and, worse, inadequately motivated to confront the predominant challenges of our time.

Even our mental maps center on a geography of a time passed. For the last half of the twentieth century, while America fought wars in Asia, built bilateral alliances with Japan, Korea, and Australia, and planned for contingencies in Korea and Taiwan, American strategy remained centered on Europe. This focus has been diffused by the breakup of the Soviet Union, intense and violent conflict in the Middle East and sub-Saharan Africa, increases in the economic and political importance of Asia, and the perceived importance of counterterrorist missions around the globe. America's ability to project physical power is immense, but it is more difficult to sustain as the demands on US capabilities are more diverse and as we operate outside of Europe's relative accessibility and NATO's multilateral alliance relationships.

## 2. Continuous and Pervasive Warfare

Over the second half of the twentieth century, American wars came more frequently than our post–World War II leaders probably envisioned. Poorly prepared for mass conflict in Korea in 1950, they thought their major challenge was to maintain American capability in peacetime so as never again to be so unprepared for war. The dissolution of the Soviet Union reinforced this perspective: the greatest challenge appeared to be whether we would have the will and skill to sustain and structure our military assets in a perhaps prolonged peacetime environment.

The 9/11 attacks changed that. For seventeen years since then, we have continuously deployed troops in combat. Those deployments have made warfare a background fact of twenty-first-century American life. Persistent and pervasive attacks in the new domain of cyber operations have brought conflict closer to home. Cyber manipulation and outright attacks on America's electoral system and economy undermine previous conceptions of peace. The first reactions of the American national security establishment were to ignore and, when that became impossible, to marginalize attention to these attacks. These reactions have been facilitated by beliefs that cyber operations have not been "war" as traditionally understood and that they are not existential. To adopt a metaphor from medicine, these conflicts pose problems of morbidity, not mortality. We believe this difference is overweighted. It is a fundamental mistake to neglect actions because they are corrosive rather than dramatic.[9] The new situation demands strategic rethinking.

Critical parts of our infrastructure are outside our borders in space, cyberspace, undersea, and abroad. Indeed, America's infrastructure is frequently collocated and shared with America's potential opponents.

[8] In the military, these are now called combatant commanders, as, for example, for Europe, the Pacific, and Africa. Our virtual and vulnerable attack surfaces have no equivalent commanders.

[9] "A wide range of actors can undertake cyber attacks which individually are only slightly disruptive or destructive, but which over time can subject the United States to 'death by a 1,000 hacks' and impose cumulatively high costs while undermining our credibility of response to more impactful individual attacks." Defense Science Board, *Cyber Deterrence*, 9. Thus, for example, industrial espionage does not have to cause deaths or disable productive capacity to warrant national response. The dominant concern about electoral interventions should be about how they affect electoral integrity and

## 3. Erosion of America's Economic Supremacy

America remains economically preeminent. But the magnitude and direction of the change in that preeminence is as, or more, striking than the continuity. GDP is neither a perfect economic measure[10] nor an inevitable determinant of "hard" military power or "soft" influence.[11] (For example, Germany's economy was not as strong as those of the Western European powers it decimated in 1940.) Economic strength, however, is roughly indicated by GDP; this strength correlates strongly with military and other forms of power; and the longer the time period, the stronger the correlation.

The United States still enjoys the largest share of the world's GDP, about 25 percent.[12] But a quarter is quite different from the half that America produced after World War II. Moreover, during the Second World War and in the Cold War, the United States never faced an opponent whose wealth was more than a third of ours.[13] At present, Chinese GDP is two-thirds of America's; the trend points to that country equaling us in the middle of the next decade; most notably, the Chinese economy is projected to be 50 percent larger than ours at mid-century.[14] While dealing with more traditional challenges, the

credibility generally, not whether they did or did not "cause" different outcomes in particular cases.

[10] Imperfections of GDP as an economic measure include that it reflects tangible production more than rewards from information products and services. International comparisons of GDP also produce different results according to attributions of where value is added in international supply chains and whether totals are measured in terms of purchasing power parity or in dollars (as we do in this paper) at prevailing exchange rates. Appreciating these debates, we nonetheless use GDP as the best available indicator of economic changes that are broadly undeniable. (In purchasing power, China, which had less than one-fifth the power of the United States in 1990, now exceeds the United States. See World Bank, "GDP, PPP.")

[11] Beckley, in *Unrivaled* (published as this paper went to press), describes difficulties China will have translating GDP into military power. Before him, Brooks and Wohlforth, in *America Abroad*, highlighted the imperfections of GDP as an indicator of power and argued that China will have difficulty converting economic power (itself crudely measured by GDP) into technical capabilities relevant to military power (pp. 38–72). They categorized China as an "emerging super-power" and concluded that "the gap between parity and a credible bid for superpower status should be measured in many decades" (p. 48). We see China as expanding technical and military capabilities more rapidly than these political scientists do. Though we recognize, as Beckley emphasizes, that the stocks of US weapons and armaments give America a substantial advantage, we believe that advantage will diminish with time, particularly because rapid technology change will reduce the value of legacy equipment and experience. The rate of Chinese progress since Brooks and Wohlforth wrote reinforces our view. See for example, Kania and Costello: "China is positioning itself as a powerhouse in quantum science. Within the past several years, Chinese researchers have achieved a track record of consistent advances in basic research and in the development of quantum technologies, including quantum cryptography, communications, and computing, as well as reports of progress in quantum radar, sensing, imaging, metrology, and navigation. Their breakthroughs demonstrate the successes of a long-term research agenda that has dedicated extensive funding to this domain while actively cultivating top talent." *Quantum Hegemony?*, 1. See also Lee, *AI Superpowers*, marshaling considerable evidence for his conclusion that the People's Republic of China (PRC) will have artificial intelligence capabilities rivaling those of the United States within one to two decades. Our perspective does not depend, however, on the unresolvable question of just how "many decades" it will take the PRC to equal or exceed US power. Our views rest on a simpler proposition: it would be perilously imprudent for US national security strategy to assume that "many decades" would be longer than the period we discuss—one that takes us to mid-century and encompasses the likely years of service of those now entering our military.

[12] World Bank, "GDP (current US$)."

[13] "Both individually (China) and collectively (China, Russia, Iran), the revisionist powers' economic might is substantially greater than any power or group of powers the United States has faced over the past century. Consider that at the time the United States entered World War I in 1917, the U.S. economy as measured by GDP was nearly three times that of Imperial Germany. When Imperial Japan's production peaked in 1943 during World War II, along with Nazi Germany's, their combined economic power was less than 40 percent that of the United States. . . . During the Cold War, Soviet Russia could do little better than these earlier rivals. In 1980, with the United States suffering from stagflation and the oil shocks following Iran's revolution, the USSR's economy was barely 40 percent that of the United States, and perhaps less." Krepinevich, *Preserving the Balance*, 38–39.

[14] See Hawksworth, Audino, and Clarry, *The Long View*. Of course, these predictions may be wrong. The preeminent introductory American economics textbook in the 1960s mistakenly announced a likelihood that the Soviet economy would become larger than the US economy within the next quarter to a third of a century. See the discussion in Levy and Peart, "Fragility of a Discipline," 131–135. As mentioned in note 11, we do not take our premise as assured; rather, we adopt it as the most prudent present basis for planning.

United States is facing a new kind of competitor in China. Over the decades ahead, it will be unlikely that America could prevail in any intense military competition with China by increasing spending.

American constraints are intensified by our economic situation. For essentially a half century, the US government has borrowed money to sustain its operations. "If closed entirely through taxes, [present annual deficits] would require tax increases of about 30 percent. Or, if closed entirely by spending cuts, they would require a reduction in spending of about 25 percent."[15] American overspending is attributable to many choices, but for our purposes, a useful way of putting the point is that in recent years this country has borrowed the amount it has spent on its military.[16]

The most reliable projections show an ever-increasing American debt. Federal debt averaged 41 percent of GDP over the past half century. It is now 78 percent of GDP. In "only one other period in U.S. history—from 1944 through 1950, because of the surge in federal spending during World War II—has that debt exceeded 70 percent of GDP. . . . By 2048, federal debt would reach 152 percent of GDP . . . and would be on track to grow even larger."[17]

In the first decades after World War II, the United States was strong enough to make extraordinary investments in both guns and butter. Prospering blue-collar and white-collar workers saw little or no conflict between their aspirations and military budgets. In the ensuing decades, middle- and working-class well-being has declined, but tension over national expenditures for both military and social activities has been softened by borrowing. It is doubtful that America can indefinitely operate this way.[18]

## 4. Immense Growth in International Trade, Finance, and Economic Interdependence

At the end of World War II, American leaders laid the groundwork for a system of enhanced global trade they hoped would avoid a return to the system of national tariffs that contributed to the depressions of the 1930s.[19] The success of their creation, abetted by a number of technological, political, and economic changes, would have astonished even the most optimistic among them.[20] We see an exponential

[15] Samuelson, "Why We Don't Prepare for the Future."

[16] US military spending in 2017 was $610 billion. SIPRI, "U.S. Military Spending." The US deficit (expenditures as compared with revenues) in that year was $665 billion. Chantrill, "What Is the Deficit?" America's debt financing is connected to the globalization of trade and finance discussed in the next subsection. A third of America's borrowing is from global capital markets. See Amadeo, "Who Owns the U.S. National Debt?" Mastanduno, in "System Maker and Privilege Taker," chronicles "tacit political arrangements" under which "the United States has maintained the relative openness of its large domestic market to absorb the products of its export-dependent supporters. It has provided security benefits to those supporters. In exchange, they have absorbed and held U.S. dollars, allowing U.S. central decision makers the luxury of maintaining their preferred mix of foreign and domestic policies without having to confront—as ordinary nations must—the standard and politically difficult trade-offs involving guns, butter, and growth" (p. 121). His view, expressed a decade ago, is that "these recurring deals have proved mutually beneficial yet ultimately unsustainable" (p. 122). Others have been particularly concerned that about a tenth of the total of US indebtedness is held by China. We are more concerned with the total debt and the limitations that arise from having it.

[17] Congressional Budget Office, *2018 Long-Term Budget Outlook*, 7–8. Moreover, this report observes that "if lawmakers changed current laws to maintain certain policies now in place—preventing a significant increase in individual income taxes in 2026, for example—the result would be even larger increases in debt" (p. 8). Of course the PRC has debt issues of its own, not so much in its public debt (now at about 50 percent of GDP) but from private indebtedness, "zombie loans," etc. that threaten its growth and stability.

[18] Of course, China has its own challenges, including the need to expand its middle class, large amounts of private debt, politically powerful but economically counterproductive state-owned enterprises, demographic changes that will decrease the proportion of workers in its population, and environmental challenges. We note the American challenges to emphasize that dramatic increases in security spending are likely to encounter more resistance than in the past.

[19] Keohane, *After Hegemony*, 135–181.

[20] Ortiz-Ospina and Roser, "International Trade."

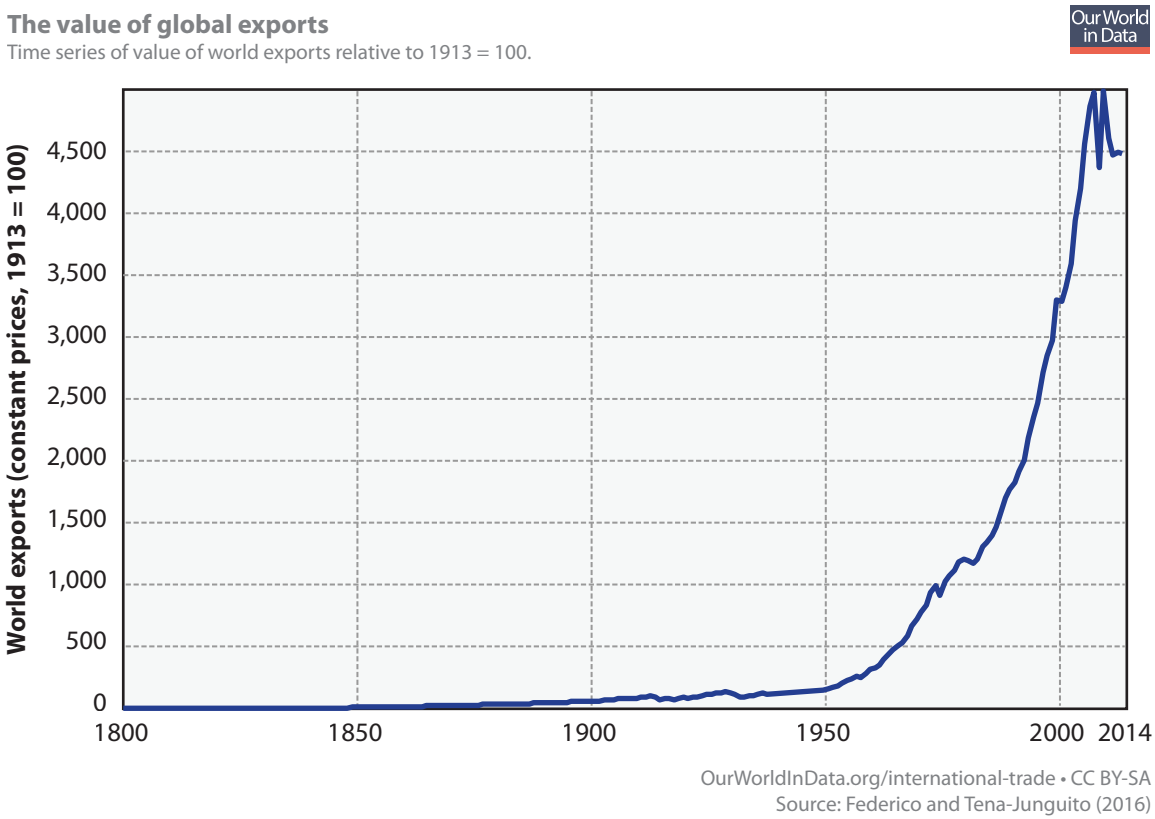


**Figure 1. The value of global exports**

explosion in Figure 1. The same could be shown for global movements of capital and international travel.

This change creates fundamental challenges and advantages for American national security. The challenges derive from the fact that the American economy now relies on global supply chains: it is linked to raw materials, production and assembly facilities, and workforces on other continents. This has been reflected in the loss of the American manufacturing base, a source of national power treasured by our predecessors. More broadly, American "multinational corporations" focus on foreign markets[21] and are dependent on foreign suppliers. They and the host countries that can influence them have interests often orthogonal to, and sometimes directly contrary to, American national security interests.[22] The ineluctable reality is that the security of the United States now depends on assets and relationships outside the United States.

As most nations commit their well-being to global trade and finance, deterrence is enhanced. Countless businesspeople from many nations, acting in their self-interest (abetted by economic thinkers and leaders), have spun a network that some have described as effectively a system of mutually assured economic destruction.[23] We would not go quite so far, but economic interests indubitably now push trading nations toward peace. It is not coincidental that at

[21] About a third of the earnings of US companies come from foreign sales. Ro, "Here's How Much." Apple, ExxonMobil, Procter & Gamble, HP, GE, Microsoft, Pfizer, IBM, Oracle, Caterpillar, and Alphabet generate a majority of their sales abroad. Perry, "Large US Companies."

