Strategy Research Project

Reshaping USAF Culture and Strategy: Lasting Themes and Emerging Trends

by

Lieutenant Colonel Peter J. Flores
United States Air Force

United States Army War College
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This paper will first examine the foundations of organizational culture and how they apply to the USAF. Through examination of a series of historical themes it will propose that the USAF has demonstrated a remarkable consistency in terms of its core doctrine of strategic attack. This paper will then explore USAF technological innovation as a social construct. Finally, it will describe how transformative periods and emerging technologies have drawn emphasis in the past and how that emphasis can be expected to shift in the current strategic climate.

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USAWC STRATEGY RESEARCH PROJECT

RESHAPING USAF CULTURE AND STRATEGY: LASTING THEMES AND EMERGING TRENDS

by

Lieutenant Colonel Peter J. Flores
United States Air Force

Dr. Stephen Gerras
Project Adviser

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U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

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RESHAPING USAF CULTURE AND STRATEGY: LASTING THEMES AND EMERGING TRENDS

> Institutions, while composed of many, ever-changing individuals, have distinct and enduring personalities of their own that govern much of their behavior…
>
> —Carl H. Builder
> The Masks of War: American Military Styles in Strategy and Analysis[1]

In September 2011, the U.S. Air Force (USAF) celebrated the 64th anniversary of its joining the U.S. Army and U.S. Navy as a separate service within the Department of Defense (DoD).[2] Although a cause for pride and celebration within the institution, this milestone comes at a time of considerable anxiety within the defense establishment. The ebbing of the Iraq and Afghanistan wars and an increased emphasis on the Asia-Pacific region may drive new priorities and new decisions. Moreover, mounting financial challenges are forcing governments around the globe, including the U.S. government, to make difficult and painful choices as they attempt to address a myriad of economic problems. Former Secretary of Defense Gates acknowledged the impact these circumstances would have on defense budgets in May 2011 when he remarked, "The defense budget, however large it may be, is not the cause of this country's fiscal woes. However, as matter of simple arithmetic and political reality, the Department of Defense must be at least part of the solution."[3]

The USAF can and will participate in this solution.[4] The decisions the service makes throughout this transformative period, however, will be influenced as much by a dramatically changed and changing strategic environment as it will be by sterile balance sheets. Those decisions will be deeply rooted in the culture and history of the service. Uncovering the roots of USAF organizational culture can provide crucial context to

explain how and why the USAF will invest its increasingly scarce resources in order to address the challenges of the future.

To uncover this relationship, this paper will first examine the foundations of organizational culture and how they apply to the USAF. Through examination of a series of historical themes it will propose that the USAF has demonstrated a remarkable consistency in terms of its core doctrine of strategic attack. This paper will then explore USAF technological innovation as a social construct. Finally, it will describe how transformative periods and emerging technologies have drawn emphasis in the past (using the USAF's efforts in near space as an illustrative example) and how that emphasis can be expected to shift in the current strategic climate.

Organizational Culture

As a complex and unique organization, the USAF is bound by "some combination of common language, culture, religion, history, mythology, identity, or sense of destiny."[5] As with all large organizations, it is driven by internal and external forces that constantly apply pressure upon it, its perception of itself, and its perception of its place in its environment. The overall culture that has emerged represents:

> …a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.[6]

These shared, basic assumptions represent deeply ingrained patterns of thought and behavior, the foundations for which are so rarely questioned that they can be difficult to discern. Nevertheless, those shared, basic assumptions play a central role in the USAF's decision-making processes. They form the core of its self-image and

establish the appropriate and legitimate boundaries on organizational behavior, thereby underpinning the culture that forms the basis of all organizational decision-making logic.

Uncovering those basic cultural assumptions, however, is far from clear cut. Edgar Schein's influential research into organizational behavior stratifies organizational culture into three levels that one can visualize as a pyramid. At the top of the pyramid are the organizational artifacts. These are the most superficial and obvious expressions of organizational behavior such as explicit rules for dress and behavior. Within a military context such as the USAF, artifacts take on a special and obvious role in the form of uniforms, badges, rank insignia, organizational crests, etcetera. Although these artifacts are openly demonstrated, and therefore can be easily discerned, without further context they may be easily misinterpreted.[7]

The next level down on the pyramid provides some of that context. This level is made up of the espoused values of the organization. These are the consciously articulated strategies, goals, and philosophies that justify organizational behavior and shape what are and are not appropriate organizational artifacts. The USAF, as with all the other branches of the U.S. military, routinely updates and publishes materials that speak to the organizations' values, vision for the future, investment decisions and overall strategic guidance. Although openly espoused, organizational values also require a measure of contextual background to understand. The foundation of Schein's pyramid provides that context.[8]

The foundation of the organizational culture pyramid is made up of the basic assumptions and values of the organization. These represent the deepest dimensions of behavior and belief underlying organizational behavior. They provide the key to

understanding why certain values are openly espoused and why certain artifacts come to be accepted. The basic assumptions and values of the organization are rarely brought into question as they exist largely at a subconscious level.[9] They simply define the truth as the organization perceives it and must be inferred from the more obvious levels of the organizational culture pyramid (e.g., openly espoused values and tangible artifacts). They represent the commonalties that bind groups into coherent wholes and provide the essence of an organization's culture.[10]

Builder contends that "like all individuals and durable groups, the military services have acquired personalities of their own that are shaped by their experiences and that, in turn, shape their behavior."[11] Consistent with Schein's description of the basic assumptions and values of an organization, Builder remarks that the core personalities of each of the American military services, what they consider their appropriate role and methods that define their contribution to the nation's defense, "become so familiar as to be hidden from view."[12]

Builder argues that the USAF:

> …conceived by the theorists of air power as an independent and decisive instrument of warfare, sees itself as the embodiment of an idea, a concept of warfare, a strategy made possible and sustained by modern technology. The bond is not to the institution, but to the love of flying machines and flight.[13]

He goes on to say that the USAF perceives itself as "the keeper and wielder of the decisive instruments of war—the technological marvels of flight that have been adapted to war."[14] For Builder, this is the USAF's mask of war.

This mask of war, this self-image, has remained remarkably consistent throughout the history of the USAF. Examining that continuity will provide important indicators of how the USAF will deal with its current challenges.

