

From the Air

Rediscovering Our Raison D'être

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After 10 years of witnessing a US focus on land-centric conflicts, commanded mostly by Army and Marine generals, the American public and even a number of Airmen understandably are beginning to believe that the primary purpose of the Air Force is to support land forces. Indeed, the Army began promoting this concept vigorously more than a decade ago by expounding a vision of war involving decisive land forces and a supporting airpower force.¹ Ten years of continuous land-centric conflict appear only to have solidified this view in the minds of both ground commanders and some Airmen. Stephen Budiansky comments that “the Air Force’s own seriousness about making the battlefield the focus of its application of precision air power had produced a cadre of officers vastly more knowledgeable about land-warfare strategy and joint operations than their narrowly

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air-minded predecessors.”² Although the Air Force certainly had to support the Army and Marine Corps during Operation Enduring Freedom and Operation Iraqi Freedom, these joint efforts might cause a large cadre of Airmen to identify more with supporting ground operations than with fighting and winning the nation’s wars through the strategic application of air, space, and cyberspace power. Hence, these Air Force officers could lose that aspect of “air-mindedness” described as “a global, strategic mind-set providing perspective through which the battlespace is not constrained by geography, distance, location, or time.”³ Such a loss could have negative consequences as land operations in the Middle East and Southwest Asia wind down and the international emphasis shifts toward East Asia, where air and sea operations would predominate.

This problem is exacerbated by the fiscal challenges facing the Department of Defense (DOD). During a time of declining military budgets, forgetting that the Air Force represents (as an independent service) the nation’s principal strategic military arm creates problems in determining which of its core functions are most critical to the national interests. In a recent off-the-record conversation, one senior Airman suggested that “the Air Force is a budget in search of a strategy,” indicating that years of supporting ground forces may have produced insufficient understanding, within the service at large, of how airpower and the Air Force can perform their main core functions, which are often independent from those that undergird land forces.

Given the daunting issues confronting the Air Force, Airmen would do well to look back at the service’s reason for being and remember why the nation established an independent air arm. Admittedly, the Air Force will and should continue to support ground forces when appropriate, but Airmen should concentrate on those core functions that the service was created to perform. Current doctrine lists 12 such functions, but the Air Force could leverage its most fundamental purpose—attaining national security objectives—by prioritizing seven of them: (1) air superiority; (2) space superiority; (3) cyberspace superiority;

power projection through (4) global precision attack and (5) rapid global mobility (including airlift and aerial refueling); (6) global integrated intelligence, surveillance, and reconnaissance (ISR); and (7) nuclear deterrence operations.⁴ The remainder of this article seeks to remind Airmen of what constitutes the Air Force's *raison d'être* (at least in the minds of the authors).

The Air Force's Roles and Core Functions

The Air Force came into being as the nation moved from an isolationist to an internationalist perspective. The experience of World War II, coupled with the advent of nuclear weapons, placed the Air Force in a unique position as the service that could most readily react to future conflicts and strike distant adversaries. The National Security Act of 1947 described the organizing principle of the Air Force:

In general the United States Air Force shall include aviation forces both combat and service not otherwise assigned. It shall be organized, trained, and equipped primarily for prompt and sustained offensive and defensive operations. The Air Force shall be responsible for the preparation of the air forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Air Force to meet the needs of war.⁵

The Key West Agreement among the chiefs of staff (1948) further defined the functions of each service. Specifically, the newly established Air Force would “gain and maintain general air supremacy” and “be responsible for strategic air warfare.” In terms of supporting ground forces, the agreement noted that the service would specifically furnish the Army with “close combat and logistical air support.”⁶

Although Army, Navy, and Marine Corps air assets are designed to tactically support land and naval forces, the Air Force has responsibility for supplying air and space assets that offer a strategic advantage. Title 10, *United States Code*, clearly describes the purpose of the Air Force as follows:

- preserving the peace and security, and providing for the defense, of the United States, the Commonwealths and possessions, and any areas occupied by the United States;
- supporting national policies;
- implementing the national objectives; and
- overcoming any nations responsible for aggressive acts that imperil the peace and security of the United States.⁷

Most recently, Department of Defense Directive (DODD) 5100.01, *Functions of the Department of Defense and Its Major Components*, unambiguously requires the Air Force to “gain and maintain air superiority, and air supremacy” as well as to “gain and maintain space superiority” and “conduct nuclear operations in support of strategic deterrence.”⁸ The Air Force continues to support ground forces, but, without a doubt, it was not and is not relegated to close air support (CAS), ISR, and airlift. To the contrary, the service has unique responsibilities that differ distinctly from those of the other services.

Gen Norton Schwartz, the Air Force chief of staff, apparently having the foresight to see past current conflicts, has begun to lay the groundwork for prioritizing Air Force functions for the future. Core functions listed in current Air Force doctrine include the following:

- Nuclear Deterrence Operations
- Air Superiority
- Space Superiority
- Cyberspace Superiority
- Command and Control
- Global Integrated ISR
- Global Precision Attack
- Special Operations
- Rapid Global Mobility
- Personnel Recovery
- Agile Combat Support
- Building Partnerships⁹

In a speech to the Air Force Association in 2011, General Schwartz identified certain “core contributions” that must be protected from budget cuts if the Air Force is to provide the nation’s leaders strategic

options. These core elements include control and exploitation of the air and space domains, as well as mission assurance in cyberspace; global strike; rapid global mobility; and worldwide ISR.¹⁰ His referral to air, space, and cyberspace deals with these three core functions' gaining and maintaining superiority. Undoubtedly the Air Force has experienced the greatest success with air superiority because no American ground troops have come under aerial attack for more than 50 years. By necessity, his global strike core contribution includes global precision attack (conventional)—one of the newer core functions since relatively recent technological developments have allowed the service to apply accurate and discriminating force anywhere on the face of the earth. The rapid global mobility mentioned by General Schwartz, provided by the nation's intertheater airlift and aerial refueling assets, is perhaps the most ubiquitous core function insofar as virtually every military operation demands it. The core contribution of worldwide ISR is an obvious reference to the core function of global integrated ISR, the oldest of the Air Force's core functions, provided during the Civil War by aerial balloons but now offered by the nation's modern air-borne and spaceborne assets. Although General Schwartz did not mention nuclear deterrence in the context of these contributions, he alluded to its importance by emphasizing the progress the Air Force has made in reinvigorating the nuclear enterprise. Since the Air Force must determine where to spend its decreasing fiscal resources to prepare for the future security environment, it should consider nuclear weapons as one of the core functions worth preserving, and it may be time for the service to pause and contemplate its nuclear past as it develops a consistent, forward-looking, long-range strategy.¹¹

In the years ahead, these core functions will prove most applicable within the context of three scenarios, used here as the organizing framework for much of this discussion: homeland defense, peer competition, and irregular warfare. Certain reforms in these core functions could also enhance the service's role as the country's air, space, and cyber combat arm. With the exception of cyberspace, statutory requirements are clear. Relatively new, cyberspace is a domain of military op-

erations whose implications for warfare are not fully understood. Undoubtedly, however, integrating the three domains remains critical.