[22] This is not unprecedented. American companies provided support for the Nazi war machine, bent American policy toward their interests in extracting resources in less developed countries, etc.

[23] The term *mutually assured economic destruction* (MAED) was coined by Dobbins et al., *Conflict with China*, 8. The earliest use of the term *mutually assured destruction* that we are aware of was in 1962 by Donald Brennan of the Hudson Institute.

present the most reckless nations—North Korea and Iran—and the breeding grounds for terrorism (Gaza, Somalia, Afghanistan, the frontiers of Pakistan, etc.) stand largely outside this system.

Inventive strategic thinkers have always used economic means to achieve security ends. The rise of global trade and finance proliferates opportunities beyond crude and cumbersome tactics like blockade. Creative strategists have brought historical enemies Germany and France together in a common market, distributed wealth through the Marshall Plan to cement a western alliance in Europe, and integrated China into the global community by opening membership in the World Trade Organization. Coercive economic tools have also proliferated: the United States uses its power in international finance to impose sanctions on Iran and others; Russia withholds gas exports (or increases or decreases subsidies for them) to pressure European nations; China conditions access to its markets on compliance with its priorities.[24]

Other characteristics of the global system are less salient but perhaps even more significant. We observe that though a patchwork of bilateral agreements exists, this system is primarily and necessarily multilateral: supply chains with different locations of production thrive under agreements that bind multiple countries under common rules and processes. This is a rule-based system with generally respected mechanisms for international adjudication. As such, trade and finance provide singularly powerful examples of how nations can and will surrender some sovereignty and bind themselves to cooperate when there are sufficient rewards for doing so.

Finally, alongside the ability of America and its allies to use their nuclear and conventional arsenals to deter the Soviet Union, the greatest factor for peace since World War II has been prosperity. In the first rank of changes since 1945 are the economic revitalization of Europe, the lifting of the continent of Asia from poverty, and the integration of China and Russia into the global economic system. Globally, since World War II, some five hundred million people have been taken out of extreme poverty every decade, essentially because of shared growth rather than redistribution.[25] The head of the World Bank put the point concisely: "This is the best story in the world today."[26]

## 5. Autocatalytic, Exponential Technology Innovation and Diffusion

We began by quoting Dickens: "It was the best of times, it was the worst of times." Nearly every modern generation since the fifteenth century has been struck—often both emboldened and unnerved—by the speed and effects of technological change. National security strategists are naturally sensitive to these changes and American strategists particularly so. "During the late eighteenth and early nineteenth centuries, the United States was nature's nation. By the twentieth, it had become technology's nation."[27] World War II left little doubt of the importance of this domain:

> All military strategists recognized then, and remember now, that the war started with Blitzkrieg, a German strategy that exploited

[24] As in eighteenth- and nineteenth-century colonialism, these and other nations invest in pipelines, ports, and other infrastructure according to their desires for geopolitical influence.

[25] "The world has lately been making extraordinary progress in lifting people out of extreme poverty. Between 1990 and 2010, their number fell by half as a share of the total population in developing countries, from 43% to 21%—a reduction of almost 1 billion people." "The World's Next Great Leap Forward," *The Economist*. "Nearly 1.1 billion people have moved out of extreme poverty since 1990. In 2013, 767 million people lived on less than $1.90 a day, down from 1.85 billion in 1990." "Poverty Overview," World Bank.

[26] World Bank, "World Bank Forecasts." Of course, even "best stories" can have darker strands. For example, "income inequality in OECD countries is at its highest level for the past half century. The average income of the richest 10% of the population is about nine times that of the poorest 10% across the OECD, up from seven times 25 years ago." "Inequality," OECD.

[27] Hughes, *Rescuing Prometheus*, 3.

> the combustion engine, message encryption, and the radio, and concluded with the code breakers in the U.K.'s Bletchley Park and the atomic bomb, a remarkable American orchestration of science and engineering.[28]

The war intensified America's advantages: it catalyzed immigration to this country by eminent European scientists; it left the United States, uniquely among major nations, with undamaged infrastructure; and it revived American manufacturing strength. In the ensuing Cold War, the United States used technological achievements to more than offset Soviet advantages in numbers.[29]

The pattern of twentieth-century technological change most relevant to military power conformed with our predecessors' premises. Steady growth was nurtured particularly by American government investment in the military-industrial complex and cooperative universities and research institutes. No country rivaled this capacity. Though technology diffused from espionage, reverse engineering, and competitors' research and development investments, it did so with notable time lags.

**Technological change has become, to borrow a term from chemistry, autocatalytic. National security decision-makers cannot prevent it; they cannot control it; they can only marginally encourage or channel it.**

In the twenty-first century, it is possible to point to some technologies that conform to this pattern—for example, present efforts to develop materials and propulsion systems for hypersonic missiles. In general, though, the old paradigm has been shattered: scientific and technical capabilities are now distributed around the globe;[30] the center of gravity for development and mastery of many technologies highly relevant to national security (artificial intelligence, robotics, space launch and payloads, data analytics, synthetic biology, etc.)[31] has moved from government into the commercial sector;[32] distributed research and supply chains

[28] Danzig, *Technology Roulette*, 4.

[29] "In 1994, Gorbachev's science adviser, Roald Sagdeev, wrote that in computers and microelectronics—the keys to modern civil and military technology—the Soviets trailed Western standards by 15 years and that the most striking indication of their backwardness was the absence of a domestically made supercomputer. The Soviets considered a supercomputer a 'strategic attribute,' the lack of which was inexcusable for a superpower." Weiss, *Farewell Dossier*, quoting Sagdeev. Antisubmarine capabilities illustrate how American technological leads were translated into advantageous applications. During the 1980s, these technologies enabled the American fleet to supplement active acoustic sonar (which had various limitations) with passive detection. A sound surveillance system (SOSUS) and narrow signal band processing techniques permitted approximate tracking of distant Soviet submarines, and long-range patrol aircraft with advanced sonobuoys could rapidly follow up. These advantages translated to other domains: America's submarine capabilities facilitated control of the surface of the sea, SEAL delivery systems and cruise missile capabilities contributed to land operations, and submarine-launched ballistic missile capabilities were central to deterring Soviet missile attack. For more extended discussions, see Wells, *A Tale of Two Navies*, especially beginning at p. 48; Ford and Rosenberg, *The Admirals' Advantage*; and Sontag and Drew, *Blind Man's Bluff*.

[30] For example, "the power of biotechnology has been growing at an exponential rate over the past several decades, driven by intense efforts in academia and the private sector . . . The United States is the clear world leader, but biotechnological knowledge and skills are broadly distributed across many developed and developing nations." President's Council of Advisors on Science and Technology, Letter, 1.

[31] Schnitzer and Levin (in "Hope and Challenge") forcefully provide an example: "The emerging miracles of modern biotechnology and biotech-inspired materials science conceal an existential threat to a fragile balance of international powers, and to our own national security. If not more thoughtfully debated on the global stage and controlled by multi-party agreement, our very existence is challenged by a single laboratory accident or ideologically-driven attack."

[32] While nonfederal funding for research and development (R&D) was 10 percent smaller than federal R&D funding in 1953 and one-half federal R&D funding in 1963, it surpassed it in 1979, doubled it by 1996, and was two and a half times greater in 2012. National Center for Science and Engineering Statistics, *National Patterns*, Table 1. Brimley, FitzGerald, and Sayler put this evolution in a historical context: "The current climate more closely resembles that of the late 19th century, when the commercial sector generated game-changing innovations like the telegraph and railroad. Likewise, the commercial sector will drive many of the innovations that will most define the next 20 years—additive manufacturing, robotics and unmanned systems, the 'Internet of things' and energetics." *Game Changers*, 9. See also Will's description of science and engineering

required for global commerce create channels for proliferation of scientific tools and know-how.

Concomitantly, the rate of technological innovation has accelerated. Technological change feeds on itself: digital information systems empower systems of research, communication, and cooperation; these systems fuel progress in fields as diverse as artificial intelligence, quantum physics, biological research, robotics, and new materials. Progress in these fields improves and expands information systems.[33] Technological change has become, to borrow a term from chemistry, autocatalytic. National security decision-makers cannot prevent it; they cannot control it; they can only marginally encourage or channel it. The challenge is to be preeminent at assimilating and exploiting what competitors can also access.

## 6. Decline in the Power of Militaries

For a national security strategist transported from 1948 to 2018, perhaps nothing would be more disorienting than reckoning with the present limits of military power, even as, in absolute terms, that power has multiplied. The range, precision, and power of weapons and their supporting systems are unprecedented. The professional capabilities of soldiers, sailors, marines, and airmen and women are dazzling. But the limits of these capabilities are also evident. Military power is less able to make, remake, or even keep order in the world than our predecessors would probably have imagined.

The causes of these limitations are numerous and varied, and result in part from some changes already noted: power at present is distributed across more nations; it is distributed more equally than in the mid-twentieth century; private enterprise is less dependent on military funding and has a bigger role in developing new technologies; these technologies are frequently available as commercial products;[34] religious, tribal, criminal, and ethnic networks are more resilient and resistant to state power than was anticipated; social media and other forms of communication have enabled nonstate organizers to assemble and direct groups with unprecedented speed, reach, economy, and effectiveness; "soft power"—including economic, information, and psychological weapons[35]—has grown and has been aggressively employed; the catastrophic capabilities of national militaries' weaponry make military actions so potentially consequential that nonmilitary actions and nonstate proxies seem like more attractive options; a world at war relies more on military tools than a world at peace (as now).[36]

as "what canals and roads once were—a prerequisite for long-term economic vitality." Will, "Rev the Scientific Engine."

[33] For example, new materials and robotics improve the capabilities of semiconductors that enable digital computing, artificial intelligence promotes the design of computing systems and is used to facilitate or thwart attacks on these systems, and new opportunities for information processing are explored with quantum and DNA computers.

[34] For example, a senior official at the National Geospatial Agency recently observed, "What has changed for us is how much the world has changed. . . . When you have this commercial GEOINT [geospatial intelligence], you now have the potential to consider a whole range of information that you weren't necessarily expecting . . . This is going to open up a new chapter where you have the commercial sector producing something that in some ways looks like what the national security apparatus can produce." Gordon, "Speed, Transparency and the Future of the NGA."

[35] Sometimes now referred to as sharp power.

[36] We note though that the number of armed conflicts has grown since 1946. Historical data are compiled by the Uppsala Conflict Data Program (see "Armed Conflict by Region"). Brands et al. take a different view of the future. They concede that "this idea—that the world had turned the page on the catastrophic great power military conflicts that had characterized much of the modern history of global affairs—has been a central premise of post-Cold War American statecraft. It has rested on several component factors and concepts, such as the decline of conflict-producing ideologies (such as communism and fascism), the supposedly pacifying influence of global economic integration, the mutual deterrence of great power nuclear arsenals, and the fact that American military primacy and American military alliances have essentially suppressed many longstanding sources of great power conflict in recent decades." *Critical Assumptions*, 18. They conclude that "today, however, the possibility of great power military conflict no longer seems so anachronistic—indeed, it seems more real than at any time in decades. . . . Both Russia and China, moreover, are working to develop military tools and strategies that are designed to allow

These factors crystallize and account, in large measure, for our difficulties and failures in Iraq and Afghanistan, as well as in countering terrorism, controlling cyber attacks, and deterring international criminal activity. When coupled with the previous section's point that economic and technological competitions between interdependent systems are complex and subtle, the implication is that we cannot wisely respond to twenty-first-century challenges predominantly by increasing traditional military investments.[37]

## 7. Erosion of Domestic Consensus and Effective Governance

It is easy to idealize the past and to understate the discord that characterized American debates about national security immediately after World War II. Nostalgia colors judgment, and we tend to filter out noise in retrospect. Trends have exceptions, and change is inconsistent in its speed and direction. Nonetheless, we believe that over the last seven decades in the United States, deference to government leaders, unity on national security strategies, and the priority given to national security goals have considerably diminished. This affects American choices and American power.

The premise that the nation would unite and vigorously respond if attacked may be correct, as after Pearl Harbor and 9/11, but it seems to be confined to dramatic physical attacks on America's homeland. Recent digital attacks have not produced a unified or vigorous response. Wars in response to perceived threats in Vietnam and Iraq were deeply unpopular and have left a residue of skepticism about alleged national security imperatives. This skepticism has been amplified by revelations in hacked, stolen, and leaked records. At present America does not have consensus or even closure about uses of our military power or about subtler instruments of diplomacy and economics.[38]

The predominant present response of American citizens to Americans fighting in Afghanistan and the Middle East and to our global operations against terrorism is indifference.[39] Partly because presidents from both parties have sought to insulate domestic life from foreign engagements, American debate over the last three decades (except immediately after the 9/11 attacks) has generally not been about national security. Rather it has focused on economic and social issues—for example, wage growth, employment opportunity, upward mobility, immigration, and abortion. Even ongoing armed combat is generally viewed as less relevant to America's immediate well-being.

Detachment is further enhanced by the diversity and obscurity of present threats and battlegrounds, our fatigue from decades of warfare, the increased power of high-tech weaponry and concomitant reductions in the demand for manpower, and our replacement of a mass conscripted force by a professional volunteer military. The United States has a large, capable, and professional military. Americans' support for their armed forces is strong and remarkably spread across the political spectrum.[40] But military service is not, as it was for the World War II generation, a

them to prevail in a limited conflict with Washington and its allies. Chinese preparations for a 'short, sharp war' in East Asia and Russia's increasingly open discussions of its nuclear 'escalate to de-escalate' doctrine testify to these efforts, as does Russia's use of its intervention in Syria." *Critical Assumptions*, 18–19.

[37] Nor can we effectively counter Russian use of information warfare, economic pressure, and nonconventional measures as used, for example, in Ukraine, by conventional military means.

[38] An immersion in detail has displaced any pretension to larger strategic debate. The most recent National Defense Authorization Act is 1,266 pages and includes some 3,600 congressional requirements.

[39] The exceptions to this general indifference involve our dealings with countries that have a large ethnic or expatriate block of voters in this country.