Continuity and Adaptation in Airpower Thought

At the close of the Second World War, General H.H. “Hap” Arnold suggested that observers could “take everything you’ve learned about aviation in war, throw it out the window, and let’s go to work on tomorrow’s aviation. It will be different than anything the world has ever seen.”[15]

General Arnold’s statement concerning the future of the USAF was both right and wrong. The USAF has proven itself remarkably adaptable to the demands of the situation and the willingness to invest in cutting-edge technology, and both have been important in defining the organization. To that extent, the USAF can be said to be forward-looking as opposed to traditionalist. A single, central idea, however, has dominated USAF thought: strategic attack. Strategic attack has played a central role in shaping USAF thinking and provides a thread of continuity that stretches from the dawn of military aviation in war to the USAF of the twenty-first century. It represents the nexus of the “decisive instruments of war”[16] and “technological marvels”[17] that are central to the USAF’s self-image.

The skillful adaptation of airpower in war and the persistence of strategic attack thinking can be seen by grouping airpower into three distinct eras: the era of the World Wars (1915-1945), the post-World War Two/Cold War through Operation Desert Storm (1945-1991) era, and finally, the long wars era (1991-early 2011).

World War I demonstrated that the technology of combat had robbed armies of the advantages of maneuver warfare and had transformed them into stagnant formations, doomed to slaughter each other in the trenches. A method of holding an entire enemy nation at risk promised enormous benefits in breaking the stalemate and achieving national objectives.[18] Although belligerents had begun to consider entire

nations legitimate targets, and technological developments could be seen as outstripping the political and moral means to contain them, the era demanded a new way of war, a new tool, with which to deliver victory.[19] Airpower seemed to present just such a tool.

World War I saw a steady increase of airpower's contribution on the battlefield, eventually growing to include early versions of many roles we associate with modern airpower. Adaptations of the air instrument such as the growth of aerial interdiction, close air support, airlift, observation, and even strategic attack all began to come into focus.[20] Among all these adaptations, the most powerful airpower concept to emerge was that of strategic attack. That is, by striking directly at the enemy's will and capacity to make war, airpower would return maneuver to the battlefield and thereby avoid the stalemated carnage of Word War I. The Italian Major General Gulio Douhet and the American Brigadier General William Mitchell typified this conception of airpower. Their airpower theories continue to provide the bedrock of USAF thinking.

Both Douhet and Mitchell perceived airpower as providing a means to avoid the waste of World War I. They both believed that by first achieving command of the air, an enemy would be left defenseless in the face of devastating aerial bombardment, thereby destroying either the enemy's will to resist (Douhet)[21] or his capacity to resist (Mitchell).[22] Douhet postulated that friendly air forces could best achieve a prerequisite command of the air by destroying enemy air forces on the ground, or as he termed it, "destroying [the] nests and eggs on the ground."[23] By comparison, Mitchell contended that friendly forces could best achieve command of the air through pitched battles in the

air itself.[24] In either case, with command of the air, the friendly air force would be free to compel the enemy's capitulation through aerial bombardment.

During the inter-war period in the U.S., the theorists and practitioners at the U.S. Army's Air Corps Tactical School (ACTS) (the immediate intellectual successors to Douhet and Mitchell) continued to refine the idea of leveraging airpower's unique capabilities to meet national objectives, without resorting to long, drawn-out conflicts of attrition. In the run-up to World War II, ACTS conceived airpower's primary utility as attacking the key industrial and economic infrastructure (i.e. the industrial web) that supported the adversary's capacity to resist.[25] Strategic attack, as embodied in Air War Plans Division, Plan-1 (AWPD-1), emerged as the dominant driver of American airpower thought.[26]

World War II put the promise of airpower to the test in a contest between coalitions of industrialized nations. This environment provided a rich opportunity to test the theory of strategic attack against the enemy's industrial web (including electrical power generation and distribution, transportation networks, fuel refining and distribution, food distribution and preservation, steel manufacturing, and general manufacturing infrastructure).[27] American airpower doctrine of the day did not fail to acknowledge many of the missions that airmen had pioneered in World War I.[28] It was, however, the role of direct strategic attack upon the will and capacity of the adversary, as embodied in AWPD-1, which took root in the minds of airmen and seemed to many to hold out the best hope for bringing speedy victory.[29]

The strategic effects of the Combined Bomber Offensive in Europe and of the bombing of the Japanese homeland, however, remain in dispute.[30] Although post-war

bombing assessments claimed these attacks had good affect on the capacity of the Axis powers to resist, it was also clear that the technology of the day did not support the precision necessary for discrete targeting and attack.[31] Additionally, it is extremely difficult to determine what effect strategic attack had on the enemy's will to resist.[32] Although the effects of the bombing are open to interpretation, it seems clear that the eventual Allied victory required sustained and coordinated ground, naval, and aerial combat operations. Nevertheless, a stubborn belief in the central tenet of airpower, in strategic attack as a decisive factor in war, flourished. That is not to suggest that relevant adaptation did not take place in the face of battlefield realities. As with World War I, World War II demonstrated not only the deepening faith in strategic attack, but also the remarkable adaptability of the air weapon.

The experiences of the American Generals Pete Quesada in the European Theater and George Kenney in the Pacific Theater provide excellent examples of the adaptability of airpower. They demonstrate how, in the hands of skilled practitioners, airpower could transcend a monolithic paradigm of independent strategic attack and become an essential contributor to an integrated, combined-arms operation.[33]

General Quesada's leadership of American tactical airpower in Europe is a marked departure from the strict focus on strategic attack that one might expect given the prevailing airpower theories of the time. Perhaps owing to his close association with ground forces as a young officer and his appreciation for the air support a modern army required, he was willing to quickly incorporate first-hand field experience to shape his force to meet the requirements of the circumstances he was faced with, if not the demands of a dominant, preexisting theory.[34]

Adaptations involving convoy patrol, preparatory strafing attacks (in effect, providing rolling artillery barrages), and the provision of flank security from the air for fast moving armored formations, all contributed to effective, integrated, close air support and air interdiction.[35] General Quesada was not alone in adapting his airpower to meet the needs of the mission at hand. In the Pacific, General Kenney faced a different set of challenges, but found that he too could adapt his airpower to meet those challenges.

General Kenney's command allowed him to apply his technical knowledge of the capabilities and limitations of airpower as well as his broad academic and staff experience to the problem of supporting the war effort in the Southwest Pacific.[36] With the strategic targets of Japan's industrial infrastructure beyond the reach of his forces, he adapted those forces to provide "aggressive, flexible, and focused use of aviation to interdict men and supplies, harass enemy communications, transport Allied soldiers and materiel to battle, provide protection for shipping and amphibious assaults, and fly in direct support of ground fighting."[37] Strategic attack purists could have seen much of this activity as an inappropriate use of airpower.