Air, Space, and Cyberspace Superiority

Air superiority has long been a central concern of American airpower.¹² According to War Department Field Manual 100-20 (1943), *Command and Employment of Air Power*, “Air superiority is the requirement for the success of any major land operation.”¹³ The need for air superiority among the services is undisputed. Note one poignant historical example: Two weeks after the invasion of Normandy, Gen Dwight Eisenhower’s son, recently arrived in the theater, criticized the disorder and lack of air defense. Eisenhower responded, “If I didn’t have air supremacy, I wouldn’t be here.” After the war, Eisenhower testified before Congress:

The Normandy invasion was based on a deep-seated faith in the power of the Air Forces in overwhelming numbers to intervene in the land battle . . . making it possible for a small force of land troops to invade a continent. . . . Without that Air Force, without its independent power, entirely aside from its ability to sweep the enemy air forces out of the sky, without its power to intervene in the ground battle, that invasion would have been fantastic, it would have been more than fantastic, it would have been criminal.¹⁴

Air Superiority

The need for air superiority is no less important today than it was in 1944. Although the doctrinal definition of air superiority leaves room for varying interpretations, it is best understood as local control of the air, which enables air, land, and naval forces to operate without interference from the enemy.¹⁵ Today, air superiority enables the Air Force to deliver strategic effects through the air—a critical and overlooked point—and to act as a force multiplier, enabling ground forces to operate with greater success. Consequently, enemy ground forces must defend against attack from both the air and land—a distinct advantage for the United States.

Air superiority is a central core function in each of the three scenarios mentioned above. For example, air sovereignty alert serves as the primary Air Force / Air National Guard contribution to *homeland defense*.¹⁶ Air patrols helped ensure that the country maintained air superiority following the terrorist attacks of 11 September 2001 (9/11). In the future, remotely piloted aircraft (RPA) and ballistic missile technology—available to adversaries—may increase the threat to the United States, making air superiority an even more critical component of homeland defense.¹⁷

When it comes to *peer competition*, gaining air superiority over contested airspace plays a vital role in defeating antiaccess / area denial (A2/AD) strategies “focused on preventing U.S. forces and other legitimate users from transiting international waters, skies, or space.”¹⁸ Allegedly, the Chinese are deploying A2/AD systems in the form of missiles and other advanced weapons.¹⁹ Air superiority also enables land as well as naval forces and clears airspace for ISR, airlift, strategic bombing, and CAS operations. An Air Force unable to establish air superiority in a conflict with a capable adversary risks the lives of Americans in the air, on land, and at sea.

Finally, air superiority is becoming an increasingly important component of *irregular warfare*. One should note that during the First Indochina War, the Vietminh gained local air superiority over the French air force during the Battle of Dien Bien Phu (1954) without possessing a single aircraft.²⁰ Today, irregular adversaries could compromise local air superiority by defeating defenseless ISR assets. In the absence of a permissive air environment, many of the nation’s RPAs could not perform critical missions that have a direct impact on the success of American operations.²¹ The largely defenseless RPAs of all four services need air superiority to operate safely and effectively over an extended period of time. Air superiority threats to ISR aircraft, however, can come through the cyber realm, as demonstrated in 2009 when Iraqi insurgents successfully hacked into the video feed of a Predator using \$26 software available for sale on the Internet.²² In 2011 an RQ-170

Sentinel RPA crashed in Iran, the victim of an electronic attack, according to Iranian officials.²³

CAS—particularly important in irregular conflicts, whether provided by an AC-130 gunship, an A-10, or rotary-wing aircraft—also requires airspace free of enemy aircraft. In this instance, the Army, Navy, Marine Corps, and Air Force can all contribute to establishing a passive air environment for their aircraft with minimal risk.

Recommendations for Air Superiority

One must not undervalue the significance of air superiority to joint operations and to the Air Force's ability to deliver strategic effects independently. Control of the air, which enables victory on the land and at sea, may become even more influential in the future. Hence, ceasing production of the F-22 Raptor may be a mistake if the nation continues to demand that the Air Force maintain broad air superiority. Accusing the service's leadership of suffering from "next-war-itis" and failing to concentrate on the ground campaigns of Iraqi Freedom and Enduring Freedom, Secretary of Defense Robert Gates relieved both Air Force Secretary Michael Wynne and Chief of Staff T. Michael Moseley in 2008—ostensibly for failure to maintain proper stewardship of the nuclear arsenal.²⁴ According to conventional wisdom, however, Gates was unhappy with the senior Air Force leaders' persistent advocacy of the F-22 because they maintained that penetrating defended airspace prior to the establishment of air superiority will require stealthy aircraft with defensive capabilities.²⁵

A recent study by the American Enterprise Institute found that the Air Force possesses an insufficient number of stealth F-22 and B-2 aircraft to conduct effective air operations—defined as hitting 30,000 separate targets—against China and North Korea.²⁶ Although some individuals have speculated that advances in radar detection and tracking will soon compromise the stealth capability of current aircraft, senior DOD decision makers appear confident that weapon systems such as the F-35 can continue to leverage technological advantages in defeating

enemy detection systems. Indeed, General Schwartz asserts that “as our Nation’s only active fifth-generation fighter procurement program, there is no alternative to the F-35, so we are committed to this program.”²⁷ However, with the F-35 program falling further behind schedule and experiencing spiraling cost overruns, the problem of relying on this single program to replace a shrinking fighter force becomes particularly acute. One estimate suggests that the final production cost of approximately 180 F-22s will average \$158.8 million per aircraft.²⁸ Estimates of F-35 production costs indicate that the 43 Joint Strike Fighters authorized in the 2011 defense appropriation averaged \$201 million per aircraft—an artificially high figure because of the small number of platforms.²⁹ Original projections called for \$114 million per aircraft (for the purchase of 2,443), but cost overruns have driven the price much higher, leaving the United States with fewer *less capable* aircraft at a much higher cost. Spiraling expenses will almost certainly lead the DOD to dramatically reduce the final order for Joint Strike Fighters—perhaps by as much as half.

Maintaining air superiority with fewer less capable aircraft will prove difficult. With the appearance of the MiG-15 during the Korean War, the Air Force nearly lost air superiority with its less capable F-80 Shooting Stars. Fortunately Gen Hoyt Vandenberg, the Air Force chief of staff, released more of the advanced F-86 Sabres to the theater of operations, regaining dominance of the skies over the peninsula. If the Air Force cannot match an adversary with sufficiently capable aircraft, it may be forced to move away from more than 60 years of theater air superiority as a fundamental tenet/ability of American airpower, and Soldiers and Marines may no longer be able to take the friendly skies for granted.