[40] Pew research polls indicate that 80 percent of Americans trust the military to act in the best interests of the public. This view is shared across party lines, with 92 percent of Republicans and 73 percent of Democrats in agreement. Johnson, "Trust in the Military"; and Pew Research Center, *The Public*, 11–21.

unifying common experience.[41] Only one in sixteen Americans serve as they come of age, and 80 percent of those have a cousin, sibling, uncle, aunt, parent, or grandparent who preceded them in the military.[42]

American disunity and the low-key attitudes of many Americans toward national security contrast with our opponents. While America struggles to achieve what is sometimes described as a "whole-of-government" approach to national security, for very different reasons and in different ways, Russia and China come close to a whole-of-country approach.[43]

## 8. Clarity about Our Global Primacy, But Confusion about Purpose

The catastrophe at Pearl Harbor triggered a transformation in the security strategy of the United States. We became the leader of a global alliance. That role—rejected for a century and a quarter from the founding of the republic,[44] briefly assumed in the last years of World War I and the first years of its aftermath, but then rejected again—was retained after World War II and became deeply ingrained as America led in the reconstruction of Europe and Japan, the construction of new international institutions, the containment of the Soviet Union, and as a guarantor of Japan, South Korea, and Israel.

**Support for engagement is sustained from habit, not from (as was the case in World War II and the Cold War) existential fear.**

The United States remains the leader of the free world. What has changed, however, is the nature, clarity, and power of Americans' motivations. US global leadership, founded on a role catalyzed by physical attack, is an effect that has detached itself from its cause. For many we are global leaders because in the lifetime of most of us, we have always been global leaders.

Military and diplomatic thinkers in the 1930s struggled with the fact that, for the American public, the cart of national security strategy was stuck in mud. Pearl Harbor and other events unleashed horses that pulled that cart out. For Americans today, the horses are long gone—a great fraction of the forward energy comes only from the inertia of the moving, but now aging, cart. A significant spike occurred as a result of the 9/11 attacks, but the absence of reoccurrence has encouraged a lapse back to apathy. Support for engagement is sustained from habit, not from (as was the case in World War II and the Cold War) existential fear.

For the last years of the twentieth century and the first years of the twenty-first, this was not a great problem. Though engagement was no longer imperative, it was relatively low cost and habitual. That respite ended with China's rise to great power status and Russia's resurgence as an aggressive, nuclear-armed regional power.

Unfortunately for policy makers, but fortunately for the world, the World War II and Cold War paradigm of conquest has lost force. There are places around the globe where occupation of a country is a relevant concern, but hardly anyone seriously thinks that Russia or China seeks to occupy the United States or enslave our citizens. Nor are America's most substantial regional concerns, for example from Iran

[41] The loss of that experience is sometimes attributed to our transition to an all-volunteer force, leading to suggestions that conscription should be restored. However, the all-volunteer force was a response to important and irreversible changes: social changes that made us unwilling to conscript and negligibly pay soldiers; technological and other changes that made it undesirable to recruit non–high school graduates; training requirements that warrant longer than two-year terms of enlistment; movement toward equality between women and men; and growth in the size of our population so that while our military needs only some 250,000 recruits, four million men and women turn eighteen each year.

[42] JAMRS, "New Recruit Survey," slide 14.

[43] We have adopted this phrase from Anthony Vinci.

[44] George Washington's Farewell Address famously charted our course: "It is our true policy to steer clear of permanent alliance with any portion of the foreign world." Before World War II, the only American treaty of alliance was with Panama.

and North Korea or movements like militant Islam, manifestations of Chinese and Russian ambitions.[45] Just what is it then that should animate America's engagement with the world? Habit? The expectations of others (often encouraged by us)? Altruism for citizens of those countries who are living without benefit of America's values? Concern that authoritarian countries will inevitably press Americans to abandon their freedoms? Fear of a foreign control more subtle than conquest? Or some conception of enlightened, long-term American interests?

## Seven Strengths: The Foundations of Our National Security

As many manifestations of the changes that we have described come to the foreground, they provoke unease with our position and hunger for rethinking our national security. A first impulse is to focus on these challenges, responding to each by patching present approaches with new structures and processes.

We take a different tack. For us, the foundation for the soundest strategies will be built on what endures and empowers us. To that end, we assert that American strength in the world stems essentially from seven assets: American values, system of governance, human capital, physical resources, economy, position in a system of international institutions and relationships, and military power. These strengths are foundational. In this section, we describe them individually and then reflect on their power collectively.

### 1. America's Values

Since July 4, 1776, America has always stood for something larger than itself. American values were not fixed on that day. The courage of that day, of the constitution that followed, and of America's foremost achievements in the centuries that have ensued was to subscribe not to a particular creed but rather to a revolutionary concept of freedom: that each citizen should be free to think for him or herself, that government should reflect the will of the people, and that the individual has rights that the government must respect and protect. To be true to our founders, we must repeatedly declare ourselves independent—independent of our government, independent of what our predecessors accepted, and independent of the conventional wisdom, prejudices, and shortsightedness of the day. Through many struggles we have come to recognize that this self-actualization through self-government requires a rule of law, a culture of tolerance, and a decentralized distribution of economic and political power to support these virtues.

As security experts, we do not have an authoritative opinion as to what this entails. In fact, we question whether an authoritative opinion is contrary to the very concepts of freedom that it might assert. We are conscious that America has often been wrong. American laws have, for many years in many places, empowered slavery; suppressed and distorted voting; supported discrimination; and relocated, interned, and blacklisted those of particular races and those with minority religious beliefs and political viewpoints. The United States has used force in wars, massacres, assassinations, and tortures that should never have occurred. We have often failed to act in the face of tyranny, oppression, atrocity, and genocide to our national regret. America has progressed and regressed. But we have, over our history and in the course of our individual lifetimes, seen moral growth in this country. This is not only a source of great pride, but it is also something we treasure as security experts. It is the nucleus of America's strength.

As the American identity has evolved, two other values—equality and opportunity—have come to occupy positions alongside the priority of freedom. These were not so well stated as a part of our revolution—they have been a part of our evolution. The reach, power, and instantiation of these values

[45] Although China and Russia are not above exploiting them for their own purposes in ways contrary to our interests.

have changed and continue to be contested. We do not pretend that they are clear or simple. But although both are periodically hotly debated, they are deeply embedded and, in the eyes of the world, especially American.[46]

We do not regard America as the sole possessor of a value system worthy of respect. Countries on all continents reflect their unique cultures, circumstances, and systems. Most prominently, the People's Republic of China is crafting a blend of Confucianism, capitalism, and communism; Europe offers paternalism, restraint on market forces, and prescribed state cultures; Japan values homogeneity over diversity, stability over change. Whatever the virtues of these systems, America's ideals are derived from different premises: a bedrock commitment to our freedom from our government; the exceptionally high value we place on opportunity, even at the expense of stability; and our commitment to equality even when it disturbs long-held legal and cultural norms. From these roots, concepts of democracy flower, and our joint commitment to democracy undergirds many of the partnerships in our system of alliances. It is not coincidental that Russia and China enjoy no partnerships (with others or with each other) that transcend short-term interests.

We should not, however, presume that our values are irresistible, irreversible, or self-protective. Russia and China themselves demonstrate that assumptions prevalent in the late twentieth century have at least so far been wrong: a taste of freedom and exposure to Western values (and integration into the global economy) have not made these countries democracies.[47] For them, our "shining city on a hill" does not shine; they prefer other hills. Similarly, American values consciously and unconsciously embedded in the internet (openness, free speech, avoidance of government controls) have not protected that forum from exploitation and subversion. And now, if a fresh example is desired, our largely unregulated processes for democratic debate have been distorted by manipulative actors.

Alongside these failures there remains the indubitable fact that over centuries, many people and nations around the world have responded to American ideals. From our origins as a nation we have believed and asserted that our ideals transcend time and place. When we blur them, as we often do by compromise or confusion, we diminish our power. When we honor them—not merely proclaim them, but reflect them in action at home and abroad—we act from a core of unrivaled strength.

## 2. America's Settled System of Governance

Americans think of themselves as citizens of a youthful and revolutionary nation. This country's adversarial culture contributes to discourse that is often disabling, distortive, and dispiriting. We have

[46] One measure of this is the widespread desire to immigrate to America or at least to study here. Our immigrant population yields measurable benefits relevant to national security, discussed below. Contrast, for example, Russia. "In my travels around the world I have met numerous people in many countries who wish to immigrate to the United States, Germany, Canada, or Australia. I have met a few who want to move to China or Japan. But I have yet to meet a single person who dreams of immigrating to Russia." Harari, *21 Lessons*, 13. An independent polling organization reports that a remarkable 23 percent of Russians with higher education want to leave Russia (though their mix of economic and political motives is impossible to discern). "The Problem with Russia's Best and Brightest," Stratfor. Note that the Chinese situation is different. The PRC is making successful efforts to attract scientists from around the world. "In 2008, China's central government announced the Thousand Talents Plan: a scheme to bring leading Chinese scientists, academics and entrepreneurs living abroad back to China. In 2011, the scheme grew to encompass younger talent and foreign scientists, and a decade later, the Thousand Talents Plan has attracted more than 7,000 people overall. . . . All successful applicants can expect a 1 million yuan (US$151,000) starting bonus, and the opportunity to apply for a research fund of 3–5 million yuan. Foreign scientists receive additional incentives, such as accommodation subsidies, meal allowances, relocation compensation, paid-for visits home and subsidized education costs. Employers are also obliged to find jobs for foreign spouses, or provide an equivalent local salary." Jia, "Career Guide: China's Plan."

[47] Similar observations could be made about some countries in eastern Europe, Turkey, and the Philippines. Democracy is a fragile organism. It must be nurtured and protected every day.

just decried an erosion of consensus and support for national security priorities. It is a safe bet that the US government will be belated, inefficient, and often misdirected as it comes to grips with essential problems. Nonetheless, it is important to observe how advantaged Americans are because we have had a continuous system of government for two and a quarter centuries and sustain consensus (however rough) about essential rules and boundaries that regulate this system.

**America is admired, trusted, and allowed to lead in proportion to how potential allies and adversaries assess Americans' well-being, patriotism, care for one another, and commitment to the well-being of the world. The proof of America's political and economic systems is in the well-being of Americans.**

Americans do not devote noticeable energy to extending or contracting our borders, fighting separatist movements, or revising our constitutional system. America's religious, commercial, and legal systems are largely independent of the executive powers of the president and his or her appointees. The roles of the military and intelligence establishments in the United States are essentially settled; the energies of our national security officials are externally, not internally, directed; they are well controlled and generally respectful of, and respected by, our executive, legislative, and judicial branches. This separation has the further invaluable benefit of increasing the number of actors and contexts that are propitious for speaking truth to power.

China, Russia, Iran, and North Korea (and, indeed, most nations on every continent) do not enjoy all these benefits. Though these countries have rich histories, their current governments are fragile. Their basic norms and procedures were born recently and are still intensely contested. Their domestic struggles routinely involve repression, corruption, imprisonment for political reasons, and assassination. Within living memory, China suffered a lost generation from the mass upheavals of its "Cultural Revolution." Russia suffered Stalin's terror and extralegal coups and corruption. Iran experienced revolution, and North Korea state-ordered executions of key leaders. The security services of these countries are buffeted by political competitions, tensions, distrust, and corruption that degrade their performance and domestic demands that distract them from their external missions.[48] In sum, though the United States often acts immaturely, even self-destructively, the American system, benefiting from experience and adjusting through time, is reasonably settled and bounded by accepted rules of law. That is not a benefit enjoyed by America's competitors.

## 3. The Human Capital of the United States

The character and quality of Americans are a foundation for an American national security strategy. US military forces are built on the qualities of our enlisted personnel and our officers. In these roles, Americans have been remarkably courageous, committed, disciplined, honest, educated, adaptive, and innovative. One by one, these attributes are not unique to Americans, but the combination permeates US forces and indeed American society. This yields substantial advantages over militaries and societies whose members are less committed and less educated, and whose freedom of thought and expression is suppressed. As one example, American military forces operate more effectively because we delegate more readily and confidently. As another,

[48] "Beijing's budgets for internal and external security have grown faster than the economy as a whole for several years, but domestic security spending has grown far faster—to where it exceeds the national defense budget by roughly 20%. Across China, domestic security accounted for 6.1% of government spending in 2017, the Ministry of Finance said." Chin, "China Dramatically Boosts Spending."

freedom of movement, thought, and speech fosters American innovation across disciplines at a rate that we do not believe is matched in China or Russia even as education spreads and achievements within disciplines concomitantly grow in these countries. This cross-disciplinary advantage yields rewards in military and economic power.

Along with a universal recognition of our power, foreign respect for America is often derived from attitudes toward Americans. America is admired, trusted, and allowed to lead in proportion to how potential allies and adversaries assess Americans' well-being, patriotism, care for one another, and commitment to the well-being of the world. The proof of America's political and economic systems is in the well-being of Americans.

World War II and its aftermath created a large reservoir of people grateful for American decency and generosity. As that experience recedes in history, that pool of goodwill is shrinking. But America benefits from sustained regard for this society's apparent commitment to opportunities for upward mobility and its abilities to assimilate different cultures and ethnicities. That strength is enhanced as the United States revisits and revises its culture to diminish racism, sexism, demagoguery, and bigotry.

It is clear that substantial challenges remain and new challenges will arise in these foundational attributes. Issues of race, gender, ethnicity, and religion remain in American life. Opportunity has diminished. Gaps have widened between the super-wealthy, the affluent, those who have only the assets they earn from paycheck to paycheck, and those who depend on government assistance. A large proportion of our population remains undereducated,[49] unhealthy, or in trouble with the law, to the point where seven of every ten young Americans are not qualified for military service.[50] Technological change (including automation and the proliferation of artificial intelligence), demography (including immigration), globalization, and environmental change are introducing occupational, social, political, and other challenges, while also creating new opportunities.

We do not purport to have special wisdom as to how to address the needs and opportunities that result. Our expertise is in a different domain: national security. But it is precisely because of our focus on that domain that we call attention to America's human capital. Issues of economic growth and economic distribution, environmental stewardship, education, and equality, and our methods of resolving these issues, are commonly spoken of in terms of morality, politics, economics, and domestic well-being. We stress that they also determine the enduring quality and long-term effectiveness of America's national security.

Accordingly, in addition to the ways in which these issues are normally discussed, we believe that all Americans need to be concerned with these issues as matters of national security. The GI Bill was justified in the mid-twentieth century primarily as a contribution to demobilization. In retrospect, the resulting enrichment of our human capital had powerful positive effects in the opposite direction: it fundamentally improved America's ability to marshal military power.[51] That enlightened legislation also helped to expand universities and an educated cohort that powered our economy and greatly extended our influence abroad. In this century, an analogous nourishment of human resources, from maternal health to technical training and graduate education, is at least as imperative.

[49] In a series of surveys, between a quarter and a half of the American adult population incorrectly answered the question "Does the Earth go around the Sun, or does the Sun go around the Earth?" For the approximately 25 percent error rate, see National Science Board, *Science and Engineering Indicators 2018*, 7–19 (Table 7-4). In surveys from 2001 to 2008, similar questions were answered accurately by only a half of those surveyed. See National Science Board, *Science and Engineering Indicators 2010*, 7–44 (Table 7-1).

[50] Spoehr and Handy, "Looming National Security Crisis."

[51] Government investments in human capital during the Great Depression similarly contributed to American capabilities when we mobilized for World War II.