Although these two officers effectively adapted the airpower tool well beyond the singular application of strategic attack, the transition from World War II to the Cold War saw the continuity of airpower thought reinforced. Strategic attack came to the absolute forefront of airpower thinking.[38]

The strategic context of the Cold War provided an ideal environment for airpower to focus on strategic attack, now defined as war (up to and including) complete nuclear annihilation of the adversary.[39] The nuclear triad of manned bombers, submarine launched missiles, and land-based intercontinental ballistic missiles (ICBMs) provided

the ultimate expression of prompt and direct strategic attack through the air. Championed by Strategic Air Command (a specified command created with the express purpose of providing nuclear strategic attack capability), air forces tasked with the strategic attack mission can be credited with playing a vital role in achieving a key American strategic goal, namely, deterring full-scale war between the U.S. and the Soviet Union.[40]

Although the great powers may have averted full-scale war, proxy conflicts such as the wars in Korea and Vietnam demanded adaptation from American airpower in mission areas that dominant airpower thought (i.e. strategic attack) had largely neglected. Having discovered the limitations of capital-intensive warfare within politically-constrained conflicts, including the unique demands of insurgent war in Vietnam, airpower was once again forced to adapt.[41]

The rediscovery of close air support (CAS) doctrine, rapid development of rotary wing and counterair technologies, and the utilization of strategically-conceived assets such as the B-52 to accomplish generalized interdiction, help to illustrate airpower adaptation in this period.[42] The war in Korea confronted American airpower with a conflict that it had not prepared for, but forced the American air force to quickly reorient itself to CAS and interdiction missions.[43] The Vietnam War saw important technological innovations such as the use of Ground Proximity Extraction System (GPES), Container Delivery System (CDS), and Low Altitude Extraction System (LAPES) in support of the besieged Marines at Khe Sanh, harkening back to the adaptations of the Berlin Airlift.[44] Both Korea and Vietnam demonstrated the tremendous adaptability of the many facets of airpower.

As it had been with the World War II strategic bombing efforts, it was difficult to definitively assess the impact of airpower at the close of these limited conflicts. The contributions of airpower had to be taken in conjunction with the contributions of the other military tools applied, providing "mixed causes and mixed consequences," rather than demonstrating overwhelming and decisive victories through airpower.[45] The complexity of interpreting the impact of air operations can be seen in the stark differences between the conclusions of two senior American officers. General David Shoup, former Commandant of the Marine Corps, concluded that the "U.S. bombing effort in both North and South Vietnam [had] been one of the most wasteful and expensive hoaxes ever to be put over on the American people."[46] On the other hand, General Curtis LeMay, former Chief of Staff of the Air Force, proclaimed that the war could have been ended in "any two-week period" through concerted strategic bombing of North Vietnam.[47] Whatever the final verdict, the dominant airpower thought retained its continuity with the roots of strategic attack in response to the broader, Cold War strategic context.

The end of the Cold War saw the decline of the bi-polar strategic context and the rise of a multi-polar environment. Operation Desert Storm marked the transition between the Cold War era and what this paper has termed the long-wars era. Operation Desert Storm presented the ideal conjunction of airpower's foundational belief in strategic attack and the organizational investments that had been made to support that mission.

In Operation Desert Storm, airpower (and increasingly spacepower)[48] demonstrated its ability to find, fix, target, track, engage, and assess adversaries in

order to achieve effects across the tactical, operational and strategic levels of war.[49] Additionally, the speed, precision, and simultaneity of airpower in Operation Desert Storm suggested that airpower technology had finally matured sufficiently to match airpower thought. The application of the full spectrum of air and space power systematically dismantled the enemy at the tactical, operational, and strategic levels. Airpower delivered on its promise to play a leading role in executing a ferocious, joint campaign that induced strategic paralysis and collapse on the part of the enemy.[50]

Operation Desert Storm can be seen as the high-water mark of airpower. The post-Operation Desert Storm era has revealed a more nuanced strategic environment for the application of airpower. A lengthy period of no-fly zone enforcement in Southwest Asia followed by a series of limited wars and long insurgent wars has challenged the validity of the strategic attack tradition and complicated USAF investment decisions.

Operation Allied Force presented a conflict that relied almost exclusively on the application of airpower in a focused, carefully targeted, strategic attack campaign. To some, it provided a concrete example of the independent value of airpower. To others, it was yet another example of the limits of that same instrument. In either interpretation, the conflict demonstrated that even with the most sophisticated technology and careful targeting, understanding the causal link between the destruction of a target and a change of enemy behavior continued to be exceedingly difficult.

Perhaps the most important lesson was that the contribution of airpower, like that of any other instrument of statecraft, should be understood within the specific context in which it is applied.[51] If, in fact, strategic attack yielded strategic success in these specific

circumstances it would be a mistake to apply that lesson to all circumstances. In any event, within the USAF, senior service leaders saw the results of Operation Allied Force as validating the continuity of faith in strategic attack.[52] Air, space, and (increasingly) cyber power in Operations Enduring Freedom and Iraqi Freedom have continued to blend contextual adaptation with the traditional strategic attack.

Technologic Innovation as Social Construction

The development of USAF power illustrates the marriage of an idea (strategic attack) with investment in a series of rapidly emerging technologies. Those technologies have moved from air, to air and space, and finally to air, space and cyberspace.[53] None of these technological innovations, however, represents intrinsic value. Much as gold or diamonds are only valuable to the extent that individuals and societies place value upon them, technologies are only valuable to the extent that societies and organizations (such as the USAF) place value upon them.