Space Superiority

DODD 5100.01 requires the Air Force to “conduct offensive and defensive operations to gain and maintain space superiority,” but significant disagreement exists as to whether the United States can or should dominate space.³⁰ Resolving this debate, which lies beyond the scope

of this analysis, will likely be driven by future technological developments; however, over the next two decades, the nation undoubtedly will become increasingly dependent upon space-based assets as critical enablers of national power. The prospect of America's losing its edge in space poses an unacceptable risk to national security.

The United States began research and development of space platforms in the early 1950s for two primary reasons: reconnaissance of the Soviet Union and development of an early warning system for the detection of Soviet nuclear missile launches.³¹ Although the USSR no longer exists, *homeland defense* still needs an effective early warning system—increasingly important in an age of nuclear and ballistic missile proliferation among rogue states and, possibly, nonstate actors. More recently, space has taken on a more utilitarian role in the daily lives of Americans as the nation finds itself more dependent on commercial and military satellites for the transmission of data (e.g., economic transactions) and other communications. Equally important to the nation and the military is the Air Force's constellation of satellites in the Global Positioning System, which supplies the necessary timing signals for everything from private automobile trips to precision-guided munitions.³²

Space is no less important as a strategic asset in a potential *peer competition*. America's technologically advanced systems in command and control, communications, targeting, and battlespace awareness provide an unrivalled advantage that depends heavily on space assets.³³ These capabilities also serve as an important conventional and nuclear deterrent against those who would challenge the international status quo. Past and present reliance on satellites for the conduct of war leaves little doubt about their growing importance and the need to protect America's vital interests in space during the coming decades.

What began over half a century ago as a need to conduct imagery intelligence of the Soviet Union has developed into an impressive array of space-based communications and intelligence satellites that have played a major part in assisting commanders during *irregular warfare* in Afghanistan and Iraq.³⁴ In Enduring Freedom, for instance, the mili-

tary either directly or indirectly used more than 100 satellites to conduct military operations.³⁵ Satellites also enabled air support of ground forces despite sandstorms during Iraqi Freedom.³⁶ If predictions are accurate and the most *frequent* form of conflict the United States encounters over the coming decades is irregular warfare, then space will prove significant in providing the situational awareness needed to target the nation's elusive adversaries.

Recommendations for Space Superiority

Maintaining preeminence in space is likely to be especially difficult as the number of nations with advanced technology and access to space increases. What was, and is, a strategic asset may also become a strategic vulnerability. Electromagnetic pulse, directed energy, ballistic missiles, and cyberspace present a threat to the space-dependent and net-enabled American way of war, which will grow over time and has the potential to deliver a debilitating attack.³⁷ On 20 January 2007, the Chinese government destroyed one of its own derelict weather satellites with a kinetic-kill vehicle, clearly indicating that China is developing significant capabilities to counter American power in space and signaling the value that one potential adversary places on this domain.³⁸

The United States must accept the challenge of developing the Global Positioning System's independence as well as nanosatellites, hardened satellites, and the ability to replace lost or damaged space assets quickly if it intends to remain a leader in space.³⁹ This task becomes more daunting since the United States finds itself temporarily without a manned space capability. Completion of the STS-135 mission on 21 July 2011 represented the final space shuttle flight after 30 years of operation.⁴⁰ Just as colonial powers in the seventeenth century eventually ceased sponsoring costly maritime expeditions in favor of private holding companies, President Barack Obama's new space policy, outlined in a speech delivered at the Kennedy Space Center on 15 April 2010, directed the National Aeronautics and Space Administration to rely on commercial space platforms for low-Earth orbit missions in the near term and to

concentrate on more long-term exploration projects such as manned missions to Mars and space asteroids.⁴¹ The lack of a government-controlled manned launch capability offers further indication of the fragility of American preeminence in space and the likelihood that it may end unless the United States invests heavily in developing and fielding resilient and readily replicable space assets. At a time when space is becoming ever more important to all aspects of life (civil and military), the country faces a threat that it can deter or overcome only by clearly demonstrating a capability to sustain its satellites and to rapidly replace those that have been disabled or destroyed. Operationally responsive space becomes possible through further development of nanosatellites, electromagnetic pulse, and directed energy defenses, as well as a clearly demonstrated ability to respond offensively and quickly.⁴² By allowing its space assets to appear vulnerable, the United States invites attack and creates an asymmetric advantage for adversaries.⁴³

Cyberspace Superiority

Soon after taking office, President Obama commissioned the 60-day *Cyberspace Policy Review*, which noted that “the globally-interconnected digital information and communications infrastructure known as ‘cyberspace’ underpins almost every facet of modern society and provides critical support for the U.S. economy, civil infrastructure, public safety, and national security.”⁴⁴ Even a decade ago, cyberspace security was not considered a vital national interest, but recent technological developments leave the nation reliant on the rapid transfer of information through cyberspace. Because the information superhighway is integrated into almost every aspect of American life, the trustworthiness of data is critical to the nation and the Air Force.⁴⁵ Thus in August 2009, the Air Force stood up Twenty-Fourth Air Force under Air Force Space Command, which will serve as the nexus of cyberspace operations for the service.⁴⁶

In its *homeland defense* mission, the Air Force relies on cyberspace in two critical areas. First, information transmitted between the nation’s

early warning systems and their operators travels through cyberspace. Data then moves to analysts for processing, exploitation, and dissemination. Early warning systems compromised by a cyberspace attack could leave the nation vulnerable to a strike. At a time when nuclear and ballistic missile technologies are proliferating, such a compromise is unacceptable. Second, command and control of the air sovereignty mission depends on cyberspace for transmission of critical information. Something as simple as compromising the integrity of data in these networks would suffice to seriously degrade a core homeland defense function.⁴⁷ For that reason, securing these assets will remain a high priority.

Clear evidence indicates that China and Russia, potential adversaries in a *peer competition*, are investing heavily in cyber warfare capabilities.⁴⁸ These developments pose a very real risk to civil and military networks. Not only can they slow or disrupt the flow of information but also a penetration of secured networks calls into question the validity of the very data upon which the Air Force relies. Given the United States' conventional advantage, cyberspace offers an attractive target. In the view of some adversaries, the damage done by a successful cyberspace attack may be enough to preempt American involvement in a crisis, such as a Chinese attack on Taiwan or in the South China Sea.⁴⁹ As the Air Force moves toward further network integration of command and control, communications, and weapons platforms, an adversary with an advanced cyberspace warfare capability will pose a formidable threat.⁵⁰ Gaining freedom of action in cyberspace will become a strategic necessity during the coming generation.

Irregular warfare is also an area of concern as nonstate actors prove adept at waging cyber warfare from remote locations using less sophisticated methods and equipment. The reported hacking of video feeds from American drones by Iranian-backed insurgents in 2009 represents one example.⁵¹ More recently, a virus infected highly classified computer systems that control such drones.⁵² Given the speed with which irregular adversaries can learn and adapt, in the years ahead

the Air Force will undoubtedly face opposed network operations from nonstate actors. Establishing the right balance in cyberspace will constitute a problem that the Air Force must solve with regard to peer and irregular adversaries alike. Moreover, although the Air Force probably will not have exclusive responsibility for cyberspace, the service should expect to ensure its own ability to operate in that domain.