Similarly, we need to recognize how much American national security has been and continues to be founded on the skills, talents, and hard work of those who are not born in the United States but are attracted to this country by the values and opportunities (including for higher education) that America offers. Repelled by fascism and welcomed here, European scientists made the crucial contributions that led us to the atomic bomb; American aerospace and rocketry achievements were critically accelerated by foreign talent; immigrants make up about a fifth of the science and technology workforce of the United States;[52] 40 percent of the Fortune 500 companies were founded by immigrants or their children;[53] and in recent decades Asian-born nationals have contributed immensely, and disproportionately, to the success of Silicon Valley.[54] Debates about rules, enforcement, and numbers of immigrants are appropriate, but from a national security perspective we must recognize that the United States increases its peril to the extent it shuts out immigrants or even simply discourages their sense of being welcomed. International students account for 81 percent of full-time graduate students in electrical and petroleum engineering programs and 79 percent of computer science students.[55] While we must be vigilant and ensure that our international students have not been co-opted or controlled by a foreign intelligence service, from a national security perspective, it is recklessly profligate to deny welcome (and work visas) to those America educates.

No budgetary or other claims of military necessity and no distaste for, or fear of, "foreigners" should be allowed to overwhelm or undermine this country's domestic human capital imperatives. In the very short term, military priorities may be thought of in terms of airplanes, ships, tanks, missiles, guns, and other weapons of war. In the long term, our security depends on the capabilities and character of the people we empower to protect us.

## 4. America's Physical Advantages

Though intangible factors like human capital and intellectual property have ever greater significance in this era, physical attributes also contribute to national power. For centuries, the immensity and natural wealth of the United States have amazed those who have explored, developed, and exploited it. America's fertile fields and beneficial climates allow this nation not only to feed itself but also to be the world's greatest exporter of agricultural products.[56] The United States produces oil and gas at levels rivaling those of the world's largest exporters. This country will likely become a net energy exporter within the next five years.[57] With rare exceptions, raw materials of all kinds exceed our national security requirements. America's size and variety, both in its cities and its rural areas, cushion it from effects of disasters, both natural and human-made, that might be disabling for other nations. These advantages are material, but as many have noted, they also beneficially affect America's confidence and openness.

## 5. The Economic Engine of the United States

Economic growth promotes, and is indubitably promoted by, improvements in our human capital. We have noted the structural weakness created by our

[52] Lan, Hale, and Rivers, "Immigrants' Growing Presence."

[53] Partnership for a New American Economy, *"New American" Fortune 500*.

[54] "In 1998, Chinese and Indian engineers, most of whom arrived in the United States after 1970 to pursue graduate studies, were senior executives at one-quarter of Silicon Valley's new technology businesses." Saxenian, *Silicon Valley*, viii. See also Manjoo, "Why Silicon Valley Wouldn't Work"; and Anderson, "Immigrants and Billion Dollar Startups."

[55] Redden, "Foreign Students and Graduate STEM Enrollment." A majority of science and engineering workers within the United States have received their undergraduate education abroad. National Science Board, *Science and Engineering Indicators 2014*, chap. 3.

[56] Simpson, "Top Agricultural Producing Countries."

[57] US Energy Information Administration, *Annual Energy Outlook 2018*, 22.

dependence on debt. But this long-term problem, like smoking in a vital young person, does not eviscerate the present and near-term power of our economy, the largest in the world. Americans create more than two billion dollars of value every hour. Many, at home and abroad, see this unprecedented productivity as a validation of our success as a society. A keen desire for access to American markets creates a strong desire to ally, or at least remain on decent terms, with the United States. American productivity, trade, and capital markets give Americans access to, insight into, and expertise about technologies that have both civilian and military applications. These are remaking warfare and related intelligence activities at an accelerating pace.

Our present affluence, combined with our borrowing, permits us to persistently fund a defense budget as large as those of the next eight nations combined.[58] It supports great expenditures on our intelligence agencies and nuclear programs outside our Department of Defense. Taken together, these expenditures amount to about seventy-five million dollars every hour. We have buttressed our power by dispensing aid at a rate that at a high point has approached a billion dollars a week.

## 6. America's Position in a Favorable International Order

Postwar American leaders created an array of institutions, treaties, norms, and legal systems to facilitate international discussion, resolution of disputes, and cooperation. Institutions of importance include, for example, the United Nations, the International Monetary Fund, the World Bank, the General Agreement on Tariffs and Trade (succeeded by the World Trade Organization), and a great number of international regulatory bodies facilitating safe interactions in travel and trade. They complemented these civilian institutions with alliances for military cooperation, of which NATO is the prime example.

**The extensive global trade described previously facilitates deterrence. . . . Today's generals and admirals are neither inventors of, nor investors in, this system, but they are beneficiaries of it.**

America's dominance at the time of the creation of these institutions and the intent of their creators secured the United States a central position in the international environment they shaped. That position has been sustained because of the attention American leaders have given it and the values, unrivaled military capabilities, and preeminent economic strength the United States has brought to it. In turn, these institutions, relationships, norms, and principles of international law have commonly (though not invariably) furthered America interests, proliferated American values, and amplified American power.[59]

American security partnerships are self-evidently useful as means of extending American power. They afford benefits ranging from shared intelligence, bases, and joint military operations[60] to coordinated

[58] The Stockholm International Peace Research Institute records US defense expenditures for 2016 as $606 billion and calculates the following for the next eight nations: China, $226 billion; Saudi Arabia, $64 billion; Russia, $69 billion; India, $56 billion; France, $55 billion; the United Kingdom, $48 billion; Japan, $46 billion; and Germany, $41 billion. SIPRI, "Military Expenditure."

[59] "The United States has created, maintained, defended, and expanded a liberal economic order to serve national economic and security interests. . . . the United States has taken advantage of its privileged position within that international order to serve its own particular ends. It has employed its preponderant power at the core of the world economy to placate domestic constituencies and preserve the autonomy of central decision makers over U.S. foreign, defense, and macroeconomic policy. Across the bipolar and unipolar eras the United States has been simultaneously a system maker and a privilege taker." Mastanduno, "System Maker and Privilege Taker," 122.

[60] "Most Americans [do not] adequately appreciate that every foreign war we have ever won was won in an international coalition in which our foreign allies did much of—and sometimes even the majority of—the fighting. Even during the Cold War, the majority of the NATO troops holding the line in Europe, and specifically in West

action on sanctions, pursuit of terrorists, and controls on money laundering. The United States is much more effective when it acts with others. America's potential opponents have no such scale or cross-border support.[61]

## Trading relationships create a gravitational field that pulls nations' security decisions in America's direction.

The present array of international economic institutions and relationships produce benefits that are similarly foundational for American security. Directly, American economic strength—and therefore American coercive power—is intertwined with America's status as the greatest trading nation on the globe. More subtly, the United States is undoubtedly more secure because others harvest rewards from the existing order. Warfare is a violent effort to overturn the status quo and destroy an undesired future. Poverty, stagnation, and sustained imbalances in global wealth are incentives to warfare. Conversely, prosperity is prophylactic: it creates investments in the status quo and enhances the prospects of stable futures.[62]

The extensive global trade described previously facilitates deterrence. Acting within an established framework of governance, businesspeople from many nations, motivated by their self-interest, have created an economic system that has been described as effectively a system of mutually assured economic destruction. We would not go quite so far, but economic interests and constituencies sensitive to those interests now push trading nations toward peace. Today's generals and admirals are neither inventors of, nor investors in, this system, but they are beneficiaries of it.

Finally, trade strengthens America's position because it proliferates American values. Rules of trade are rules of law. The flow of economic information, the lifeblood of trade, abets the flow of political information. Moreover, American products, American markets, and the Americans who develop, sell, support, and consult on their use carry American culture with them. Those who seek to sell to consumers in the United States must learn and often live in our culture; this affects their views of this country and of their own societies. For three-quarters of a century, America has dominated this playing field. To the extent we yield leadership in trade to China, Europe, or others, trade will transmit their values, not ours.

We recognize that global trade creates losers as well as winners and stresses as well as benefits. We are not deaf to calls, in America and abroad, for constraining globalization of our economies. Nor would we slight the fact that prosperity for some countries means prosperity largely or even exclusively for elites who control economic resources and political power. But, we have no doubt that global trade has immensely contributed to American security. Debates about the benefits of trade must include its effects beyond economics. Trading relationships create a gravitational field that pulls nations' security decisions in America's direction.

Germany, were foreign, not American. If you don't see the foreigners doing a lot of the effective fighting, you're probably studying either the history of a war America lost or the history of a war America is losing." Zelikow, "You'll Never Walk Alone." For example, our allies have suffered over one thousand combat deaths in Afghanistan since 2001. Mazarr and Rhodes, *Testing the Value*, 45.

[61] We ascribe this largely to the power of our values. Allies are no doubt attracted by our military power, economy, and trading position; they may value the stability of America's governance and the individual qualities of Americans. But it is not a coincidence that our strongest alliance relationships are with those—the British Commonwealth, western European and Nordic nations, Israel, Japan, South Korea, Taiwan, and increasingly India—whose values are consonant with ours. When alliance relationships are rooted primarily in interests and only marginally in values—as with Turkey, Egypt, Saudi Arabia, Qatar, and Pakistan—they can be significant, but are less powerful and more brittle.

[62] Of course, prosperity, even prosperity that is internationally interdependent, is not a guarantee of peace. Were this the case, the First World War would not have occurred. But global depression was not just an antecedent—it was a cause—of the Second World War. And the collapse of global trade, accelerated by misguided national protectionist policies, was a major cause of that depression.

## 7. America's Military Forces and Intelligence Agencies

American military forces protect this country against existential threats by making it apparent that our opponents cannot be advantaged by waging nuclear or conventional warfare against the United States. Beyond that, US conventional forces and nuclear capabilities advance our interests and values by pledging and providing support to countries as diverse as the NATO nations of Europe, Israel, South Korea, and Japan.

These forces and capabilities cannot eliminate, but they restrain, aggression by Russia in eastern Europe, by Iran in the Middle East, and by North Korea in Asia. They moderate expansive pressure by China in the South China Sea and East China Sea. Less dramatically, on an everyday basis, our forces are invaluable partners for activities as varied as peacekeeping and training in Bosnia, anti-piracy patrols off the coast of Africa, and anti-drug operations in and around Latin America.

To perform these roles, our military has demonstrated robust capabilities across six different domains: on land, in the air, on the sea, under the sea, in space, and in the electromagnetic spectrum.[63] Operations in these domains involve varied instruments of power, including, for example, our nuclear triad; computing and telecommunications hardware and software and skilled professionals to configure, operate, and protect those assets; soldiers, sailors, airmen and women, and marines; intelligence abilities to illuminate opponents' weapons' locations, operations, capabilities, and (most difficult to divine) intentions; and ships, airplanes, tanks, and other platforms by which and from which we deploy our combat forces and our weapons.

To renew and sustain these capabilities, the US national security agencies have nurtured ecosystems for research and development, acquisition, maintenance and transport, recruitment, training, retention, and promotion. They attempt to balance these efforts so the US military and intelligence agencies simultaneously maintain substantial readiness to act; resources and systems to sustain their actions over months, years, or even decades; and a constant replenishment of legacy equipment and continuously improved modes of operation with more modern systems.

[63] Cyberspace is a human construct within this domain.

**Our first concern is that we often neglect, stunt, squander, and even vandalize America's strengths.**

## Reflections on These Strengths

We highlight these strengths because we believe that America must protect them, nurture them, and use them creatively in combination. Our first concern is that we often neglect, stunt, squander, and even vandalize America's strengths.

Our predecessors were not perfect: racism, McCarthyism, and complacency about inequality besmirched American values; America has devalued large portions of its human capital through sexism and segregation; the United States enshrined an unequal status quo in international institutions; this country has engaged in wars that drained its economy and eroded its military.

But our predecessors' investment in America's strengths was extraordinary and empowered three-quarters of a century of US preeminence. Human capital was enhanced through the GI Bill, Great Society programs, substantial funding and favorable tax treatment for universities, and grants and low-interest loans for students. Priority was given to federal investments in research, development, and infrastructure, and those in turn invigorated the US economy and US military. Alliance relationships were nurtured with aid (most famously through the Marshall Plan) and strengthened by creation of

the system of treaties and international institutions described above.

Twenty-first-century America has no such achievements. At the turn of the century, significant international change was in motion with the addition of China to the World Trade Organization and the expansion of NATO.[64] Subsequently, however, the 9/11 attacks and the Great Recession demanded defensive measures that deflected attention from American investment in its assets at home and abroad. American efforts to build or strengthen major international institutions have been spasmodic and have sputtered.[65] At home, a majority of US citizens agree that this country's educational systems, infrastructure, income tax, immigration laws, and health care systems must be reformed and invigorated, but this consensus has not led to action. America's economic growth is not sustaining its expanding federal budget. Instead the government of the United States is increasing debt[66] to the point that in the decade to come, federal interest payments will exceed funding for our military.[67] Because America's health care costs are twice those of other Western democracies,[68] the government of the United States is now pointedly described as a health care enterprise with an army.[69] We fear that the next step might come to be described as a health care enterprise *without* a first-class Army—or Navy, Marine Corps, and Air Force. The US government is now exposed to the realistic prospect of national budgets that shortchange military resources for equipment, operations, personnel, and research and development.

**The present disposition to military operations has . . . distracted American military leaders from longer-term objectives. While present imperatives accelerate tactical innovation, they retard changes of more enduring effect. In an age of innovation, America cannot afford its leaders' present persistent discounting of the future.**

This inaction has fueled disparagement and in some quarters despair about the American system of governance. Under no circumstances would we exchange this system for that of China or Russia. But it is notable that so far in the history of the twenty-first century, those governments have evolved and become more stable while America's has become less effective and universally less well regarded.

In the decades after World War II, America's values were often challenged, both from within (for example, by McCarthyism and racial tensions) and from without (by communism). But the trend was clearly to expand American freedoms and to widen access to opportunity and participation in voting rights, education, and the distribution of power in American society. It is not coincidental that the US military was in the vanguard of many such efforts. Partly this is because the US armed services are in large measure meritocratic organizations. But it is also because opening roles to women and minorities significantly expands the pool of talent and the diversity of perspectives and therefore adds to our strengths. These expansive trends may, however, be exhausted.

[64] In 1999, China acceded to the World Trade Organization, and the Czech Republic, Hungary, and Poland became members of an enlarged NATO. Ten smaller eastern European nations have joined NATO since then.

[65] Initiatives to create coalitions to slow climate change and to prevent Iran and North Korea from developing nuclear weapons have not resulted in sustained alliances or achievement. The last major multilateral change to the international trading systems was negotiated a quarter century ago.

[66] The International Monetary Fund reports that "amongst advanced economies, only the United States expects an increase in the debt-to-GDP ratio over the next five years." Gaspar and Jaramillo, "Bringing Down High Debt."