Viewing technological innovation as a function of social construction takes into account the technical, scientific, economic, and political factors (among others) that combine into a "seamless web of technology and society."[54] This relationship does not represent the integration of mature technologies into the society or organization, but rather a symbiotic relationship who's "elements are permanently interacting, being associated, and being tested by the actors who innovate."[55] As Donald Mackenzie noted in his 1993 book *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance*:

> Changes in technology go hand-in-hand with changes, small and large, in the preconditions of their use, in the ways they are used, in who uses them, and in the reasons for their use…for the way technology changes cannot be explained in isolation from the economic, political, and other social circumstances of that change.[56]

Technological innovation, however, is not simply synonymous with progress. Innovation is properly understood as change, which is devoid of any value save that which the actors place on it. Technological innovation within the USAF has been subject to the same resistance that all organizational change faces. To paraphrase Thomas Kuhn, change only happens when the actors can no longer evade anomalies that subvert the existing tradition or practice, that is, the existing paradigm.[57] The worth of an innovation is by no means predetermined, but rather, must be demonstrated to address some perceived deficiency in the existing paradigm. None of the innovations the USAF would eventually champion had a predestined value. Rather, they represented expressions of the dynamic that each:

> …new device merely opens a door; it does not compel one to enter. The acceptance or rejection of an invention, or extent to which its implications are realized if it is accepted, depends quite as much upon the conditions of the society, and upon the imagination of its leaders, as upon the nature of the technological item itself.[58]

Therefore, societies and organizations will only make the necessary investment required to enter through the door of innovation if they ascribe value to the innovation. Viewing technological innovation as a symbiotic relationship between the organization and the innovation, particularly with regard to airpower, can be seen in the reactions of the major powers following the First World War. Although faced with similar technological opportunities, France, Great Britain, Germany, and finally the U.S. all reacted in accordance with the unique calculations and values of their societies. Those calculations have had lasting effects on the USAF and continue to color the decisions it makes today.

Each nation reacted in its own fashion to the lessons of the First World War. France took away a respect for the effects of massed artillery support and embraced

technologies and doctrine appropriate to strategic defensive and methodical battle.[59] Britain focused on exposing itself to limited liability vis-à-vis ground combat on continental Europe and planned to exhaust any would-be aggressor through aerial defense of the home island and through their traditional command of the sea.[60] Germany, on the other hand, developed the technology and doctrine to support a joint conceptualization of warfare that emphasized offense and maneuver.[61] In each instance, decision-makers were required to obey their nation's unique political, economic, and psychological limitations and proclivities in adopting or rejecting technological or intellectual innovations.[62] Whatever the specific peculiarities of each nation's reaction to the First World War, it is clear that only a complex interaction of social factors (including history, economics, and politics) can account for the decisions that were made concerning military innovation.[63]

The U.S. followed its own path in reacting to the lessons of World War I. Both external (to the U.S. Army) and internal pressures shaped that reaction with respect to how the service would integrate new technologies into existing framework. The external forces included the perception of the threat environment, consequent economic pressures on the military, and civilian ambivalence towards that military. A comparison of how the U.S. Army ascribed value to two distinct emerging technologies can be seen in the approach to the tank and the airplane during this period.

Many American political leaders perceived the period after the First World War as "an era without military threat to the security of the United States."[64] They believed that by pursuing international disarmament regimes the nation could return to its traditional isolationist position, which would render a large standing army unnecessary. Therefore,

the U.S. Army presented an attractive target for fiscal belt-tightening. No matter how promising the technologies, both the tank and the airplane would have to vie for scarce resources.[65]

This competition for support for nascent technologies affected the tank and the airplane very differently. The airplane was inherently a dual-use technology (i.e. having both military and commercial applications). This provided enormous financial incentive both inside and outside the military to pursue aviation. Moreover, the close relationship between the civilian and military aviation sectors (reaching back as early as 1915 with the establishment of the National Advisory Committee for Aeronautics) provided benefit for both. Unlike the airplane, the tank had no obvious civilian application.[66] In an era of tight armament spending, the dual-use technology had the distinct advantage in becoming ingrained into the existing, broader societal network.

The National Defense Act (NDA) of 1920 set the stage for the key distinction between how the tank and the airplane would fit into existing U.S. Army paradigms.[67] The requirements of the NDA "engendered a constituency for the airplane within the Army…and abolished the structure that might have nurtured the tank. The future of U.S. Army aviation was in the hands of advocates; the potential of the tank was controlled by traditionalists, largely satisfied with the existing doctrines and technologies."[68] As previously discussed, innovation (i.e. change) requires the acceptance of the need for a new paradigm. Immediately after World War I, air proponents advocated a new paradigm, specifically an independent air force. This vision was one of the key elements of the cascade of changes that helped propel air innovation. The tank did not have a similarly motivated and vocal set of proponents.

The debates framing the development of tanks and airplanes demonstrate organizational choices as elements of social construction. Neither the value of the tank nor the airplane was preordained, but rather, emerged as a result of the symbiotic relationship of technology and organization that social construction predicts. Whether or not changes take root within the social construct framework may be difficult to foresee, but examining past transformative efforts will help explain why transformations succeed or fail and how the USAF will react to an environment transformed by a "defense strategy for an age of fiscal austerity."[69]

Past Transformations

The American military has already undergone at least two significant transformations since the close of the Vietnam War. In the 1970's, a successful transformation was driven by a combination of the burden of the failure in Vietnam and the fear of a looming Soviet threat.[70] In comparison, the transformation of the 1990's lacked the focused rationale for change that had given its predecessor perceived value.

The aftermath of the Vietnam War and the apparent growth of the Soviet threat provided concrete challenges to the status quo within the U.S. military in the 1970s. The trauma and constraints of the era, including the requirement to transition from a conscript force to and all-volunteer force, were sufficient to force the inherently conservative military establishment to undergo major changes.[71] In *Finding the Target: The Transformation of American Policy*, Frederick Kagan suggests that the success of these changes can be attributed to the clear and specific challenges being addressed (e.g. the failure in Vietnam and the fear of the Soviet Union), the diversity of approaches each service contributed to solving the problems, a focus on near-term technologies, and a holistic approach to military transformation.[72]

Kagan contends that redundancy and overlapping capabilities provide important flexibility to the military instrument. They represented diverse approaches that were expressions of the individual personalities and proclivities of each service, valuable expressions of each service's mask of war. These divergent approaches placed an array of capabilities at America's disposal for application in a wide range of potential futures.[73]

The successful transformation of the 1970s focused on technologies that were in advance of current capabilities, but were within grasp. Kagan terms this a "narrow sliver of technological development that is just visible at the horizon."[74] By following an aggressive, but measured approach to development, the military was able build capability without wagering excessively on any one vision of what the future might bring. It was able to create military advantage by growing strong enough to contend with current threats, yet supple enough to react to emerging dangers. Moreover, by focusing on incremental gains, emerging technologies could establish a new baseline of (what Kuhn terms) "normal science."[75] That is, new technological paradigms that could draw adherents, with those adherents in turn to lending value to the technologies in question.