Recommendations for Cyberspace Superiority

Given its ubiquitous nature, cyberspace is the most pressing core function in need of attention. Unlike other functions in which the Air Force historically assumed leadership in innovative technology, cyberspace has become the one area in which the service trails in technological development and has constantly asserted a reactive rather than proactive strategy in dealing with cyber threats. Turning the Air Force into a cyber fortress not only keeps adversaries out but also keeps Airmen in—harming mission accomplishment. If the Air Force wishes to operate in an environment where opposed network operations are the norm, then it must develop an alternative approach to protecting the integrity of information.⁵³

The service lacks the manpower (with the requisite skills) to prevent penetration of its networks and to ensure the credibility of information. According to the Air Force's chief cyber scientist, "Currently, the Air Force does not have an adequate cadre of appropriately educated officers performing the cyber mission."⁵⁴ Recognizing the need, the *Air Force Cyber Command Strategic Vision* document (2008) observed that "perhaps the most critical mission of Air Force Cyberspace Command is the development of full-spectrum professionals to employ core cyberspace capabilities across the entire range of military operations."⁵⁵ Initially, the command identified, reclassified, and reassigned personnel possessing the needed skills from specialties such as electronic warfare, network warfare, and network operations.⁵⁶ Building the internal capability is manpower intensive and requires a set of skills not offered in technical school. The service must recruit personnel holding ad-

vanced degrees in computer science and related fields with the specific objective of building a competent cyber force. This objective will likely prove the most daunting of all since it demands a degree of flexibility from a service accustomed to institutionalized manpower development. Cyber Command addresses this challenge in its strategic vision: “Delivering cyberspace career force capabilities will require changes to the personnel system to identify qualified Airmen with critical skills for presentation to combatant commands when required.”⁵⁷ Should the Air Force fail, the consequences will prove significant. The simple fact is that China, a potential competitor, already possesses a larger pool of skilled cyber personnel than the United States—a pool that the People’s Liberation Army is aggressively expanding.⁵⁸

The service must also begin to think differently about cyber. Simply applying the tactics and strategies of the air and space domains to cyber may lead to an incorrect understanding of how effects are produced in cyberspace. When thinking about cyber, Airmen often fall prey to misconceptions analogous to those they once encountered from their brethren on the ground. Computer networks—frequently conceived of in ways similar to lines of maneuver—may not be the best means to deliver information required for mission accomplishment. Cloud computing and other developments may make the current emphasis on network security obsolete, just as the cannon ended the era of walled castles.⁵⁹

Power Projection

In his book *Air Power*, Budiansky notes that “after every war, soldiers curse the generals and politicians who neglected to anticipate and prepare for war. Airmen, more than most, would draw an especially bitter pleasure in this pastime, forever repeating stories that demonstrated the obtuse shortsightedness of the great men who had dismissed the importance of the airplane.”⁶⁰ As far back as 1926, the Air Corps Tactical School began teaching a course in Employment of Combined Air Force, which advocated the Army Air Corps’s ability to achieve “strategical

objectives” through the projection of airpower behind enemy lines.⁶¹ When an independent Air Force came into existence in 1947, it did so in large part because of this capability.⁶² The bomber force was the nation’s primary means of power projection prior to the development and deployment of intercontinental ballistic missiles (ICBM) in 1959.⁶³ Half a century later, the ability to project power rapidly through air and space remains as necessary as it was in World War II and throughout the 50-year Soviet-American standoff.⁶⁴

In the aftermath of the Cold War, the United States took advantage of the “peace dividend,” shrinking the size of the Air Force by two-thirds and significantly reducing its number of power-projection aircraft.⁶⁵ Less than a decade into the era of American hegemony, al-Qaeda struck the United States, beginning the “long war” and ending the “procurement holiday” of the previous decade. As the Air Force prepares for the coming decades, strategic power projection will once again play a key role in defending the nation’s vital interests.

Certainly, Afghanistan and, until recently, Iraq remain the most pressing security concerns, but they too will diminish in their significance as the military attains mission objectives and as budget constraints and war weariness take their toll. Ensuring that the Air Force can serve the nation in its capacity as a strategic arm represents a responsibility for which failure is not an option. Lengthy design, development, and deployment times dictate that the Air Force begin planning for a security environment in which peer competition assails the existing order.⁶⁶ Just as the nation became fixated on the Soviet Union during the Cold War, so is it currently fixated on al-Qaeda and other terror networks often operating from distant, remote locations. The nation will call upon the Air Force’s power projection capability when the service least expects it, as occurred during the opening phase of Enduring Freedom.

Global Precision Attack

The United States has long thought of itself as an island protected by the Atlantic and Pacific oceans. Technology, however, is bridging these

watery expanses. In the future, as in the past, the Air Force's core function of global precision attack, whether conventional or nuclear, will be important to *homeland defense*. Bombers designed for global precision attack, for example, send a clear signal to adversaries that the US Air Force can strike anywhere on the earth with speed and precision. Nuclear-capable bombers and the remaining ICBMs also deter adversaries from attacking the United States. These capabilities (conventional or nuclear) have served the nation well for half a century and will become increasingly important in the years ahead. Developments in ballistic missile and other technologies bring enemies within striking distance.

Fortunately, defending the nation's vital interests against *peer competition* over the next two decades may not require major combat operations. Much more likely is the deterrence of a potential competitor from challenging the status quo with options for global precision attack.⁶⁷ In those cases in which the United States must use force, the Air Force's ability to deliver strategic effects from a distance gives the president unparalleled options and places fewer American troops at risk. Additionally, in some instances, penetration of heavily defended airspace will be the *only* option available. In his recent look at the twenty-first century, George Friedman writes that

the key to warfare in the twenty-first century, then, will be precision. The more precise weapons are, the fewer have to be fired. That means fewer soldiers and fewer defense workers—but more scientists and technicians. What will be needed in the coming decades is a weapon that can be based in the United States, reach the other side of the world in under an hour, maneuver with incredible agility to avoid surface-to-air missiles, strike with absolute precision, and return to carry out another mission almost immediately. If the United States had such a system, it would never again need to deliver a tank eight thousand miles away.⁶⁸

Friedman highlights the fact that occupation of territory is a labor-intensive endeavor, a fact unlikely to change in the future. He also points out that the United States need not defeat a peer/near-peer competitor's army to defend American interests. Rather, preventing an adversary

from altering the status quo through global precision attack is the foundation of effective American strategy. In the decades ahead, the Air Force is best suited to deliver the strategic effects suggested by Friedman.

The nation's potential competitors understand the importance of American power projection, illustrated by China's focus on A2/AD, ballistic missile, and cyberspace capabilities. That country's *expansion* of the People's Liberation Army Air Force and People's Liberation Army Navy, together with its *reduction* of the People's Liberation Army, signals where China considers its strategic interests most vulnerable. Continuing to hold adversaries at risk with formidable options for global precision attack is in the best interest of the United States.