[67] In its report *The Budget and Economic Outlook: 2018 to 2028*, the Congressional Budget Office has estimated defense spending as high as $679 billion and net interest at $702 billion by 2023.

[68] "Health Spending," OECD.

[69] The federal government now spends over a trillion dollars a year on health care. "Health Care," Congressional Budget Office.

Our concerns that America's strengths are not being nourished are compounded by our judgment that they are not being coordinated. Power accrues to those who not only have these strengths but also use them most skillfully together. Borrowing a metaphor from Emerson, they are like the fingers of a hand—together they can grasp things that are impossible for one alone. Occasionally we preach this gospel, but the United States rarely practices it across competing executive agencies and congressional committees or between the federal government and state or local governments. Systematic cooperation between the American private and public sectors is still rarer. The transcendent perspectives and skills that can synchronize different activities are more manifest in the national security policies of China than in those of the United States. It is as though the concept of synergy was more evocative in Mandarin than in English.

The American approach is unbalanced as well as ill coordinated. Budgets highlight this imbalance. Even more so, it is evident from how intensely, skillfully, and persistently we organize, train, and equip military service members and how inadequately we do this for our foreign service officers and federal civil servants.

We show military capabilities last in our enumeration of America's strengths, not because they are the least significant of our tools (far from it!) but because waging war should be a last resort. Sometimes, military intervention will be required, even rapidly required, but it should be chosen only when political and economic efforts are judged to be inadequate or unacceptably slow, uncertain, or costly. Military action is to security as surgery is to health.

The present disposition to military operations has a further, fundamental weakening effect. A disproportionate military commitment has worn down the US military's service members and equipment and distracted American military leaders from longer-term objectives. While present imperatives accelerate tactical innovation, they retard changes of more enduring effect. In an age of innovation, America cannot afford its leaders' present persistent discounting of the future.

## Implications: Foundational Strategic Premises

America's national security strategy must confront the challenges posed by our past success. National security professionals are trained and recognized for their mastery of traditional means of managing conflict and cooperation. They naturally address new problems by first placing them in familiar strategic frameworks and then employing time-tested tactics and tools.

Absent another dramatic terrorist attack on US soil, these professionals face little public pressure to embrace disruptive change. Though concerned with issues of cybersecurity, immigration, and the economics and inequities of trade, the American public is broadly satisfied with American security.

Consequently, public and professional attitudes keep America on an inertial path that keeps this country doing what, since World War II, it has done. On this path, America's strengths are so formidable that, in the short term, the United States can meet its security needs by increasing levels of spending.

In the long term, though, this is a strategy for failure. While the seven American strengths we have identified endure, changes in our environment demand changes in our premises. Those changes in turn require changes in US strategies and in the institutions, processes, platforms, and skill sets created in another century in response to other premises.

We emphasize particularly important implications of our analysis under three headings: America's national security objectives; the economic and technological environment in which these objectives must be pursued; and the likely contexts of conflict, competition, and cooperation across multiple domains

within which an American national security strategy must be implemented.

## National Security Objectives

*The first priority of America's national security strategy should be to constantly, energetically, and imaginatively enhance the strengths from which American power derives.* Opponents can compete with the US economy, America's position in the world trading system, America's military power, and its human capital. But their gains in these respects are natural consequences of the development of a more normal world. The United States cannot (and, for gains in nonmilitary power, should not) impede them. The most significant variables this country can control are those associated with our own enrichment and coordination of the elements of our power.

None of America's strengths inevitably endure. Americans can erode American values; vandalize the US government; undervalue, malnourish, and squander this country's resources, infrastructure, and human capital; turn against trade; swamp ourselves in debt; alienate our allies; and cut back on or misallocate investments in military power.

**The most critical tests for American national security strategy will not be at borders and on battlefields abroad but on street corners and in living rooms in America.**

A well-conceived national security strategy must put this country on a different path. If it nurtures its strengths, America will remain the most powerful nation because its natural advantages of size, resources, and location will continue to be magnified by the vibrancy of our values, our human capital, our natural resources, and our economy; by the stability of our institutions; by our central position in the world economy; by our alliance relationships; and by our military power. Opponents cannot replicate American stability or the appeal of American values without becoming more like America. We will be safer if they manage this transition.

*American security strategy should recognize that America's strengths substantially define our ends as well as empower our means.* These strengths not only determine American power, but they also shape this country's identity and its priorities. American national security strategy should protect and enhance American values, the stability of the US government, the safety of America's population, our economy and human capital, the international order in which the United States plays a central role, and America's military capabilities.

*A strong security strategy must both renew the American vision and render it consistent with the realities of American power.* American leaders at the end of World War II were in a position of exceptional global power. They used that opportunity to substantially remake the world in America's image. American preeminence was then challenged for four decades by the Soviet Union. Another period of unrivaled American dominance occurred after the breakup of the Soviet Union. But America's position as an overwhelmingly dominant nation ended in the first years of this century.

A robust assertion of American values and interests will create competition, friction, and perhaps conflict with authoritarian states, of which China, Russia, Iran, and North Korea are the most important present and likely future examples. America cannot control all the factors that may inhibit conflict or facilitate cooperation. But America can powerfully shape many variables and the gravitational field in which these variables operate. To do this, US national security officials need to assess this country's limits and its imperatives and opportunities.

As an example of limits, we do not believe that American security strategy should promote a program of regime change in authoritarian countries. In our judgment, efforts in this direction would be

futile and generate more problems than advantages. America should articulate its values and protest moral and legal abuses within these countries, but these and other nations must find their own way through change organic to their own systems.

At the same time, America must be equipped and committed to protecting its values and interests. If this country fails to do that, these values and interests will be hobbled, compressed, and eventually consumed. American strategy should not confuse restraint with regard to the domestic activities of authoritarian states with acquiescence in their hostile activities beyond their borders. In a static world it is possible that the United States could ignore aggression by authoritarian states unless and until they physically attacked America or evidenced an intention to do so. In theory, this would be an "I'm OK, you're OK" world in which nations deferred to one another's spheres of interest. We take this view, however, to be founded on an improbable premise: that human affairs can be static. The premise of security strategies should be that relations between nations are and will be dynamic. We have too often seen, as others have put it, that the appetites of authoritarian regimes expand with their eating.

*A successful security strategy must emphasize that America's strengths in any competition are amplified by its alliances.* America's competitors have shown very limited abilities to create equivalent alliances. In fact, nations that border China, Russia, Iran, and North Korea have commonly chosen to ally with us. American national security strategy must buttress these allies against the range of threats, physical intrusions, commercial pressures, cyber attacks, and other forms of coercion to which they will be (and have been) subjected. The challenges of checking authoritarian power are more likely to present themselves in pressures or outright attacks on America's allies than in physical attacks on America.

This presents a challenge at home as well as abroad. The clarity that unified the American public in World War II and in this country's fight against communism has blurred after decades of matter-of-fact supremacy; it has been dampened by weariness from struggling with numerous distant wars. Now, American citizens do not share a consensus for personal sacrifice or for subordination of economic means so that they serve national security ends. Indeed the converse is commonly assumed—that the US security apparatus can be valued predominantly by its protection of our economic interests.

*Broad public understanding is a prerequisite to investment in and support for stronger American national security capabilities and actions. Consequently, a successful American security strategy must speak to and be embraced by the American public.* Toward this end, efforts must be made to publicly illuminate some risks that are immediate—for example, the cybersecurity challenges discussed in the appendix. Classification of much that is happening in this arena may narrowly assist American intelligence and other efforts. But it forfeits too much in the pursuit of a more important objective: educating and enlisting the American public.

Beyond this, American discussions must emphasize that the most important risks highlighted in this paper are longer term. For America to succeed in the face of challenges that will only become fully evident some decades from now, Americans must commit to action now. Experience over two-thirds of a century since World War II has taught US national security officials much about how to deter conflict and how to triumph in combat. Unfortunately, they have learned less about how to secure the commitment of Americans to achieve those ends. The most critical tests for American national security strategy will not be at borders and on battlefields abroad but on street corners and in living rooms in America.

## Economic and Technological Environment

*Twenty-first-century American strategy cannot reliably replicate America's twentieth-century achievement:*

*this country cannot expect to spend its way to security.* No predictions are assured. But the soundest present premise for American strategy is that China's GDP will approximately equal that of the United States during the second quarter of this century. American strategy should presume that as mid-century approaches, the PRC will have advantages from a GDP increasingly larger than that of the United States. These advantages will be diluted by consumption demands from a PRC population three times that of the United States, with a higher proportion of elderly citizens[70] and environmental problems and energy dependencies that will be costly to address.[71] Corruption and the distortions and security demands of an authoritarian system will further burden Chinese progress. Whether China will have the will and skill to convert its economic strength into military power is unpredictable. However, if American security is to remain in American hands, it cannot be premised on the congenial assumption that our national security budgets will be greater than those of this potential rival.

*To sustain even technological competitiveness, a successful strategy must catalyze enhanced investments in human capital, research and development, and incentives for innovative absorption of new technologies.* The American technological dominance that prevailed over the lifetime of virtually all readers of this paper cannot be presumed. The United States should not sell itself short. America's strengths in human capital, its economy, and its ecosystem for invention and the dissemination of innovations will continue to give this country great advantages. However, US strategy cannot presume consistent and comprehensive technological superiority. Our strengths must be nourished. In the appendix, as an important and illustrative example, we show how we would amplify innovative capabilities in our military services.

*A sound strategy must presume that competitors will surprise American national security agencies in development and employment of technologies. A sound strategy must promote institutional changes that will enhance resilience when these surprises occur.* Surprise may be achieved through simple means, as for example, with improvised explosive devices, or with sophistication, as, for example, in some recent cyber attacks. In these and other instances, America's responses were inadequately resilient. As technological capabilities become more widely distributed and rates of technological change accelerate, technological surprises will become more frequent. While, by definition, their particulars cannot be predicted, recognition of their greater likelihood should prompt investments designed to improve resilience.

In the appendix we offer an illustration of changes that should be achieved in the case of cybersecurity. We emphasize, however, that this is a particular case of broader, rapid, unceasingly transformative, twenty-first-century technological changes. The

[70] China's dependency ratio for retirees (those aged sixty-five or older divided by total working population) was 14 percent in 2015 and could be as high as 44 percent by 2050. The number of people over the age of sixty-five will increase from one hundred million (in 2005) to approximately 330 million in 2050. Rapoza, "China's Aging Population"; and Wang, "China's Population Destiny."

[71] "The problem of energy supply and the environment has emerged as a significant new challenge to China's future development. . . . There has been a surprisingly large improvement in the efficiency with which energy is used. In 1973, 0.64 tons of oil equivalent were used per thousand dollars of GDP, by 2003, this had fallen to 0.22 tons. . . . Energy efficiency was better in China than in the United States in 2003 and the IEA expects this to be true in 2030. However, the environmental impact of energy use in China is particularly adverse because its dependence on coal is unusually large and carbon emissions are proportionately much bigger from coal than those from oil or gas. In 2003, 60 per cent of energy consumption came from coal, compared to 23 per cent in the United States, 17 per cent in Russia and 5 per cent in France. . . . Chinese coal is particularly dirty, sulfur dioxide and sooty particles released by coal combustion have polluted the air in its major cities and created acid rain which falls on 30 per cent of its land mass. There are more than 20,000 coal mines and nearly six million miners with low productivity and dangerous working conditions. . . . These environmental problems are likely to be bigger in China than in the rest of the world, as it is more difficult and more costly to reduce the proportionate role of coal." "Chinese Economic Performance in the Long Run," OECD. In 2010, the PRC Ministry of Environmental Protection estimated the cost of pollution as 3.5 percent of GDP. Albert and Xu, "China's Environmental Crisis."

digital revolution is of immense importance, but it is not the end of technological history. As other technologies—synthetic biology, artificial intelligence, quantum systems, new materials, additive manufacturing, etc.—emerge, American military and intelligence agencies must be more skillful than they were in responding to cyber opportunities and risks. Strategists must resist the temptation to focus narrowly only on particular technologies that dominate today's horizon.

*America's security strategy must elevate a priority that our military could previously afford to neglect: defending Americans and American infrastructure on American soil.* New weapons often transcend geographic constraints. As a result, the protections that derive from the oceans adjacent to the continental United States are now much less significant. New technologies proliferate power, enabling groups, individuals, and smaller nations to inflict unprecedented and intolerable damage. As a result, deterrence through nuclear and other responses becomes less relevant, and defensive measures (sometimes described as deterrence by denial) become more important. In the appendix we recommend steps toward this end in the illustrative case of cyber defense.

*US national security strategy must identify weapons systems, personnel investments, and strategies that should be eliminated because they no longer justify their expense or because they will create intolerable risks in future environments.* This divestment should be driven by recognition that improvements in sensors, data analytics, unmanned systems, and weapons range will reduce, and perhaps eliminate, safe harbors. Bases, ships, airplanes, space systems, cyber systems, and civilian infrastructure will, for all nations, become more difficult to defend. A national security strategy will readily identify consequent areas of opportunity and new investment. The challenge and the imperative will be to make room for the new by cutting the old.

## Conflict, Competition, and Cooperation

*A twenty-first-century security strategy must nurture American mastery within and across all operational domains—land, sea, undersea, air, space, and the electromagnetic spectrum (including cyberspace).* America's historical economic and military supremacy will be challenged in each of these arenas. Mastery of one or all of these domains will not be adequate. Cross-domain coordination and capabilities will be imperative, as attacks will be launched from one domain into another.

**We routinely take risks in warfare. America's national security strategy should also encourage us to take them for peace.**

*A successful American security strategy cannot simply address competition; in dealing with hostile or potentially hostile competitors, it must artfully blend and balance competition and cooperation.* This blending was not a salient requirement when our national security establishment was forged during World War II and the Cold War. But in the twenty-first century, cooperation is imperative because national economies are intertwined and infrastructures are internationally distributed, often even shared (in space, undersea, in each other's countries, and across the electromagnetic spectrum). Moreover, collaborative global responses are required for critical and borderless problems (pandemics, climate change, terrorism, refugee movements, etc.), and norms and responses must be developed to reduce risks as potent military and civilian technologies proliferate.

*We routinely take risks in warfare. America's national security strategy should also encourage us to take them for peace.* In particular, while China will be America's greatest economic, political, and military competitor in the twenty-first century, it also represents the greatest opportunity to advance shared global interests, including, for example, mitigating climate

change, preventing nuclear proliferation, detecting and combating pathogens, avoiding conflict in space, and promoting regional stability. American strategy should vigorously pursue cooperative opportunities in these and other areas, while acknowledging that these initiatives carry risks of increasing technology access and influence. The appendix provides examples and suggests some specific approaches.