The confluence of technological, intellectual, organizational, and procedural change "affected every aspect of military life and function."[76] Although not preordained, this holistic approach to military transformation created tremendous synergy that drove positive change throughout the military.[77]

The 1970s military transformation helped successfully contain, and eventually disintegrate, the Soviet Union and apparently expose a "total exhaustion of viable systematic alternatives to Western liberalism."[78] Consequently, the military

transformation of the 1990s could be interpreted as having taken place during a "strategic pause."[79] In the absence of any apparent major threat, this pause appeared to provide an opportunity to leap forward in terms of military capability. However, these circumstances left no specific problem for the military to focus its energies on and no specific impetus to ascribing value to emerging concepts.

Given this vacuum, the transformation of the 1990s can be viewed as an "intellectual and budgetary luxury."[80] Essentially, it was a solution searching for a problem. Enticed by the sort of efficiencies the business sector was achieving by taking advantage of the information boom of the 1990s, the military was asked to leap forward and create technologies and doctrines that could most efficiently incapacitate and disintegrate a highly integrated national enemy.[81] This image of the wars to come would seem to be ideally matched to the longstanding USAF narrative, but seems to have ignored the fundamental premise that war is a political activity that is undertaken by two competing entities.

Having developed an incredibly sophisticated, information-enabled force, the U.S. experienced one of the many paradoxes of strategy. That is, having postulated and prepared for a very specific future that stressed speed, simultaneity and information dominance, the U.S. has been faced with enemies who have chosen to avoid American strengths, capitalize on American weaknesses, and create a future for which the American military is ill prepared.[82] The USAF in particular has seen its relevance to the counterinsurgency efforts in Afghanistan and Iraq questioned by powerful voices.[83]

Kagan writes that "the US Strategy community of the 1990s was in general so caught up with the minutiae of technology that it lost sight of the larger purpose of war,

and therefore missed the emergence of a challenge even more important than that of technology—the challenge of designing military operations to achieve particular political objective."[84] Something of this attitude may be seen in General Tommy Franks' comment that (following the fall of the Hussein regime), "Iraq's new leadership would have to be identified on the fly, even as the military liberation was under way. Perhaps an Iraqi general would step forward, or a figure from the educated elite."[85] Although too much can be made of this single statement, it does seem to represent a surprisingly cavalier attitude when balanced against the sober and comprehensive preparations that went into planning major combat operations in Iraq. As challenges in Iraq and Afghanistan have multiplied, it has become clear that the transformation of the 1990s produced a finely crafted tool to conduct general war. However, it is also clear that "the Pentagon did not field a force designed for counterinsurgency" and that this oversight imperiled America's political aims in the region.[86]

It remains to be seen if the impact of the impending end of the Iraq and Afghanistan campaigns, and the looming budget decreases will sufficiently focus the military establishment towards a transformation of historic consequence. What is clear is that those factors will present the establishment, including the USAF, with a potentially transformative period. This period will require the USAF to carefully weigh future investments and make difficult choices. Incorporation of emerging technologies by the USAF will conform to this new reality but, as previously discussed, the investment choices the USAF makes will again be shaped not by any absolute value, but rather by the socially constructed value the service places on those investments.

USAF history is replete with examples of this dynamic. As previously alluded to, the various incarnations of USAF power have grown to include traditional airpower, ICBMs, spacepower, cyberpower and the recent addition of remotely piloted aircraft (RPAs) to the airpower stable. Much can be gleaned from these successful examples, but perhaps even more can be illustrated by examining a capability that has so far failed to take hold in the USAF, the technologies of near space.

In July 2005, *Air Force Magazine* noted "the Air Force's operating domain—frequently called the 'vertical dimension'—traditionally has been defined as that area ranging from the surface of the Earth to geosynchronous spacecraft orbits 22,000 miles up," but that a "slice of that domain has been ignored…At present, this region is a 'no man's land.'"[87] Also in 2005, the USAF Scientific Advisory Board adopted the term near space to refer to that no man's land, the region surrounding the Earth between 65,000 and 325,000 feet (ft.) in altitude.[88] The region above the troposphere (where most of Earth's turbulent weather occurs) between 65,000 and 80,000 ft. in particular could provide a relatively benign environment for the operation of near space vehicles.[89]

Currently, the near space region is not being used to support military operations on a large scale. A body of literature, along with limited tests and demonstrations, has emerged suggesting that near space technologies could play an important role in meeting current warfighter requirements. Nevertheless, the near space concept has not permanently captured the imagination of key USAF decision-makers nor the institutional investment required to capitalize on the concept. Although many of the underlying principles supporting near space operations are well-rooted in the air and space experience, near space concepts have struggled to develop the organizational

momentum necessary to add a potentially important new set of options to the joint warfighting toolkit.

The Near Space Example

The near space concept does not fall within the traditional strategic attack framework the USAF defaults to, nor has sufficient external pressure required the USAF to adapt to near space as a viable technology (unlike the persistent pressure that has pushed RPAs forward). As a matter of social construction, the near space concept falls into a seam between the values of the USAF at large and those of one of its major subcultures (and presumed champion of near space) as embodied in Air Force Space Command. It should therefore come as little surprise that no organization has stepped forward to provide lasting advocacy for the near space concept. As then Chief of Staff of the Air Force General John P. Jumper noted in 2005, "near-space has been a cultural blind spot."[90]

Near space does not fit neatly into the USAF's self-image. It does not promise decisive action through strategic attack. Although near space craft may be sophisticated technological marvels, they may also be the sort of simple, rugged, lighter-than-air vehicles that have been "derided, often wildly misunderstood and largely ignored"[91] for well over fifty years. As General Jumper commented in 2005 regarding near space technologies, they "tend to be these lighter-than-air things that are not very appealing…You never go to an air show to go watch a balloon performance." [92] He went on to say, "they don't put on a very good acrobatic show and it's just not very cool."[93] To the broader USAF, near space may be more analogous to traditional space than to traditional air, finally prompting General Jumper to comment: "What if we gave it to the

space guys?"[94] From the perspective of Air Force Space Command, however, near space has presented a discontinuity with its own organization perception.

Air Force Space Command represents a distinct sub-culture within the USAF. It perceives itself as participating in the continuing struggle to achieve command of the medium of space as a location, rather than providing a new, independent and decisive instrument of war.[95] The command may have adopted this locational focus in response to the fact that space capabilities do not fit easily into the strategic attack narrative. Additionally, the relationship to technology that the "love of flying machines and flight" [96] represents in the traditional USAF flying community does not necessarily have an analog in the space community.