As the opening campaign of Enduring Freedom demonstrated, the Air Force, unlike other services, can generate strategic effects anywhere in the world.⁶⁹ Global precision attack becomes particularly useful when one discovers hard-to-find nonstate actors in distant locations (accessible only with airpower) where the United States is engaged in *irregular warfare*. Because irregular adversaries of the future will flock to remote and unstable places in response to America's dominance in conventional conflict, rapid power projection will prove instrumental in realizing US objectives. In many cases, it can attain those objectives with global precision attack and will not have to deploy ground forces. Should those forces need the Air Force, however, both CAS and interdiction are now, interestingly enough, classified in the latest functions document (DODD 5100.01) and in both basic and operational Air Force doctrine under the all-encompassing category of global precision attack.⁷⁰ By merging strategic attack with these formerly delineated ground-support subelements, Air Force leadership has perhaps acknowledged the problem of identifying their purpose solely within the context of supporting land forces.

Recommendations for Global Precision Attack

Today, however, global precision attack is in precipitous decline because a much smaller Air Force continues to depend on many of the

same global attack platforms it did when the Berlin Wall fell; indeed, some were in service when East Germany erected the wall. If, as Under Secretary of Defense for Policy Michèle Flournoy suggests, the United States will take a leading role in defending the “global commons,” then the nation will need sufficient global precision attack to do so.⁷¹ Thus, the Air Force will have a strong influence on the ability of the United States to reach its strategic objectives.

During the previous generation, global attack platforms experienced a slow, steady decline in both numbers and capability. Only our 19 B-2 bombers are capable of penetrating advanced anti-aircraft defenses; fielding a new global precision attack bomber is imperative. Although design and production of the “2018 bomber” are currently delayed, initially five blocks were planned for production between 2018 and 2025—with the initial Block 10 configuration (24 aircraft) serving as the Air Force’s last manned bomber. Subsequent blocks would integrate technologies on the leading edge and continue to improve US capabilities.⁷²

In addition to the development of a hypersonic bomber able to penetrate advanced anti-aircraft defenses, the nation would benefit from conventional long-range ballistic missiles. Capable of “prompt global strike,” such weapons would enable the Air Force to hit a fleeting target from home soil, far from an American military presence while reducing or eliminating collateral damage.⁷³ This force could effectively deter the nation’s adversaries by putting any point on the earth within range of a conventional strike. Despite the valid concern that an adversary might mistake the launch of a conventional ICBM for a nuclear attack, the United States can and should resolve such a concern and not allow it to preclude the development of prompt global strike.

Finally, the retirement of air launched cruise missiles from the arsenal and the unsettled fate of the much shorter-range joint air-to-surface standoff missile and its extended-range variant create a decline in the Air Force’s critical capability.⁷⁴ A long-range (conventional) cruise missile would likely prove important as an enabler, either striking targets deep behind enemy lines or opening heavily defended airspace to

American aircraft. As China, Iran, and other possible adversaries extend the range of their anti-aircraft defenses, the Air Force must be able to defeat these systems or face a world of highly contested global commons.

Rapid Global Mobility (Airlift)

Although global precision attack is the kinetic element of power projection, airlift enables the Air Force to deploy personnel and materiel rapidly to any point on the globe when and where needed.⁷⁵ Due to the strategic nature of airlift and the fact that land operations will remain necessary in the future, the Air Force must continue to make this core function a priority. Quickly moving large numbers of people and amounts of materiel from the United States to any point on the earth is an Air Force core function that no other service can match. Gen Henry H. “Hap” Arnold correctly declared that “we have learned and must not forget that from now on air transport is an essential element of airpower, in fact of all national power.”⁷⁶ As is often necessary, the forward deployment of Airmen, aircraft, and the materiel to sustain them buttresses national power. The lack of such an ability undermines the deterrent effect of airpower. Hence, airlift’s contribution to national security and the core mission of the Air Force is significant.

At its simplest, airlift swiftly moves people and materiel across great distances. Because the United States has a history of taking war to its enemies rather than waiting for the fighting to reach its shores, the homeland has not seen the ravages of conflict in more than a century. Thus, airlift has an indirect role in *homeland defense*—principally in military support to civil authorities. Mitigating the effects of a large-scale disaster is the primary role of airlift in homeland defense.

Projecting American power to the far reaches of the globe during *peer competition* will remain an important function for airlift. Examples of such Herculean efforts abound. Whether Gen William Tunner’s airlifters flying supplies over “the Hump” to Gen Joseph Stilwell in the China-Burma-India theater during World War II, Gen Curtis LeMay’s creation of the Berlin airlift in response to a Soviet blockade, or the

transport of military personnel and supplies to the Persian Gulf during Operation Desert Shield, airlift plays a strategic role in the ever-present geostrategic competition against peer/near-peer competitors.⁷⁷ This is unlikely to change over the coming decades. In fact, as American interests shift to Asia, airlift will probably become more prominent in the protection of national interests.

Enduring Freedom and Iraqi Freedom, operations involving *irregular warfare*, serve as excellent illustrations of the significance of airlift in this type of conflict. Air Mobility Command reports that by the end of 2009, the Air Force had carried 9.66 million passengers and 3.92 million tons of cargo during 529,981 sorties in support of these two operations.⁷⁸ If, according to predictions of the future, irregular conflicts will dominate, then airlift will prove integral to American power projection, allowing the other vital core functions to concentrate on *homeland defense* and *peer competition*.⁷⁹

Recommendations for Rapid Global Mobility (Airlift)

Airlift has become the backbone of American expeditionary warfare, making it a critical component of any strategy. Representing the majority of Air Mobility Command's inventory, the C-130 Hercules first entered service in 1956, and the latest model (C-130J) appeared as recently as 1999. The Air Force, Air Force Reserve, and National Guard fly more than 400 of these durable aircraft—the nation's principal intratheater airlifter.⁸⁰ The 111 C-5 Galaxy intertheater airlifters, built between 1970 and 1989, have an estimated 80 percent of service life remaining. That fact, together with an upcoming modernization program, will make these aircraft a viable Air Force asset well into the twenty-first century.⁸¹ The newest and most widely used intertheater cargo aircraft—the 158 C-17 Globemaster IIIs, manufactured between 1993 and 2004—will most likely not need replacement for decades to come.⁸² As this brief description of the current state of Air Force airlift suggests, this aspect of power projection is in excellent condition. Consequently, we recommend no substantive changes for the near future. The strate-

gic airlift fleet is scheduled for replacement around 2040, however, so the length of acquisition time (14 years for the C-17) suggests that planning for the follow-on global C-X aircraft is in its initial stages.⁸³

Rapid Global Mobility (Aerial Refueling)

With few exceptions, projecting airpower depends on the Air Force's refueling tankers to extend the range of American and allied airpower. As the only country in the world with the aerial refueling capability to carry out global combat operations, the United States boasts tankers that greatly enhance the operational scope of US military aircraft and that of its allies.⁸⁴