*American national security strategists must better advocate for and protect the security rewards that derive from the international system of trade and finance.* This system cannot guarantee peace, but it decreases the likelihood of major conflict by proliferating prosperity and giving nations an increased stake in the status quo. It offers the most important and pervasive example of competitive nations subjecting themselves to norms, laws, and institutions that resolve international disputes. The dollar's position as the international reserve currency particularly enhances American power and provides leeway for debt that underpins our federal budget. National security consequences must be articulated and considered in the development of America's initiatives as powerful economic, political, and technical forces remake the global system in the years to come.[72]

*A mature American strategy must improve coordination of America's technological, economic, political, and military activities.* China and Russia have been faster than the United States to grasp that they are engaged in a multifaceted strategic competition. Their more comprehensive approach is evident in their use of intelligence campaigns against technological and economic targets, government orchestration of their commercial sectors, pressure on foreign companies to share data and technologies as a prerequisite to access their domestic markets, and, in China's case, long-term funding of critical technologies and use of trade, aid, and loans[73] as means of building relationships. By contrast, the United States does not use its intelligence capabilities this way, forswears commercial coordination, has done little to control foreign entrance into our markets, has not sustained growth in its long-term research investments, has discounted the security advantages of trade agreements, and is moving to diminish aid and lending[74] as instruments

[72] Presently, for example, the economic playing field is being reshaped by China's expanding wealth and market power; the political environment in the United States and other nations is creating pressures for tariff and other protections; and artificial intelligence and robotics are reshaping trading patterns—for example, among emerging nations for whom manufacturing has previously been a proven path to development.

[73] For example, "since 2000, China has assumed an increasingly dominant role in the construction and rehabilitation of transportation infrastructure around the globe. In Sub-Saharan Africa, it has funded a US$320 million ring road around Ethiopia's capital, Addis Ababa; a US$3 billion railroad that runs from Addis Ababa to Djibouti's seaside port of Doraleh; a US$4 billion railroad that connects Kenya's capital with the port city of Mombasa; a US$600 million road that connects Gabon's leading seaport (Port-Gentil) with its capital, Libreville; and a US$500 million road in Cameroon that connects the port city of Douala with the capital, Yaoundé. In Asia, China's government has funded a US$7 billion high-speed railway from Laos' capital city, Vientiane, to the capital of China's Yunnan Province (Kunming) and a US$2 billion highway from Karachi to Lahore in Pakistan, while pouring billions of dollars into the construction and rehabilitation of roads in Cambodia, Sri Lanka, and Indonesia. In Latin America, it has provided US$2 billion in support of the rehabilitation of a 1500 km railway in Argentina, US$350 million for suburban mass transit extensions in Venezuela, and hundreds of millions of dollars for highways and bridges in Jamaica, Suriname, Ecuador, and Bolivia. In the Middle East and North Africa, it has invested US$2 billion in the electrification of a 926 km railway from Mashhad to Tehran and US$250 million in Morocco's Berchid-Beni Mellal highway." Bluhm et al., "Connective Financing," 4. AidData/William and Mary's website on Chinese aid, https://www.aiddata.org/china, provides an invaluable compendium of data.

[74] The Marshall Plan, which provided approximately 4 percent of recipient nations' GDPs over a four-year period, stands as an exemplary use of aid to enhance security. It provided $13 billion, which is $137 billion in 2018 dollars. The United States spent approximately $30 billion in 2017 and has spent $12 billion to date for 2018 ($28 billion planned). US Department of State, Foreign Assistance website. As a percentage of gross national income, this amounts to 18 percent, which places the United States near the bottom of industrialized countries for levels of foreign aid provided. Kessler, "Fact-Checking." Between 2000 and 2014, US and Chinese governments had "similar sized [aid] portfolios with very different compositions." See graph titled "How Does China Compare against the United States?" in Dreher et al., "Aid, China, and Growth." Now China spends more than America even with its presently pronouncedly smaller GDP. It is likely that the PRC will become more dominant in this dimension as Chinese wealth increases relative to America's.

of influence.[75] The challenge is not one of imitation. China has used "aid" in a manner that recalls Western colonialism; it makes loans as a wasp stings and paralyzes a tarantula, so it can lay its eggs within its helpless living victim.[76] This behavior provides no model and generates its own backlash,[77] but America must offer a robust alternative to counter it.

The United States will be challenged to achieve coordination of American power because many of these elements reside in our private sector. While authoritarian states refuse to recognize limits to state power, limits on the power of government and the maintenance of private life are fundamental to American values. A successful security strategy will have to reconcile traditional American approaches with modern security needs. It cannot eviscerate the boundary between public and private life, but at the same time it cannot treat public and private power independently. For example, the United States needs to identify the responsibilities of large multinational corporations, many with headquarters in America or dependence on American markets, to contribute to American national security.

## Conclusion

Our discussion of premises is not offered as a work of history or political philosophy but rather as a foundation for construction of American national security strategies and programs. Its test is whether it positions and provokes US national security strategists to better solve problems.

**We do not live up to the standards of American leaders before us by iterating their strategies, multiplying their weapons, enshrining their bureaucratic structures, or replicating their worldviews.**

In the appendix to this paper, we take three priority national security problems as examples of challenges for change: our urgent need to be the most successful innovator and absorber of new technologies; our requirement to sharply upgrade our cybersecurity capabilities; and our need to find methods of cooperation that will reduce the risks of intentional and inadvertent war, while increasing our capabilities to tackle transnational problems. In each case we seek to show how new premises should lead to new conclusions and quite specific actions.

We are not unique in recognizing that substantial new threats are evolving and provoking concerns about American security. As they entered World War II, our predecessors felt the same way. We are in an immensely stronger position than they were. Our challenge is to perform at least as well as they did.

The path to doing that is not to copy them or to mindlessly accept their twentieth-century premises in our twenty-first-century situation. We do not live up to the standards of American leaders before us by iterating their strategies, multiplying their weapons, enshrining their bureaucratic structures, or replicating their worldviews. Instead, we grasp and follow the essence of their example by building

[75] "Despite boasting the most powerful economy on earth, the United States too often reaches for the gun instead of the purse in its foreign policy. The country has hardly outgrown its need for military force, but over the past several decades, it has increasingly forgotten a tradition that stretches back to the nation's founding: the use of economic instruments to accomplish geopolitical objectives, a practice we term 'geoeconomics.' . . . Around the time of the Vietnam War . . . international economic policymaking emerged as the near-exclusive province of economists and like-minded policymakers. No longer was it readily available to foreign policy practitioners as a means of working the United States' geopolitical will in the world." Blackwill and Harris, "Lost Art of Economic Statecraft." The authors expanded their argument in their book *War by Other Means: Geoeconomics and Statecraft*.

[76] China gained control of an Indian Ocean port in Sri Lanka when that country's government defaulted on loans that China had extended, giving China a new strategic foothold in the Indian Ocean. Abi-Habib, "How China Got Sri Lanka."

[77] As an example of backlash, the newly elected prime minister of Malaysia has resisted Chinese pressure, citing "unequal treaties" entered under China's Belt and Road initiative. Bland, "Malaysian Backlash."

our strategy on a fresh assessment of our challenges, our weaknesses, and above all the sources of our strength.

While doing this, we have, in this paper, persistently pressed the point that nothing seduces like success. American achievements over the last seventy-five years have given us unrivaled power and enviable security. It is seductive to idealize the outlook of our predecessors and assume the premises that they assumed. But the world has changed, and that course, accordingly, is dangerously mismatched to our situation. It is similarly seductive to attribute our risks to our opponents and then to redouble our efforts while decrying theirs. But that overlooks the variable that we can most control: ourselves. The enemy that matters most is not out in the world. It is inside our heads.

As a preface to strategy, we have attempted to inventory, prioritize, and refresh our thinking. Our discussion has emphasized not only the vital importance of American military power but also the essential power that arises from our nonmilitary instruments of influence, including, notably, our values, the stability of our system of government, our human capital, our economy, and the international order well shaped to our values and interests.

We have emphasized that our foundational assessments are not just instrumental. These American attributes also define our goals. We interact with foreign nations and groups to protect or advantage our values, our citizens, our economy, and the international community in which we live and from which we benefit. Realism and idealism are not conflicting or alternative approaches to the world. Realism should dominate our means, and idealism, our ends. But our ends and means are braided.

This intertwining defines America's challenge and advantage. As other nations improve their economies, education systems, infrastructure, and militaries, they will compete more effectively and in some realms even exceed us. The benefits we realize from the buffers of the Atlantic and Pacific are greatly diminished, and in some contexts erased, by technological developments that give others intercontinental kinetic capabilities and remotely managed cyber weapons.

The time when America had all the advantages and was a sanctuary is over. But the return to a more normal world—one that we do not dominate and in which we are not insulated—should not obscure that we are specially advantaged. We derive power from what makes us Americans. Our nation is singularly attractive because it is free, open, and rich with opportunity. We control these variables. So long as we do not vandalize ourselves, competitors will be severely disadvantaged if they choose to rival us without these attributes. Most wonderfully, if they become more like us in these ways, that too will make us more secure.

Seen this way, American thinking about our national security should start from the premise of our preeminence. Our best is superbly good. If we are clear-eyed about our situation, committed to our essential premises, and creative enough to apply the full range of our strengths in energetic, imaginative, adaptive, and coordinated ways, we can face the future with confidence.

# Appendix From Premises to Priorities and Plans: Three Examples

This appendix offers illustrative examples of how the American national security establishment can build on new premises to develop new processes, programs, and structures. The first example assesses our national security establishment's capabilities for innovation. The second discusses our cyber defense system. The third discusses the imperatives for expanded international cooperation and offers recommendations for moving in that direction.

## Example 1: Innovation

### Strategic Challenges

This paper emphasizes that proliferating connections among technological, economic, political, and military systems demand new thinking about multifaceted strategic competitions. It asserts that national security officials will require new abilities to coordinate effort across traditional domains (land, air, sea, and undersea) as well as new domains (space and the electromagnetic spectrum). It also observes that the digital revolution cannot be regarded as the end of technological history—to the contrary, it is a harbinger of further challenges as synthetic biology, artificial intelligence, quantum systems, etc. transform competition and conflict. American national security strategists cannot presume that the United States will naturally and indefinitely maintain technological superiority. To sustain even technological competitiveness, a successful strategy must improve investments in human capital, research and development, and processes for absorption of new technologies.

**American national security strategists cannot presume that the United States will naturally and indefinitely maintain technological superiority.**

These considerations point to an imperative to improve innovative capabilities within American military and intelligence agencies. A successful commitment to innovation is, however, more readily promulgated in principle than converted to practice. This example describes some ways in which our proclaimed priority for innovation can be converted into personnel, procurement, and budgetary priorities.

### Analysis and Recommendations

Though it is a cliché that government bureaucracies generally, and military bureaucracies particularly, resist innovation, we believe that the US Department of Defense and US intelligence agencies have been remarkably innovative. As one illustration, we observe that most of today's senior Air Force officers started their thirty-year careers developing proficiency flying twentieth-century aircraft and dropping dumb bombs, but then adapted to computer-controlled "fly-by-wire" aircraft, precision munitions, stealth, unmanned vehicles (commonly flown by enlisted personnel), communications, navigation and surveillance systems, and cyber operations. Few if any American corporate enterprises have absorbed such repeated revolutionary change. None has sustained change as long and as successfully as the American military.

We associate this achievement with some organizational characteristics. Central to this is a focus on mission. Headquarters personnel have rich histories—and probably futures—of service in the field, and they are intimately connected through years of relationships with field commanders. If an innovation can meet an immediate operational requirement or save lives, it is powerfully incentivized. Thus, for example, drones were long seen as useful only for target practice and then for decoys. But requirements for tracking mobile missile platforms in Serbia in 1999 catalyzed the widespread use of drones as instruments of surveillance. Less than three years later, amid wars against al-Qaeda and the Taliban, imperatives for faster strikes after target identification led to equipping unmanned aeronautical vehicles with missiles. The evolving mission then drove technical and operational improvements in ground stations, command and control, observation, data analysis, and other activities. These were accompanied by intense policy, legal, and strategic debates. Together these changes produced revolutionary innovation.

An up-or-out system that refreshes leadership and ensures a constantly youthful force also contributes to openness to new ideas. The eminent quantum physicist Max Planck captured an important truth when he observed that new scientific theories came into their own only as older leaders are replaced by "a growing generation [that] is familiarized with the ideas from the beginning."[78] The US military, like most militaries, is an inherently youthful organization. More than half of American uniformed service members are under thirty—a striking contrast, for example, to the federal civil service where only 6 percent of the permanent workforce is under that age.[79]

Not least significantly, our military services have historically been richly funded. As we have emphasized, a great challenge for established organizations is not whether they favor innovation but what they are willing to give up to support it. Not what they would add, but what they would cut. Start-ups circumvent this challenge by having no existing operations. Our military circumvents this hurdle by securing funds for innovation on top of existing operations.[80]

However, there is no assurance that this strength will endure, much less evolve to meet the demands of the future. Sources of weakness can be identified. We have noted economic pressures that may diminish adding funds for innovation. Even without this constraint, the American military's mission orientation causes it to live in the present. As a contemporary observed about the working poor at the start of the nineteenth century, "their present wants employ their whole exertion." The future is heavily discounted as the demands of maintaining, operating, and controlling complex physical systems (many of them legacy systems from another era) drain organizational energy and provide strong reasons for risk aversion. A robust ability to

**Something deeper impedes disruptive military change: professional skills, camaraderie, and pride idealize existing ways of doing business.**

[78] Plank, *Scientific Autobiography*.

[79] US Office of Personnel Management, "Data, Analysis & Documentation, Federal Employment Reports." As of 2015, 65 percent of active-duty service members were thirty or younger (853,693 individuals). Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy, *2015 Demographics: Profile of the Military Community*. One implication of this is suggested by the fact that of federal civilians working on information technology issues, there are five over the age of sixty for every one under the age of thirty. Oversightandreform, "Workforce for the 21st Century Part III."

[80] Conversely, budgetary stringency commonly stifles innovation. As the body in extreme cold channels blood to the heart at the expense of the limbs, so military leaders, in a time of scarcity, allocate resources to ongoing "core" operations and systems, rather than to innovation.

manage everyday challenges encourages discounting of what might happen—the "can-do" orientation that pervades each day leads to an implicit belief that "can-do" will get us through tomorrow.

This attitude is amplified after victory. Organizations that believe they are dominant have the least inclination to further innovation. Thus, the British fleet's shining victory at Trafalgar impeded its transition from sailing ships to steam, and China's preindustrial domination of Asia contributed to its military's indifference to what the Industrial Revolution portended for military power.[81]

Something deeper impedes disruptive military change: professional skills, camaraderie, and pride idealize existing ways of doing business. Professional identities are built around abilities to use certain weapons in certain ways: the pilot's pride in his or her command of a plane, the captain in his or her ship-handling abilities, the marine and soldier in his or her rifle are exemplary. To render the instrument obsolete is to subvert the professional investment tied to it. "Military organizations are societies built around and upon the prevailing weapons systems. Intuitively and quite correctly the military man feels that a change in weapon portends a change in the arrangements of his society."[82] Means become confused with ends.