The unique value of Air Force Space Command is inexorably linked to the uniqueness of the space environment and its perceived distinctions from all other mediums of warfare. This unique place within the USAF and the broader defense community could become less prominent if the organization's focus were allowed to shift from the location of space to the provision of space-like services from somewhere other than space itself (such as near space).

Nevertheless, by July 2005, the near space concept had achieved sufficient momentum for General Lance Lord (then Commander of Air Force Space Command) to recommend to the Chief of Staff of the Air Force that the service propose to the Chairman of the Joint Chiefs of Staff that the USAF "be named the lead DoD agent for all DoD systems that will operate in the Near Space region."[97] General Lord fell short of volunteering his command for the leading role in near space within the USAF, but that position was implicit. Less than two months later, the Chief of Staff of the Air Force (the

position having transferred from General Jumper to General Michael T. Moseley in the interim) delivered a memorandum to the Chairman of the Joint Chiefs of Staff (USAF General Richard B. Myers) recommending that the USAF in fact "be appointed lead agency for DoD Near Space activities."[98]

In early 2006, an Air Force Space Command Directorate of Plans and Programs memorandum bluntly stated: "On 10 Feb 06, General Lord reaffirmed in a meeting with Command leadership that exploiting the near space region is a key Air Force Space Command responsibility," and went on to request the Space and Missile Systems Center "establish a program office to research, develop, and acquire near space military space systems."[99] Schein's organizational culture pyramid model would suggest that Air Force Space Command's openly espoused organizational values were growing to embrace the near space concept and that appropriate artifacts (creation of dedicated organizations, specified funding, etc.) were becoming a reality. However, the command's fundamental perception of itself, deeply rooted in largely-unquestioned basic assumptions, was reasserted following a changing of the guard in senior leadership positions. This period provided the command an opportunity to completely reevaluate its position towards the near space concept.

The Space and Missile Systems Center's response to Air Force Space Command's request to establish a near space program office read (in part):

> The nature of this acquisition requires detailed experience in development of airframes intended to navigate, loiter, and operate at high altitudes within the atmosphere. This work is outside the core competencies of SMC [Space and Missile Systems Center]. Considering the competitive demand on the Center's organic acquisition talent, it isn't prudent to take away from *space development activities* to support work that other Air Force organizations are well suited for.[100] (emphasis added)

The operative phrase in this passage is “space development activities.” There was no question that the effort was worthwhile, it simply was not part of the Space and Missile Systems Center’s portfolio. The center saw itself then, and continues to see itself now, as developing and delivering services only through the medium of space.

This Space and Missile Center memorandum was followed by another telling message, this one communicating the 14th Air Force (the Numbered Air Force tasked will all USAF space operations) commander’s reservations:

> I am concerned about our command overselling the utility of Near-Space effects. AFRL [Air Force Research Laboratory] has done a very good study which produced some interesting conclusions on Near Space…The value of balloons operating at 80,000 feet or so is very questionable when you consider potential threat, military utility and cost. The AFRL study did a nice job of looking at the problem from all angles. I believe if we look at their work objectively, we would conclude that *Near Space should not be a high priority effort for us*…In a resource constrained environment, this effort siphons off precious funds that I believe could be better used elsewhere.[101] (emphasis added)

The preceding two memoranda marked a dramatic change of fortune for the near space concept’s development within Air Force Space Command. By January 2007, Air Force Space Command began to transfer responsibility for the Global Observer program (envisioned as a hydrogen powered RPA operating at mission altitudes from 55,000-65,000 ft. for durations of 5-7 days) to Air Combat Command, and potentially shift the entire near space concept to that command.[102] Finally, by 2007 the USAF had moved away from the term near space towards the term high-altitude operations.[103] Although discussion of near space/high-altitude operations applications emerge from time to time (and defense manufacturers continue to attempt to carve out a niche for the concept),[104] it appears that neither the USAF nor Air Force Space Command find sufficient value in the concept to dislodge accepted technologies. Near space remains

out of step with the traditional USAF value of strategic attack and the locational focus of Air Force Space Command and it lacks sufficient cache to break through the social construction barriers that stop it from finding a place in the service.

Today's Challenge

On October 24th, 2011 Secretary of Defense Leon Panetta addressed a Town Hall Meeting of U.S. military and Japanese Defense Force personnel at Yakota Air Base, Japan. His comments included the following sentiments:

> Today, we are at a turning point after a decade of war. We've got to continue to deal with turmoil in the Middle East…, but we have the opportunity now to be able to focus on those challenges, provide an American military that is capable, that's agile, that's flexible and that can respond to those threats.
>
> …most importantly, we have the opportunity to strengthen our presence in the Pacific. And we will. This is an important region. Security of the world in many ways is dependent on the security of the Pacific. And so we will continue to do that.
>
> I bring a very important message to Japan and to this region, and the basic message is that the United States, as a Pacific nation, is and will remain a Pacific power in this region. We will always maintain a strong presence in the Pacific, and we will be a force for peace and prosperity in the Pacific region.[105]

Less than a month later, in remarks to the Australian Parliament, President Barrack Obama reemphasized American interests in the region, in part remarking:

> After a decade in which we fought two wars that cost us dearly, in blood and treasure, the United States is turning our attention to the vast potential of the Asia-Pacific region...the tide of war is receding, and America is looking ahead to the future that we must build.
>
> As President, I have, therefore, made a deliberate and strategic decision—as a Pacific nation, the United States will play a larger and long-term role in shaping this region and its future, by upholding core principles and in close partnership with our allies and friends.
>
> ...As the United States puts our fiscal house in order [and] as we end today's wars, I have directed my national security team to make our

> presence and mission in the Asia-Pacific a top priority. As a result, reductions in US defense spending will not—I repeat, will not—come at the expense of the Asia-Pacific.[106]

This increased focus on the Asia-Pacific region, coupled with decreasing American defense budgets, has helped set the stage for potentially sweeping changes in DoD missions. How might the USAF react to this transformative period? Based on organizational culture and established patterns, the USAF could turn to traditional themes and familiar technologies in the service of strategic attack doctrine. However, several important publications suggest that the USAF is undergoing a cultural renaissance that is challenging the traditional conception of independent and decisive air operations and expanding the USAF self-image to wider horizons.[107]

The recently published *USAF Strategic Environmental Assessment* (supporting strategic planning for the years 2010 through 2030) proposes:

> Key future global and international relations trends associated with globalization, natural resources, demographics, information technology, shifting balances of power, and key regional developments are expected to impact [USAF] strategic planning over the next 20 years.[108]

This new reality is driving the USAF to shift emphasis from previous norms of strategic attack and towards a more nuanced set of demands on the nation's air, space, and cyberspace forces. USAF strategic planners are reminded to consider:

> Potential future adversaries, including many non-state actors, are gaining the ability to challenge US military power in various ways. Instability is increasing in many areas of the world significant to US interests. In addition, the demand for certain types of operations—especially those associated with irregular warfare, humanitarian operations, special operations, information gathering, and urban operations—will likely increase.[109]

This vision of the future does not strictly adhere to the traditional focus of the USAF. As the USAF budget proposal to the U.S. House of Representatives Committee

on Armed Services for the fiscal year 2012 suggests, a broader view of the USAF mission to "fly, fight and win…in air, space and cyberspace"[110] is required. That view demands emphasis on global vigilance (the ability to provide surveillance around the world), global reach (the ability to project capability anywhere on the globe), and global power (the ability to hold any target on the globe at risk), all of which are now at the core of the USAF's vision of itself.[111]

This message is not only being communicate up towards the Congress, but down to the rank and file of the service itself. The Chief of Staff of the Air Force (CSAF), General Norton Schwartz, communicated this message directly to the force in his July 2011 Vector (a mechanism the CSAF uses to relay key intellectual and doctrinal issues to the entire force), in which he stated:

> While we conduct many missions, there are four unique Air Force contributions that define us—gaining control of air, space, and cyberspace; holding targets at risk around the world; providing intelligence, surveillance, and reconnaissance (ISR); and rapidly transporting people and equipment across the globe.[112]

This sentiment reflects a general shift in USAF thought. In the 2011 USAF Doctrine Document 1 (AFDD-1) (the foundational doctrine document for the service), strategic attack has been relegated to a position as one of three subordinate elements of global precision attack (which is itself one of the twelve core functions of the USAF).[113] This can be compared to the 2003 AFDD-1, wherein strategic attack was listed as the first of 17 operational functions of air and space power (the terminology of core functions not yet having come into vogue).[114] Even more pointedly, the 2003 version discusses strategic attack at some length, going so far as to state:

> Understanding strategic attack is critically important to future joint operations. Air and space power is inherently a strategic force and an offensive weapon. Unlike other forms of military power, air and space

> power may simultaneously hold all of an enemy's instruments of power at risk—military, economic, and diplomatic…Strategic attack, as envisioned today, is more than just a function—it is also a different approach for thinking about war. It is the manifestation of the airman's perspective: thinking about defeating the enemy as a system.[115]

By comparison, the 2011 version shares a very different vision of what the USAF can contribute to national defense:

> The evolution of contemporary airpower stems from the Airman's original vision of combat from a distance, bypassing the force-on-force clash of surface combat. Originally manifest in long-range aircraft delivering kinetic weapons, airpower has evolved over time to include many long-range supporting capabilities, notably the conduct of networked information-related operations. This evolution has accelerated as Airmen conduct a greater percentage of operations not just over-the-horizon but globally, expanding operations first through space and now also in cyberspace. Just as airpower grew from its initial use as an adjunct to surface operations, space and cyberspace have likewise grown from their original manifestations as supporting capabilities into warfighting arenas in their own right.[116]

Intellectually, it appears the USAF has reached a tipping point with regard to its traditional self-image. The service appears to be at the beginning of a process of accepting a broader emphasis on technology in air, space, and cyberspace rather than maintaining the traditional focus on air (and specifically, the mission of strategic attack). Although it remains to be seen whether or not this refocusing will coalesce into a seamless web of technology within the USAF society and shape the basic assumptions and values of the USAF, it should be noted that AFDD-1 has already redefined the most basic USAF concept of airpower: "Airpower is the ability to project military power or influence through the control and exploitation of *air, space, and cyberspace* [emphasis added] to achieve strategic, operational, or tactical objectives."[117]

The looming end of operations in Iran and Afghanistan, imminent budgetary downturns, and an increased emphasis on the Asia-Pacific region are all applying

pressure to the USAF culture. That culture, as a set of shared assumptions made up of visible artifacts, espoused values and (at the deepest level) basic assumptions, has traditionally been linked to flight and the technologies of flight and has been implemented through a central belief in the doctrine of strategic attack.

That belief has remained consistent from the dawn of military aviation, through the tumultuous period of the world wars and into the wars of the early twenty-first century. Nevertheless, throughout this history important technological innovations have emerged and given rise to new capabilities and opportunities, but these technologies have been far from universally accepted. Rather, each has been a participant in a symbiotic relationship between the technology and the society and organization it may serve. Each is tested and assigned value in a social construct that is acceptable to the organization in question. This particular manifestation of organizational culture has, on occasion, led to otherwise promising technologies to be cast aside.

Nevertheless, transformative periods in the past have allowed sufficient impetus to develop around technologies and processes within the USAF such that their value cannot be denied and they emerge as a new, accepted standard. Current USAF thought, as shared by the CSAF and codified in new USAF doctrine, suggests that the service is embroiled in an important shift in emphasis and is establishing a new set of basic assumptions for the air, space, and cyberspace force. It remains to be seen how deep these changes will go and how effective the force that emerges will be in contending with the strategic challenges of the twenty-first century.

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[87] Hampton Stephens, “Near-Space,” *Air Force Magazine* 88, no. 7 (July 2005): 37.

[88] U.S. Department of the Air Force, United States Air Force Scientific Advisory Board, *Persistence at Near Space Altitudes*, USAFSAB Report SAB-TR-05-06 (Washington, DC: Department of the Air Force, August 2005), iii.

[89] The near space region is subject to a unique combination of environmental factors that distinguish it from other elements of the vertical dimension (i.e. space and air). Spacecraft (specifically, Earth satellites) are ruled largely by the dictates of gravitational forces and elliptical motion, having escaped the effects of Earth's atmosphere. Conversely, the behavior of aircraft (below 65,000 ft.) is dictated by the familiar atmospheric forces of thrust, weight, drag, and lift. These two realms of operation can be characterized as the "Keplerian" space region (named in honor of the 17th century German astronomer Johannes Kepler) and the "Bernoulian" air region (named in honor of the 18th century Dutch-Swiss mathematician Daniel Bernoulli) the vertical dimension. Although operating at the upper reaches of the atmosphere, near space flight is bound by Bernoulian principles. The role of air density and winds are of particular interest when establishing a baseline understanding of near space.