As the hours and days immediately following 9/11 illustrate, the need for aerial refueling begins with *homeland defense*. Without Air Force tankers, fighter aircraft tasked to maintain air sovereignty could not have flown in the nation's skies for long. Continuing to provide aerial refueling for air sovereignty alert will remain an important part of the Air Force's contribution to homeland defense. Furthermore, the fact that America's adversaries have found it easier to strike the United States directly will intensify the need for an effective air defense.⁸⁵

For more than a century, the US military has waged expeditionary warfare. Crossing vast oceans to move personnel and materiel to the battlefield is a staple of the "American way of war," and preventing conflict from reaching American shores is an objective of every president. Absent the ability to project power to the far corners of the globe, the United States could not realize its objectives in *peer competition*. By extending the range of fighter, bomber, cargo, and other aircraft, tankers enable the Air Force to take the fight to an adversary. Projecting power anywhere on the earth stands as a unique capability of the United States and a significant concern of adversaries. As mentioned previously, the People's Republic of China is engaged in a military modernization program that emphasizes the development and fielding of systems which counter Air Force power projection.⁸⁶ This is prompted by a growing concern that Chinese and American interests

will diverge and that the relationship between the two countries may turn adversarial as they reach parity. Hence, China's military modernization effort seeks to counter the threat it most fears—American air and naval power.⁸⁷ Ensuring that the United States does not lose the capacity to defend its interests and influence actors in the Asia-Pacific theater and elsewhere requires that the Air Force maintain aerial refueling sufficient to project power quickly, anywhere in the world.

Irregular warfare against nonstate actors places a high demand on the Air Force. For air-breathing platforms, persistence, which increases mission effectiveness, is a particularly important characteristic because of the often unexpected and brief opportunities that arise for striking fleeting targets. Aerial refueling gives ISR and air-to-ground attack aircraft that persistence by increasing loiter time in places such as Afghanistan and Iraq. Regarding future irregular conflicts in which the United States is unlikely to have a large ground presence, RPAs with a combined ISR and strike mission will need aerial refueling as they undertake long-endurance missions and serve as a key instrument of American power projection.⁸⁸

Recommendations for Rapid Global Mobility (Aerial Refueling)

Despite aerial refueling's importance in supporting many of the other critical core functions in all three scenarios, some people fail to appreciate its ability to enable long-range operations. Currently 400 KC-135 Stratotankers, manufactured during the Eisenhower, Kennedy, and Johnson administrations, serve as the Air Force's primary aerial refuelers.⁸⁹ Augmenting the venerable KC-135 are the 59 newer KC-10 Extenders in the Air Force's inventory.⁹⁰ The recent granting of the air refueling tanker contract to Boeing for delivery in 2017 is the single most important step that the service has taken to guarantee the long-term viability of aerial refueling.⁹¹ Because purchasing a capable, cost-effective air refueling aircraft is in the best interest of the Air Force and the nation, the platform should be protected against future cost-cutting measures.

The foreseeable security environment and the missions that airpower will likely undertake leave little doubt about the utmost impor-

tance of power projection (i.e., global precision attack, airlift, and aerial refueling) to the Air Force. Moreover, the service will require significant investments to replace the aging platforms that conduct this mission. The Air Force has made significant progress in maintaining existing weapon systems and procuring new ones, but pressure to reduce military spending could jeopardize sustainment and modernization of the fleet.

Global Integrated Intelligence, Surveillance, and Reconnaissance

The history of military aviation is replete with examples of aircraft serving as ISR platforms. During the Civil War, the Army of the Potomac used manned balloons to determine Confederate troop strength and monitor movements of the Army of Northern Virginia.⁹² Such platforms first saw use in aerial reconnaissance during World War I; only later did the great air battles of the war take place.⁹³ World War II and the Cold War offer additional examples of the Army Air Forces and the independent Air Force contributing to victory during war and security during peace by means of the aerial reconnaissance mission.⁹⁴ The Air Force's operation of an impressive array of ISR platforms in the air and space domains leaves little doubt that the service will continue to make these capabilities available across the spectrum of operations for decades.

Intelligence, Surveillance, and Reconnaissance

Among the Air Force's oldest and most important surveillance roles is its provision of early warning in the event of an attack against the United States. Initially Air Defense Command, the largest of the Air Force's original major commands, had responsibility for early warning and *homeland defense*.⁹⁵ Development of the continental radar system and of reconnaissance and early warning satellites by the early 1960s allowed the Air Force to supply the continental United States with an extensive early warning system.⁹⁶ In light of the proliferation of ballis-

tic missile and nuclear weapons technology as well as continued *peer competition*, the North American Aerospace Defense Command and its early warning mission remain an essential part of the nation's defense—an area that benefits from the Air Force's significant contribution to the broader ISR core function.

Major combat operations against a large conventional force present a set of distinct, difficult issues for combatant commanders, including the development of comprehensive battlespace awareness. The substantial global ISR assets of the Air Force can greatly reduce the fog of war by providing a constant presence above the battlespace as they send information to commanders. Conflict with a peer/near-peer adversary would likely necessitate very different assets than those deployed to Afghanistan today. One should also highlight the fact that superior battlespace awareness acts as a force multiplier, permitting fewer ground forces to attain tactical objectives against a larger enemy force. Since ISR stands to play a major role in future peer competition, it merits priority among the Air Force core functions.

Operations in Afghanistan and Iraq often serve as public examples of airborne ISR's part in contemporary *irregular warfare*.⁹⁷ Whether supplied by a satellite, an RPA, or a light attack / reconnaissance aircraft like the MC-12, information plays a critical role in target acquisition.⁹⁸ Because nonstate adversaries continue to adapt to the tactics, techniques, and procedures employed by the United States, locating them will demand improved awareness of the battlespace. Fortunately, the current conflict has accelerated the development and acquisition of airborne ISR assets, which will serve the Air Force well for years to come and must enjoy protection as part of the service's core functions.

Recommendations for Intelligence, Surveillance, and Reconnaissance

ISR contributes to the joint fight and cannot be replicated by any other service. However, the current focus on RPAs (Reaper, Predator, and Global Hawk) capable of performing ISR and strike missions may not

constitute the best use of a shrinking acquisition budget.⁹⁹ The reality of modern conflict—particularly irregular warfare—is that the military always needs additional intelligence.¹⁰⁰ To offer this service, the Air Force must charge recipients for the cost of systems and personnel. One solution entails seeking a second change in the Defense Working Capital Fund, which enables the Air Force to charge beneficiaries for these services—much as it does for airlift.¹⁰¹ At present, those who benefit from and use many Air Force capabilities bear none of the cost, thereby incentivizing the demand for more of everything. Developing a market mechanism that weighs demands against costs would be a positive step toward solving some of the fiscal issues confronting the Air Force.