On a larger scale, vital, changing organizations treat the instruments they use and the products they produce with a minimum of emotion: they are cattle to be replaced as the seasons change. Military officers too often treat established systems and processes as though they were pets—embraced, defended, and loved beyond their utility.

Thus, our Air Force makes room for drones but pursues manned aircraft beyond a point of justification. Thus, our Navy says its biggest investments will be in aircraft carriers at least through 2048. To be sure, we continue to benefit from platforms that let us project power, and each iteration of these platforms has improved over its predecessors. But the basic character, strengths, and vulnerabilities of each were determined in the mid-twentieth century. We are left to infer that America's best military judgment is that hundred-year-old tools are the best choices for mid-twenty-first-century jobs. We think that is as commendable as it would have been to announce in 1840 that balloons and sailing ships would be weapons of choice in 1940.

This clinging to the old feeds the frustration of military reformers and gives American military services their bad reputations for innovation. These organizations innovate when they have to, but, by and large, only then—and wartime is not the optimal time to experiment with disruptive capabilities.[83] In times of less conflict and especially in the wake of apparent success, innovation is pushed to the margin. Unmanned aircraft, asymmetric operations, etc. find some money, missions, and missionaries. However, in all branches of the armed services, power over the two most important organizational levers—military promotions and military service budgets—remains in traditional places, with traditional priorities. The highly professional leaders who occupy these positions defend the professional identities they have mastered and the professional networks that have promoted them.

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[81] Conversely, Germany's general staff in the 1930s, in the wake of defeat in World War I and amid enemies on all fronts, remarkably combined the combustion engine and the radio to create blitzkrieg. And Israel, after the shock of the Yom Kippur War, surrounded by hostile states, committed itself to remarkable and recurring military innovation.

[82] Morison, *Men, Machines, and Modern Times*, 36. Morison (pp. 208–209) also offered the Pythagorean precedent referenced on the next page. Augustyn et al. provide an example describing how the United States moved to a fully automatic rifle nearly a decade "and many lives" after the Warsaw Pact. "The United States stayed insistent on the semiautomatic rifle using a full power cartridge as the weapon of choice. This was founded on a number of reasons, ranging from the worry that an automatic weapon would cause a Soldier to waste all of his ammunition to the insistence that the American Soldier was first and foremost a rifleman whose role was to project a single, large grain bullet accurately far downrange." Augustyn et al., *Envisioning the Deep Future of Small Arms 2022–2042*, 5.

[83] To those who doubt this, we commend the science fiction writer Arthur C. Clarke's short parable "Superiority."

Pythagorean mathematicians defended their professional creed by killing the man who discovered irrational numbers. America's military services are not so extreme. They often encourage free speech and sometimes praise innovative thought. But to gain transformative power by promotion to the highest ranks, innovators must progress by traditional achievement in traditional positions. Few are capable of and willing to sustain the necessary decades without appreciation and application of their disruptive ideas and skills. As a result, their careers die, not from assassination but from malnutrition.

**We do not think speed should be sought at any cost. But our judgment (and that of many others) is that speed and a resilient ability to respond to new imperatives are persistently undervalued in present processes.**

Over the years America has gotten by because all militaries (save perhaps Israel's) had this problem, because American wealth permitted pockets of development (sometimes, deep pockets—for example, DARPA, with an annual budget now at three billion dollars, and the related network of military and national laboratories), and because occasionally exceptional civilian leadership introduced priorities (for example, for stealth aircraft) from outside the system.

We do not believe this formula can be relied on to yield success in the decades ahead. We believe that America's future military supremacy depends on directly addressing the priorities and processes at the centers of power within America's military services.

In a system truly committed to innovation, we believe the following will be achieved. We offer these examples, both as prescriptions we recommend and as metrics by which observers can assess where the US military is and how it is, and is not, progressing.

- Acquisition processes that now place a premium on avoiding flaws in fielded equipment will be balanced to give comparable weight to the fact that military failures can also result from delays in fielding equipment. We do not denigrate testing, questioning, and carefully evaluating new approaches.[84] We do not think speed should be sought at any cost. But our judgment (and that of many others) is that speed and a resilient ability to respond to new imperatives are persistently undervalued in present processes. Our immediate goal should be to reduce time from design to the initiation of program production to half of that at present. Reengineering bureaucracies and program objectives will be required to achieve this, but programs that take longer than this should be viewed skeptically and pushed toward spiral development.[85]
- The projected value of platforms and systems will be discounted to account for anticipated limits in their adaptive abilities as they age. Programs should be incentivized to plan for absorption of presently unpredictable future technical developments—for example, by providing space and power for future systems, permitting rapid adaptation of software, and facilitating replacement of modules on top of more stable basic systems.

[84] Even smart leaders lose perspective about ideas they embrace. Group processes, checks, and balances are necessary to produce objective evidence and decrease errors. For a recent example, see Carreyrou, *Bad Blood*, 121–130 (detailing how General Jim Mattis, then central commander, pressed in good faith for very rapid adoption of a fraudulent system of blood testing and was checked by a military acquisition officer who demanded more evidence of efficacy).

[85] Congressional reform will be required to establish procedures that comparably accelerate authorizations and appropriations. However, an intense executive branch priority for speed will increase pressure on Congress to achieve this. And executive branch changes are warranted, whatever the extent of congressional delays.

- Field experiments, war games, and red teams will be extensively used to experiment with alternative platforms, weapon systems, relevant commercial products, and ideas. These activities, in the words of a Defense Science Board report on red teams, "all have in common the challenging of an organization's norms . . . red teaming at its essence is about the culture of an organization."[86]
- Skilled third parties will routinely employ activities like red teaming to evaluate capabilities not only as they exist now but also as they may be reshaped in the years immediately ahead. If, as we anticipate, these activities demonstrate that there is more reward in new technologies than would be captured by existing programs, higher percentages of total budgets will be allocated to these technologies.
- If, as we anticipate, these activities demonstrate that the most efficacious strategies and tactics emerge from cross-domain activities (that is, attacks from one domain to another—for example, from sea to land or space to land, or cyber to air), then existing structures and processes will be reviewed and revised to ensure that we are positioned to seize these opportunities and counter the risks.
- Civilian leaders who control nominations for three- and four-star appointments and senators (who must confirm these nominees) should give priority to officers who have demonstrated an eagerness and ability to support innovation. We would routinely ask candidates: "What do you believe that most of your colleagues do not and that is important to your service's capabilities?"[87] For selections at these and all levels, we would like to see the spirit captured in a 1902 letter from an admirable naval officer to a colleague: "I am perfectly willing that those honestly holding views differing from mine should continue to live; but with every fibre of my corpse I loathe indirection and shiftiness, and where it occurs in high places, and is used to save a face at the expense of the vital interests of our great service . . . I want that man's blood and I will have it, no matter what it costs me personally."[88]
- The Goldwater–Nichols Act valuably stimulated cooperation across service boundaries by, among other things, requiring candidates for flag and general officer positions to serve in joint positions. This requirement, however, is more rewarding for those in less technical positions and unintentionally limits the opportunities officers might have to serve outside their services in the private sector, universities, and other environments. The Goldwater–Nichols requirement should be expanded so that those who are expected to rise to general officer ranks may, as an alternative to joint duty, serve a year or more outside the military in positions designed to expand their technical knowledge, including in commercial companies, government laboratories, and universities.
- Promotion paths should be established for enlisted members and officers that render promotion at all levels compatible with a continuous, career-long focus on a particular technical skill.
- We applaud a renewed emphasis on allocating intelligence resources to horizon scanning for technology advances by other governments. This effort should, however, be accompanied by something less familiar and more uncomfortable for intelligence agencies: net assessments of American and foreign commercial research and development and applications relevant to national security.

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[86] Defense Science Board, *Role and Status of DoD Red Teaming*, Memo for Chairman. See also Zenko, *Red Team*, particularly for its informative discussions (e.g., beginning on p. 52) of how red teaming can be undermined or controlled to produce predetermined results. On other techniques, see Herman, Frost, and Kurz, *Wargaming for Leaders*; Sabin, *Simulating War*; and Perla, *Art of Wargaming*.

[87] We first heard this question asked by Silicon Valley's Peter Thiel.

[88] Letter from Admiral Sims quoted in Morison, *Admiral Sims*.

## Example 2: Cyber Defense

### Strategic Challenges

"The United States is currently years behind its rivals in cyberspace, both conceptually and operationally. . . . Remedying this strategic inadequacy must be a priority for DoD military and civilian leadership over the coming years."[89] This stark conclusion, promulgated a few months ago by the head of the most senior and respected technical advisory board to the Department of Defense and supported by a unanimous report of leading experts,[90] demands attention.

**Ineffectiveness in the face of cyber attacks contradicts our strategic premise that America must assert and protect its values and interests because if this country fails to do so, these values and interests will be hobbled, compressed, and eventually extinguished.**

It is widely recognized that relentless, numerous, and effective cyber attacks occur each day on America's national security agencies, other US government agencies, key parts of America's infrastructure, America's public and private companies, and American citizens. State-sponsored attacks that constitute the most important part of this onslaught challenge America to act on the premise, advanced in this paper, that it should not acquiesce in hostile activities of autocratic states beyond their borders. Ineffectiveness in the face of these attacks contradicts our strategic premise that America must assert and protect its values and interests because if this country fails to do so, these values and interests will be hobbled, compressed, and eventually extinguished.

Digital attacks also provide an object lesson of consequences from this paper's observations that technological capabilities are more globally distributed, that personnel and incentives systems must be revised to respond to new challenges, that the United States must presume and be more resilient in the face of surprise, that the Atlantic and Pacific no longer protect America as they once did, and that distinctions based on borders and differentiation between the private and public sectors are, in this context, anachronistic.

This short example does not attempt to describe a full cyber strategy, an undertaking that requires discussion of topics as intricate, diverse, and often classified as, for example, offensive capabilities, deterrence, the laws of war, and choices about research and development priorities. We offer, however, a discussion of how previous premises have blinkered and hobbled the structures, processes, and strategies that have shaped America's cyber initiatives to date and suggest how changing these premises can empower improvements. As discussed in this paper, we believe that responding to these changes as they affect digital information systems is important not only in itself but also as a test of our national security agencies' abilities to adapt to a range of new technologies.

### Analysis and Recommendations

It is not surprising that predictions in the early 1990s consistently undervalued, indeed typically ignored, the internet and the information technology revolutions that have come with it. To be sure, the internet was

[89] Defense Science Board, *Cyber as a Strategic Capability*, memo for the under secretary (Craig Fields).

[90] The report is largely classified, but its conclusions and recommendations are summarized in Defense Science Board, *Cyber as a Strategic Capability*. Note, for example, "Finding 1: Current cyber strategy is stalled, self-limiting, and focused on tactical outcomes" (p. 2).

invented by our Department of Defense and was used by some fourteen million people in 1993. But this system was conceived and long perceived as simply a messaging mechanism. No national security establishment could have confidently foreseen that a majority of the world's population would connect to the net over the next quarter century and that this technology would be at the heart of the world's economic, military, social, and political activities.

But a wiser establishment would have thought more broadly and vigorously outside the category that became the canonical focus in 2001: NBC (nuclear, biological, and chemical weapons) or, as they came to be called, WMD (weapons of mass destruction). At that time, a greater number of more senior leaders could have recognized what some less senior and more technical officers saw: that we were rapidly becoming dependent and exposed to a different *C*—the computer—and a different *W*—the web; that digital systems were honeycombed with vulnerabilities that could be exploited; and that these vulnerabilities could not be adequately redressed by security supplements in the form of firewalls, passwords, and antivirus systems.

American security experts have now come to realize that we built dependency on digital systems beyond our ability to defend them; that the architecture of these systems is inherently vulnerable; that security cannot be built around them after they are designed and distributed; and that vulnerabilities are enhanced because digital systems are complex, connected, concentrated, constantly changing, and dependent on global infrastructures. The power and ubiquity of these systems open new opportunities for physical and psychological warfare by impeding the availability, the integrity, and the confidentiality of the digital data and operations on which modern society rests.

As we have observed, digital technologies are not the end of technological history. When other technologies rapidly develop and proliferate, American strategists should take their cyber experience as a costly demonstration of the need to consider security and control as a design criterion from the outset, not as an afterthought or add-on. Sound strategy must be cautionary as well as opportunistic.

A strategic reconsideration of American military and intelligence cyber capabilities should start by recognizing that, as we observed in the preceding example, innovation is challenged by the burdens of day-to-day operations: an "increasing proportion of the federal IT budget is spent just keeping the old systems running."[91] After this imperative, the energy and funds available for innovation are shaped by what social scientists describe as path dependency. Because American intelligence agencies were quicker than military services to see the implications of digital systems, American thought about cyber strategy has disproportionately concentrated on collection, offensive capabilities are less developed, and defensive vulnerabilities were inadequately recognized.

Distortions in energies are intensified because of how missions are prioritized. America's national security agencies favor overclassification, offensive investments over defensive investments, and military over civilian targets; they place a premium on refined (often covert) tools and discount instruments that are noisier and less subject to control; they are more oriented to satisfying requirements for destroying an opponent's capabilities in military conflict and less to supporting deterrence, disruption, or information warfare in peacetime. Further narrowing their vision, national security agencies are ill inclined and unaccustomed to coordinating with the civilian parts of government and the private sector.

[91] Charlet, *Understanding Federal Cybersecurity*, 23. "The GAO assessed that of the more than $80 billion spent per year across the federal government, 77 percent went to operations and maintenance of systems and 23 percent to development, modernization, and enhancement. This reflected a 9 percent increase in operations and maintenance since 2010, and an overall reduction of $7.3 billion in development, modernization, and enhancement in that same period." Ibid.

All these, however, could and should have been transitory problems. Greater challenges arise from habits of thought and deep structural divisions that fragment US leadership, blinker our perceptions, and dilute our expertise. We, like other Americans, cherish our civil liberties; appreciate the benefit and convenience of divisions that assume national security agencies operate abroad and other agencies at home; understand that there are distinctions between the powers, the skills, and the interests of our public and private sectors; and recognize that different abilities are needed to deal with mayors, corporations, and private citizens than are needed to deal with militaries, be they friendly or hostile. We understand the governance philosophy that prompted separating the legal framework of US intelligence agencies (Title 50 of the US Code) from that of the US military services (Title 10 of that code).[92]

**This distinction between home and abroad has deep roots in our predecessors' worldview, but we need to outgrow it because our commercial, technological, and security circumstances have changed.**

But it is myopic, anachronistic, and unrealistic to treat cyberspace as geographically bounded or geographically or functionally subdivided.[93] It is appropriate to fear our own government's threat to Americans' privacy and freedom but dangerous to focus on that concern to the point that other governments and groups abscond with Americans' confidential information and undermine American freedoms.[94]

Above all it is self-defeating to consign America's scarcest resource—a precious pool of intelligence and military experts on this subject—to defense of operations and facilities abroad, while employing weaker forces to defend Americans at home. This distinction between home and abroad has deep roots in our predecessors' worldview, but we need to outgrow it because our commercial, technological, and security circumstances have changed. We are like a nation attacked by guerrillas, but committed to deploying our armies only beyond our borders and to patrolling their own barracks while assigning less potent local militia and police to protect our villages and cities.