Over the course of several years it has become de rigueur in certain circles to label the space specialists within the USAF as Keplerians and air specialists as Bernoulians. These terms may seem overly simplistic, but they succinctly capture an important facet of each community's self-image. A fuller discussion of this dynamic may be found in Kevin Rhoades' *Bernoulians versus Keplerians: Is US Airpower Doctrine Good Enough for the Employment of Space Forces?* (Maxwell AFB, AL: School of Advance Air and Space Power, 2004).

[90] Edward B. Tomme, *The Paradigm Shift to Effects-Based Space: Near Space as a Combat Space Effects Enabler*, CADRE Research Paper 2005-01 (Maxwell AFB, AL: Air University Press, 2005), iii.

[91] Michael Woodgerd, "Mobilus Initiative: Airships as a New Aerospace Industry Segment," *Department of Defense Office of Force Transformation: Trends,* July 22, 2004, 1.

[92] Stephens, *Near-Space*, 38.

[93] Ibid.

[94] Gen John P. Jumper, "Chief of Staff of the Air Force Address," speech, Command, Control, Communications, and Computers/Intelligence Surveillance and Reconnaissance Summit, Danbury, MA, October 27, 2004.

[95] Builder, *Masks of War*, 27, 68.

[96] Ibid, 32.

[97] Gen Lance W. Lord, Commander, Air Force Space Command, to Gen John P. Jumper, Chief of Staff of the Air Force, memorandum, July 15, 2005.

[98] Gen Michael T. Moseley, Chief of Staff of the Air Force, to Gen Richard B. Myers, Chairman of the Joint Chiefs of Staff, memorandum, September 8, 2005.

[99] Maj Gen Mark D. Shackelford, Director of Plans and Programs, Air Force Space Command, to Brig Gen William N. McCasland, Vice Commander, Space and Missile Systems Center, memorandum, February 27, 2006.

[100] Brig Gen William N. McCasland, Vice Commander, Space and Missile Systems Center, to Maj Gen Mark D. Shackelford, Director of Plans and Programs, Air Force Space Command, memorandum, April 28, 2006.

[101] Maj Gen William L. Shelton, Commander, 14th Air Force, to Gen Lance W. Lord, Commander, Air Force Space Command, memorandum, May 8, 2006.

[102] Peter LaFranchi, "US Special Forces to Test AeroVironment Global Observer," *Flight Daily News*, January 29, 2007, http://www.flightglobal.com/articles/2007/01/29/ 211775/us-special-forces-to-test-aerovironemnt-global-observer.html (accessed October 15, 2011).

A mission altitude of 55,000-65,000 ft would place Global Observer just below the commonly accepted altitude range for near-space operations. Final operational parameters for the Global Observer had not been established in 2007, but from its inception it has been considered among the family of possible near-space technologies.

[103] It should be noted that in September 2005, Gen Michael T. Moseley assumed the position of Chief of Staff of the Air Force. In June 2006, Gen Kevin P. Chilton assumed command of Air Force Space Command. Gone from the scene were Generals Jumper and Lord, the most vocal proponents of the near-space/high-altitude concept and Air Force Space Command's responsibility for it.

[104] 95th Air Base Wing Public Affairs Office, "Global Observer Makes First Hydrogen-Powered Flight," January 12, 2011, linked from the United States Air Force Page at "News," http://www.af.mil/news/story.asp?id=123238084 (accessed November 25, 2011).

[105] Leon Panetta, "Remarks to Town Hall Meeting," speech, Yakota Air Base, Japan, October 24, 2011, http://www.defense.gov/transcripts/transcript.aspx?transcriptid=4911 (accessed November 15, 2011).

[106] Barrack Obama, "Remarks to Australian Parliament," speech, Parliament House Canberra, Australia, November 17, 2011, http://www.whitehouse.gov/the-press-office/ 2011/11/17/remarks-president-obama-australian-parliament (accessed November 23, 2011).

[107] Builder, *Masks of War*, 136-137.

[108] U.S. Department of the Air Force, Directorate of Strategic Planning, Headquarters, United States Air Force, *US Air Force Strategic Environment Assessment (2010-2030),* (Washington DC: U.S. Department of the Air Force, March 11, 2011), iv. The document goes on to state: "The Globalization's numerous positive and negative impacts on global politics, economics, demographics, and technology access are expected to continue over the same period. Unless a breakthrough occurs in renewable energy or fossil fuel resource availability, fossil fuel prices are expected to rise significantly as rising global demand will outpace supply. The distribution of food and water supplies is expected to become more uneven. Aging populations in much of the industrialized world are threatening sustainable economic growth in terms of shrinking labor forces and the rising costs of caring for aging citizens. Rapidly growing populations in much of the developing world are outpacing job creation and overwhelming basic services. International migration is increasing as more people move to find economic opportunity and basic services. Many expect greater gains over the next twenty years than occurred in the entire 20th Century in terms of the volume, exchange, and access to

information. While the United States is expected to remain the single largest military power in the world, many nations—especially China and India—are rapidly building capability, leading towards a shift in the balance of power, a more multi-polar world, and potentially adverse changes to traditional alliances and partnerships.

[109] Ibid.

[110] U.S. Department of the Air Force, "USAF Mission," linked from the United States Air Force Page at "Our Mission," http://airforce.com/learn-about/our-mission (accessed November 25, 2011).

[111] U.S. Department of the Air Force, *Posture Statement, 1, 2, 29.*

[112] Gen Norton A. Schwartz, "Chief of Staff of the Air Force Vector," July 4, 2011.

[113] U.S. Department of the Air Force, *Air Force Basic Doctrine*, Air Force Doctrine Document 1 (Washington DC: U.S. Department of the Air Force, October 14, 2011), 48. A complete list of the USAF core functions is: nuclear deterrence operations, air superiority, space superiority, cyberspace superiority, command and control, global integrated intelligence, surveillance, and reconnaissance, global precision attack, special operations, rapid global mobility, personnel recovery, agile combat support, and building partnerships.

[114] U.S. Department of the Air Force, *Air Force Basic Doctrine (2003)*, 40.

[115] Ibid, 41.

[116] U.S. Department of the Air Force, *Air Force Basic Doctrine (2011)*, 13.

[117] Ibid, 11.