The Importance of Nuclear Deterrence

The nuclear arsenal remains the most important capability for defending national sovereignty from an attack by a *peer competitor* or rogue regime. Nothing else gives an adversary more reason for pause than nuclear weapons. Composed of three legs, the nuclear triad—ICBMs, manned bombers, and submarine-launched ballistic missiles—gives the United States a deterrent force that makes direct attack on the nation a costly choice. The Air Force fields two of these platforms.¹⁰² Perhaps more so than the other core functions, nuclear deterrence operations are difficult to place within one of the three general scenarios (homeland defense, peer competition, or irregular warfare) because of the interrelated effects produced by the nuclear arsenal. Although a somewhat arbitrary distinction, one can think of nuclear deterrence operations as serving three clear objectives related to the escalation ladder that gained prominence during the Cold War.

Nuclear Deterrence Operations

After the United States dropped atomic bombs on Hiroshima and Nagasaki in August 1945, the distinctiveness of those weapons soon became

apparent. As the world began to comprehend the power of thermo-nuclear devices, developed in 1951, preventing nuclear war between the United States and the Soviet Union became the principal, if not the only, purpose of those weapons. Without question, deterrence was the most significant and successful policy of the Cold War—and it has not failed to prevent a nuclear holocaust.¹⁰³

The combination of nuclear-capable bombers, ICBMs, and submarine-launched ballistic missiles is effective in the *homeland defense* mission because redundancy and survivability make the high cost of an attack on the United States unacceptable to conventional adversaries. Although the Cold War ended a generation ago—only to be replaced by the long war—nuclear deterrence remains vital to the defense of the United States. One recent report suggests that, at its most expensive estimate, the nuclear complex costs 9.96 percent of the 2009 defense budget—a reasonable expense, considering the security it offers.¹⁰⁴ In 2009, for example, the United States spent less on the nuclear enterprise than one company—Microsoft—generated in annual revenue.¹⁰⁵ Put another way, the cost of the nuclear arsenal represents less than one-tenth of 1 percent of the gross domestic product.

As nuclear weapons material and technology continue to spread, deterring current and future adversaries (nuclear and conventional) will remain central to American national security. Furthermore, because US policy precludes responding to biological and chemical attacks in kind, nuclear weapons provide an effective deterrent against these threats.¹⁰⁶ The ICBM's responsiveness is accompanied by bombers as the only leg useful in signaling escalation or de-escalation. Clearly, nuclear deterrence operations remain a critical capability.

In today's strategic environment, some national security analysts believe that the most probable use of a nuclear weapon will come from a nonstate actor or, more likely, a rogue regime such as North Korea or Iran seeking to strike a devastating blow against the United States.¹⁰⁷ Thus, America could find itself engaged in *irregular warfare* in which a limited nuclear strike may be an option. The Air Force must maintain

a force capable of performing such a mission. Rogue regimes seldom negotiate in good faith and tend to respond negatively to diplomatic overtures that would limit their nuclear capability, as evidenced by 20 years of fruitless efforts involving carrots and sticks to convince North Korea to halt its development of nuclear weapons. Additionally, cash-strapped nations such as North Korea could possibly sell nuclear weapons to terrorist networks that would have extreme difficulty building a weapon of their own.

Past experience suggests that terror networks and their state supporters are influenced by existential risks and rewards, which offers reason to believe that a visible limited-strike capability may assist in deterring a nuclear attack against the United States.¹⁰⁸ Removing a limited nuclear strike from consideration as a response to a nuclear terrorist attack gives countries little motivation to cease hosting or tolerating terror networks within their geographical borders. Recent history suggests that pariah governments and militant extremists are often unconstrained by liberal Western values. They respect strength, and, as America's withdrawal from Somalia demonstrated, the appearance of weakness can invite attack.¹⁰⁹ As with strategic nuclear war, an actual limited nuclear strike would remain remote and an action of last resort, but the consequences of such an attack dictate that the deterrent value should remain an arrow in the nation's nuclear quiver.

The United States should retain a credible nuclear strike option, but the preferred alternative calls for improved multinational nonproliferation efforts and nuclear forensics that will reduce the risk of nuclear terrorism by making nuclear material more difficult to acquire and anonymity more difficult to achieve. Extending the nuclear umbrella over America's allies such as Germany, Japan, and South Korea, for example, has proven effective in convincing these governments to forgo development of their own nuclear weapons programs.¹¹⁰ Linking nuclear materials to their source of origin will not only lead to better law enforcement and more effective safeguards but also give pause to nuclear suppliers and state sponsors of terrorism faced with the possi-

bility of nuclear retaliation.¹¹¹ The Air Force has a role in supporting broader DOD efforts in this area. To keep nuclear materials from falling into the hands of terrorists or the Iranian regime, for example, in November 1994 two Air Force C-5 Galaxy transports moved 581 kilograms of weapons-grade uranium from Kazakhstan to Oak Ridge National Laboratory in Tennessee.¹¹² The service's principal role, however, must remain the precision delivery of the weapons themselves.

In the final calculation, deterrence equals capability plus will, leaving the United States little option other than maintaining a limited strike capability and nuclear doctrine to support it. Current Air Force doctrine does provide for the limited use of nuclear weapons to convince the enemy of the United States' commitment to using the necessary degree of force to meet objectives.¹¹³ By giving the president the option to visibly escalate or de-escalate during hostilities (bombers) and strike with speed and precision (ICBMs) from positions within the United States, the Air Force figures prominently in protecting the American people.

Recommendations for Nuclear Deterrence Operations

If the nation's nuclear deterrent is to remain credible, the United States must refocus on the core function of nuclear deterrence by maintaining a nuclear arsenal and delivery platforms of sufficient size and diversity to assure both allies and adversaries that the United States has the capability and will to employ nuclear weapons to terminate large and small conflicts as quickly as possible on favorable terms.¹¹⁴ By doing so, the nation bolsters the deterrent effect of the nuclear arsenal and, as the Cold War illustrates, reduces the probability of both nuclear and conventional warfare. *Peer competition* between the United States and Soviet Union remained largely peaceful because the United States could clearly withstand a nuclear strike and retaliate with sufficient nuclear force. The United States, therefore, must ensure that it has a nuclear arsenal sufficient to maintain a credible deterrent "that can under any circumstances confront an adversary with the prospect of

unacceptable damage.”¹¹⁵ Moreover, issuing a unilateral no-first-use declaratory policy could undermine the credibility of nuclear deterrence and might encourage adversaries to seek an asymmetric advantage against a United States perceived as weak and unwilling to wage nuclear war.

Although the relationship between the United States and the People's Republic of China differs markedly from that of the United States and Russia, China is actively modernizing and expanding its nuclear arsenal.¹¹⁶ Russia, though seeking to reduce its strategic nuclear arsenal, is also modernizing while maintaining a large tactical nuclear force.¹¹⁷ Only the United States has chosen to forgo modernization. For China and Russia, nuclear weapons serve to deter conventional and nuclear aggression against either country. They also deter efforts that might undermine either state's vital interests. By offering political leaders a sense of security that the Chinese and Russian (conventional) militaries cannot, nuclear arsenals stabilize the strategic relationship between the great powers. According to one former commander of United States Strategic Command, eliminating nuclear weapons would “make the world safe for conventional war.”¹¹⁸ Consequently, the Air Force should maintain a credible nuclear capability.