The costs of this approach are severe in the development and deployment of US resources and, no less significantly, in the thinking and working relationships of American leaders and their most skilled lieutenants. Digital information and digital information systems are pervasive, powerful, enduring, and networked. American experts are scarce, hobbled, transitory, and too isolated from one another. The resources they command are precious and potentially powerful, but poorly coordinated and commonly dissipated.

**Scarce and transitory expertise.** We have seen extraordinarily gifted military officers and civil servants within the national security agencies who comprehend evolving cyber challenges as well as they can be comprehended. A few are appointed for two or three years to intermediate positions on the National Security Council staff, after which they commonly leave government. Some gain some authority for a few years in one or another of the military and intelligence agencies. A smaller number achieve some status in other government agencies,

[92] Though we note that the Coast Guard is able to straddle the division.

[93] This is not to say that geography is irrelevant. National security policies can and should tactically take account of the fact that servers, cables, and internet users, among other attributes, are in specific geographic locations. This, however, is not a good basis for organizing our strategies and bureaucratic structures.

[94] Achieving a more balanced understanding of these risks is an example of a requirement we refer to elsewhere in this paper: the need to better educate Americans about national security issues.

like the FBI and the Department of Homeland Security. Almost all, however, are transient, unduly constrained in authority and resources, and ill positioned for promotion, particularly and precisely if they want to continue to work on cyber problems.[95] Traditional institutions may slowly recognize and even modestly reward new talents, but they concentrate resources in traditional equipment and operations and place power in the hands of those with traditional skills.

This deficiency in America's national security agencies is compounded by parallel problems in the private sector, in state and local governments, and in federal agencies outside the realm of national security. There are some committed companies, particularly in the financial sector where all critical assets are digital, all digital assets are constantly under attack, and speed and rich resources permit rapid investment to counter recognized fundamental risks. But many government entities and many companies remain unacceptably exposed to problems of cybersecurity.

**Hobbled and isolated leadership.** The United States needs a great many more links—channels of communication, coordination, synergies, sharing of ideas and strategies, rotation through different organizations—among its cyber leaders. Occasionally, we have built these links and reaped great rewards. For example, the National Security Agency created an Enduring Security Framework Forum that gave civilian leaders access to classified discussions, and the forum observed and rapidly acted to correct a foundational security flaw in virtually all computers. The FBI's Cyber Division has built relationships with a number of major corporations. Some "industry-specific information and analysis centers" have been nourished by the Department of Homeland Security and other federal agencies, like the Department of Treasury. But these are ad hoc exceptions to a general rule.

That rule is one of walls. The national security agencies regard domestic involvement as distracting, risky (lest it leak classified material), and legally inhibited. Civilian agencies and private entities view national security experts as strangers with different priorities, and federal agencies as prone to use information in support of regulation or perhaps unauthorized intrusion. Threats and risks are overclassified, and access to classified information is inhibited by unjustifiably burdensome clearance processes, stunning inefficiencies, and frequent incompetence. It takes, for example, more than half a year for the average clearance to be processed.[96]

We are rather confident that when other nations consider cyber attacks on America they do not say things like "we cannot seize twenty-one million files from the US government's Office of Personnel Management because it is a civilian agency and we only attack military targets," or "we will not implant malware on the American electric grid because it is managed by private companies and regulated by states, not by America's federal government,"[97] or "we will steal critical technologies from government agencies but not from private companies." Their actions demonstrate that our opponents do not differentiate commercial value or military

[95] See our comments in example 1 on innovators' prospects for promotion and note the Defense Science Board's recommendation beseeching the secretary of defense to "direct the Chiefs of Staff of the Army and the Air Force, the Chief of Naval Operations, and the Commandant of the Marine Corps . . . to treat the cyber mission career field as a national security priority, where promotion boards understand the cyber mission as a priority and facilitate recruitment, retention, and career-long professional development in cyber expertise." Defense Science Board, *Cyber as a Strategic Capability*, 4.

[96] It has been calculated that it takes on average 203 days for a case to be processed, and this number excludes 10 percent of the particularly complex cases and ignores delays required for completing voluminous paperwork. Reinvestigations take 227 days on average, again excluding the 10 percent most difficult cases and time for completing paperwork. These numbers, from the US government site Performance.gov, were reported by Ogrysko, "Periodic Reinvestigation."

[97] "Alert (TA18-074A)."

utility on the basis of provenance or lineage. They see this domain as a unified whole.[98] Until America does the same, we will be no more effective than we would be if American doctrine proclaimed that sea power was an asset to be deployed only in some regions of some oceans with only certain kinds of ships engaged in certain familiar operations. The US private sector will be no more protected than it would be if we told a Main Street merchant that, to shield himself from air attack, he needs to develop his own air force—or at least hire it from a private contractor. Cyber success requires broader thinking and more unified action.[99] In this domain, as in many others, fragmentation and obligatory or incentivized isolation lay a foundation for failure.[100]

**Cyber success requires broader thinking and more unified action. In this domain, as in many others, fragmentation and obligatory or incentivized isolation lay a foundation for failure.**

We particularly require substantial, tested capabilities that can be mobilized in emergencies, so that the United States has a capacity to respond to widespread attacks on the digital underpinnings of America's economy and its war-fighting capabilities. The recently created Cyber Command could build this capability but is a long way from having the mission clarity, resources, and urgency that the situation demands.

We do not pretend to offer a map that charts a clear path to progress. We believe, however, that the rethinking we are calling for is essential, even if insufficient. Without it, America will not gain adequate protection from second-order steps, some useful and some quite questionable, such as a new regulation (perhaps imposing standards on critical infrastructure), new processes (perhaps mandating information sharing), new capital investments (perhaps in trusted foundries and other facilities), new research programs (perhaps creating larger systems validated by formal methods), new security requirements (as the now defunct Orange Book set federal requirements for new systems), or new products (for example, facilitating encryption).

The prerequisites are to recognize that though America is not at war by many traditional definitions of that term, the United States is engaged in conflict in this domain, the stakes are very high, and this country is losing. Absent this recognition, we grieve for America's past and fear for America's future. Conversely, when this country accepts that new modes of organization are required for a new mode of conflict, we clear away obstacles, establish priorities, and pool resources that empower collaboration and accelerated progress. When we recognize that a great technological problem looms, we build organizations with stable, long-term leadership, vigorous training, and assured promotion, as we did with the nuclear Navy and US Air Force. We need to transcend our cyber failures with these kinds of cyber solutions.

[98] This is true, as well, in their defensive efforts. Legislation enacted in 2017 in the PRC, for example, regulates private and public entities' protection and sharing of data on the premise that data "has become a national basic strategic resource." Xi Jinping has "stressed on many occasions . . . there must be unified planning, unified deployment, unified promotion, and unified implementation." Yanqing, "Cross-Border Data Flows."

[99] We do not mean to imply that nothing is being done. Many of our incremental and hortatory efforts are admirable and helpful. They have, however, plainly been inadequate.

[100] The Defense Science Board conveyed the urgency of this approach in support of the fourth finding in its report: "Cyber capabilities developed by DoD must be integrated into a whole-of-government approach, and integrated with private sector and coalition efforts to most effectively defend our collective interests." Defense Science Board, *Cyber as a Strategic Capability*, 2. To the extent that a whole-of-government approach raises concerns about civil liberties, these must of course be addressed. But they are better addressed by oversight and regulation than by fragmentation.

## Example 3: Cooperation with Rivals

### Relevant Premises

Our strategic premises record our view that in this century, national economies are intertwined, infrastructures are internationally distributed (in space, undersea, in each other's countries, and across the electromagnetic spectrum), collaborative global responses are required for critical pressing problems (pandemics, climate change, terrorism, refugee movements, etc.), and risks of inadvertent catastrophe rise as potent military and civilian technologies proliferate. This global environment requires that a successful American security strategy do more than attempt to prevail in or manage competition; it must artfully blend and balance competition and cooperation. This is particularly evident in our relations with China, a nation whose economic power, we have emphasized, is approaching America's and will probably come to exceed it. In this context, our recommended strategic premises encourage a willingness to take risks for peace that at least approaches our acceptance of risk in conflict. This example provides some illustrations of how our call for cooperative initiatives might be translated into action.

### Analysis and Recommendations

Alliances are sometimes thought of as long-standing agreements between nations having common values. However, alliances can be achieved between nations with fundamentally different values if a transcendent common need is perceived by both. It is hard, for example, to think of a dictator as repugnant to American values as Josef Stalin. Russia's interests were defined for decades as contrary to those of the United States, and Russia allied itself with Germany at the outset of World War II. But we hardly even pause in retrospect to question Roosevelt and Churchill's decision to ally with Stalin during World War II. For four years until that war was resolved, the great common threat of Hitler overwhelmed the real divergence of other interests and the immense conflict in values between America and Russia.

In other realms, common interests have united nations of radically differing values. We have observed how a complex of rules and norms has secured global participation in an international trading system that proliferates the prosperity of all. An analogous account could detail how major nations cooperate in upholding agreed-upon principles and practices that contribute to global health. To be sure, there are inconsistencies, conflicts, and duplicities, but this is not uncommon in partnerships, and it is reasonable to say that we are all partners in these domains.

More narrowly, in recent years, America made common cause with Russia in pressing Iran to accept a freeze on its nuclear program, and China and Russia were essential parties with America and other nations in an agreement on climate change. These are not "alliances," but they are cooperative ventures catalyzed by a perception of common problems.

So it may be in the years ahead. If, for example, a highly contagious disease like SARS broke out in North Korea, we believe the resulting concerns would render America and China, at least for these purposes, allies. If North Korea employed a nuclear weapon anywhere at any time, we believe the United States and China would, with different values and interests, nonetheless together recognize that they needed to ally to find an effective response.

We think that many plausible challenges of the next decades may and should compel similar cooperation. This century's human, technical, and environmental interactions are so complex that no one should pretend to have certainty in predicting which challenges may have this effect. But we can identify high risks[101] that we think are strong candidates for cooperative attention, hopefully before, and certainly after, they occur.

- Our military and civilian systems are likely to experience accidents as they grow more complex, opaque, and interactive. If these accidents involve, for example, military sensor or command and control mechanisms associated with nuclear systems, potentially catastrophic consequences could catalyze cooperation. We share permissive action link (PAL) systems to diminish the likelihood of unintended nuclear attacks. There are analogous opportunities as nations introduce other technologies.
- Environmental and public health disasters could have devastating global effects. The global influenza epidemic at the end of World War I killed more people than the war.[102] We have already seen important, though belated and very imperfect, international responses to SARS and Ebola epidemics. Most impressively, a sustained international effort eradicated smallpox.[103] Extreme weather events have increased, and climate change is likely to produce more such events, as well as disruptive spreads of deserts and erosion, famine, and flooding.
- Human disasters caused by significant changes in patterns of birth, mortality, and mobility may provide occasions for joint prophylactic and restorative efforts. We are on a trajectory for a majority of the world's population to reside in megacities of over ten million people.
- Proliferation of the power to destroy into the hands of groups and individuals will challenge all nation states. Already available commercial technologies and tools have immense ability to disrupt and to kill. Our systems of commerce are highly connected, concentrated, and vulnerable. Global cooperation to protect travel by air and sea is impressive. International efforts to control terrorism in other contexts are much less successful. But as terrorist events proliferate in diverse settings, they are strong candidates to incentivize international cooperation.
- Efforts to develop norms and controls for cybersecurity, artificial intelligence, genomic editing, and other technologies have made some progress but have not kept pace with the growing risks they will present, whether in the hands of nations, groups, or individuals. International cooperation is required to mitigate these risks.

Twentieth-century strategies for dealing with international security challenges were focused on alliance relationships and deterrence. The United States discouraged nuclear proliferation by offering nuclear guarantees ("extended deterrence") to NATO, Japan, and Korea. These initiatives did not always succeed, but in a period of exceptional American dominance they fit their purpose and largely achieved their goals. This strategy has continuing utility for some traditional problems, but it is not well matched to the twenty-first-century challenges just enumerated. The United States cannot solve these problems by forming alliances only with

[101] For a fuller account, see PricewaterhouseCoopers, *Five Megatrends*.

[102] "Remembering the 1918 Influenza Pandemic," Centers for Disease and Control and Prevention. Recent strains of influenza have been much less potent than in 1918. Our abilities to counter potent strains are still quite limited. International responses effectively constrained the recent potent Ebola epidemic, but these responses benefited from the fact that the epidemic occurred in an area of western Africa receptive to American and European intervention. For the most part, SARS was contagious only when its victims were quite visibly ill. It burned itself out.

[103] We are struggling to achieve the same result with polio.

like-minded democracies. America must do something harder, which is to cooperate with adversaries and potential adversaries.

**We think the military attitude that risk is inherent in action should be more strongly taken to heart on the civilian side.**

If this is accepted, a national security strategy should orient the president and his or her White House to repeatedly initiate and intensively orchestrate efforts at addressing problems, optimally before and certainly after they become crises. This requires less involvement in tactical questions (drone strikes, troop levels, etc.) and more proactive strategic investment by both the president and the National Security Council. It also requires a willingness to take risks.

We think the military attitude that risk is inherent in action should be more strongly taken to heart on the civilian side. In bilateral relations as well as multilateral relations, we would take more chances because we think that the present world order is too fragile—it demands that we invest more effort and take more risks to bring it to a more stable place.

How might new thinking emerge from this strategic priority? As one possible initiative, we would invite a proposal to China that America and the PRC attempt to establish a spiral toward improved relations. We would propose experimenting with this by one nation taking a self-abnegating measure that the other would value, with an understanding that the other would respond with a similar but yet more valuable self-abnegating measure. We would invite China to decide whether to go first or second. If the United States went first, we might, for example, offer a suspension of US flights testing radar responses at China's borders. These activities have some value to America. But we would risk surrendering something of value to begin moving toward a less risky state that we would value more.

Risks might also be taken to exploit opportunities. As the Soviet Union dissolved, we developed a joint space program that has endured despite rising tensions between Russia and the United States. A proposal for a joint mission to Mars or a base on the moon might catalyze US–Chinese cooperation and focus the relationship on positive possibilities. An effort of this kind would need to transcend concerns that information shared for cooperation could be used against us in conflict. The risk is real. Our strategic premises, however, incline us to proceed down this path, analyzing periodically whether benefits outweigh costs and accepting a measure of risk so long as likely gains outweigh risks.

These examples demand analysis and care. They are offered not for immediate implementation, but rather to indicate kinds of possibilities for more proactive action to induce cooperation. A national security strategy should stimulate as much thoughtful energy in this direction as in preparing and managing for conflict.

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