People working in the highest levels of government wish to reduce the nuclear arsenal. The same strategic guidance that reaffirmed commitment to the nuclear deterrent force also stated that “*it is possible that our deterrence goals can be achieved with a smaller nuclear force, which would reduce the number of nuclear weapons in our inventory as well as their role in U.S. national security strategy*” (emphasis in original).¹¹⁹ Nuclear operations, however, will remain a cornerstone of the service's contribution to national security for the foreseeable future. Further, at less than 10 percent of the defense budget, the nuclear weapons complex is a cost-effective guarantor of national survival. Plans to reduce the number of weapons, however, do not mean that the arsenal can do without significant investment. Warheads, delivery platforms, infrastructure, and human capital are all aging. Reports

from the Defense Science Board and the Secretary of Defense Task Force on DOD Nuclear Weapons Management as well as statements from Gen Kevin Chilton, USAF, retired, the former commander of US Strategic Command, and Secretary of the Air Force Michael Donley advocate reinvigorating the nuclear weapons complex. Specifically, the report on nuclear deterrence skills recommended that civilian leadership “maintain critical weapon design, development, production, integration, and surveillance skills by exploring follow-on nuclear weapon system designs, including prototyping.”¹²⁰ Hence, if the nation is committed to reducing its nuclear arsenal, then those fewer weapons should have more capability. The United States, therefore, should emphasize restarting development (but not necessarily production) of a new warhead. Continuing to rely on decades-old designs and an untested life-extension program is not a plan for success.

Not only does the current approach send a signal to adversaries that the United States no longer views nuclear weapons as a critical aspect of national defense, but also technological innovation stagnates when scientists and engineers spend their days maintaining outdated technology instead of developing the next generation of weapons. The latest Air Force doctrine stresses the need for responsive research and development and industrial infrastructure as a critical leg of the nuclear triad.¹²¹ Furthermore, the National Nuclear Security Administration’s stalled Complex 2030 plan calls for significant investment in nuclear weapons complex infrastructure, personnel, and research.¹²² Such an investment could facilitate current strategic guidance for responsible reductions in the nuclear arsenal by providing the scientific means to lessen the need for resuming underground nuclear testing; it could also accelerate the dismantling of retired weapons.¹²³

Finally, a credible deterrent demands a reliable means to deliver nuclear weapons across the strike capability of the nuclear triad. Each leg of the triad contributes uniquely to both conventional and nuclear deterrence.¹²⁴ To maintain a credible strike capability, the United States must develop the next-generation ICBM and continue to modernize

the submarine-based nuclear force. Also, the latest strategic guidance notes that “the U.S. military will invest as required to ensure its ability to operate effectively in anti-access and area denial (A2/AD) environments.”¹²⁵ Hence, the United States should develop a bomber capable of penetrating advanced A2/AD systems. In many instances, these investments in the nuclear force will also benefit conventional capabilities. The next-generation bomber as a prompt global strike delivery platform for both nuclear and conventional munitions is but one example.

Given the reality of today’s fiscal resources, concentrating on the nuclear arsenal makes economic sense. With entitlement spending consuming an ever-increasing percentage of the federal budget, defense spending is declining.¹²⁶ The United States may see a day in the near future when it must rely on more economical nuclear weapons to ensure the basic requirements of national defense, a scene strikingly similar to the one in the 1950s when President Eisenhower turned to cheaper nuclear weapons as an alternative to more expensive conventional military capabilities. Because personnel costs constitute the greatest expense in today’s military, replacing a conventional force comprised mostly of ground forces with nuclear weapons may lie on the fiscal horizon. Thus, a *credible* nuclear arsenal is necessary. Investing in the nuclear weapons complex will enhance the deterrent effect of nuclear weapons by signaling potential adversaries of American resolve. As historian Phillip Meilinger points out in his biography of Gen Hoyt Vandenberg, when this Air Force chief of staff attempted to build the nuclear force with limited funding in the late 1940s, “a deterrent force that is not credible is not a deterrent; it is an invitation.”¹²⁷

Conclusion

Over the past two decades, the Air Force has spent considerable effort and resources meeting the airpower requirements of US Central Command. Beginning with Desert Shield, Air Force major combat operations in the Middle East, the Balkans, and Southwest Asia, as well as contingency and crisis operations in Haiti, Indonesia, Japan, and

elsewhere have continued unabated. The constant demands of major operations such as Desert Storm, Northern Watch, Southern Watch, Enduring Freedom, and Iraqi Freedom require a heavy focus on the tactical and operational aspects of airpower, which has played a role in delaying the recapitalization of some platforms necessary to conduct Air Force core functions at the strategic level of war. While the Air Force is in the midst of acquiring the next generation of multirole fighters, airborne ISR RPAs, tankers, and possibly even remotely piloted long-range penetrating bombers, it still has aging platforms that have long passed their expected service life. Consequently, the Air Force must either engage in costly modifications to maintain combat-ready status or modify the missions of these aircraft to adjust to the changing threat environment (e.g., using the B-52 as a launch platform for nuclear cruise missiles rather than a penetrating bomber).

In many instances, technological innovation and the capabilities of the nation's adversaries make these systems highly vulnerable. Thus, if the United States desires to maintain an Air Force capable of global vigilance, reach, and power, it needs a clear strategic vision that explains the service's objectives over the coming decades. Such a vision may then guide acquisition and planning. The fact that the service suffers from acquisition requirements well in excess of likely funding is certainly reason for concern. However, the Air Force has weathered difficult days throughout its relatively short history and may do so again.

If the myriad of defense experts are correct in suggesting that the economic and military growth of Asia—China particularly—signals a shift in American interests to the Pacific, then the region's geography may lead to a renaissance of airpower.¹²⁸ The air-sea battle concept now under development represents one such reaction to this new strategic paradigm. As General Schwartz and Adm Jonathan Greenert, chief of naval operations, point out in an article on air-sea battle, "Autocratic states and groups seeking to subvert the prevailing political and economic order are already leveraging their geographic advantages to employ armed coercion and political action to counter Ameri-

can presence and power projection, as well as to disrupt free access to key areas in the air and maritime commons.”¹²⁹ Since the distances involved are much greater than those in other theaters of operation and the strategic environment, for the most part, is not conducive to the use of land power, Air Force and Navy airpower will likely prove the best option for defending the nation’s interests in the years ahead. To illustrate the challenge posed by these vast distances, consider that a pilot must log only 3,638 miles from New York to Paris but 6,255 miles from Los Angeles to Beijing. If the United States wishes to protect its interests in an environment where distances are greatly extended and A2/AD strategies compound the problem, it will do so in part because the Air Force offers innovative solutions to future problems. The “core” of those solutions should concentrate on functions that contribute to the Air Force’s strategic mission. ★

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