No. 4
April 2016

The Mitchell Forum

Domain Control for Cross-Domain Effect: Defining the Central Purpose of the US Air Force

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About the Forum

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Abstract

In an era of fiscal austerity, great power competition, and non-state threats, the US Air Force must pursue a clear and consistent narrative to articulate its priorities and value to the nation. To reveal the purpose of the USAF the author explores a theory of "domain control" to illuminate the role of the service and its fundamental purpose: to gain then exploit advantage in air, space, and cyberspace in pursuit of US national security interests. Domain control, for cross domain effect, is the Air Force's very reason for being.

With this understood, the theory of domain control forms a useful lens to describe the shifting priorities of the Air Force over the last 25 years, and highlights a fundamental assumption of the American way of war—the ubiquitous access to information through networked technology.

This paper also highlights that the era of US dominance in air, space, and cyberspace is over, and that strategic competition is the "new normal" for the current generation of airmen. Finally, to advocate for a potential strategic opportunity to offset adversarial gains, this paper explores the concept of "multi domain operations," realized in Desert Storm but never articulated as such, as a cornerstone of any future USAF campaign, and as a potential "third offset" strategy for the Department of Defense.

A Call for Clarity

In any form of strategic endeavor, there is a problem to solve, and a clearly articulated statement of that problem is essential. Without a firm grasp of the problem, one is simply presented with noise and left grasping for activity without purpose. At the heart of strategic design, therefore, is clearly articulating the overarching purpose of an organization in order to focus and prioritize resources and structure. For Airmen, this is a challenging endeavor. The very flexibility that is airpower's greatest asset creates diversity in missions and roles for an air force that masks its core purpose. Because articulating this purpose is challenging, Airmen should redouble efforts to do so concisely.

In light of current strategic threats to US security interests, as laid out in the Obama Administration's 2015 National Security Strategy, reconsidering the US Air Force's purpose is essential. The era of strategic monopoly in the air—an anomaly held for the last 25 years that enabled a generation of Airmen to focus almost exclusively on cross-domain force application in support of land warfare—is coming to an end. As the Air Force no longer holds unchallenged power in air and space, and as the joint force has become so dependent upon both cyber access and leveraging cross-domain advantages, a purpose founded upon a presumption of strategic monopoly will lead to strategic failure. The Air Force must now articulate an operating concept reflecting the loss of monopoly in the air domain, but also addressing the interplay of the multiple competitive domains of air, space, and cyberspace.

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The Air Force's purpose must be to gain, then exploit, advantage in air, space, and cyberspace in pursuit of US national security interests. All power is ultimately projected onto the land against an adversary's capability and will, and air and space superiority is a means to that end. Without that superiority, the nation will be unable to apply its influence. Indeed, air and space—and cyberspace—are the keys to securing access. Similarly, when a footprint is established, the Air Force trinity of air, space, and cyberspace is now central to the prevailing American way of war.

To develop this thesis, this paper will explore the warfighting domains and, borrowing the methodology of political scientist Samuel P. Huntington, deduce a purpose statement for the Air Force. It will then explore the implications of operations in the cyber and space domains, and highlight how, in delivering a credible conventional deterrent to counter the Soviet Union, advanced platforms masked the true value of networked information in war. Finally, to move beyond a simple theoretical and historical construct, this paper will advocate an operational concept, based upon a theory of "domain control" in the information age, to deliver continued competitive advantage for the Air Force and the United States.

Articulating the Problem

Samuel Huntington, as the pre-eminent American political scientist of his generation, shaped academic debate through his thinking on civil-military relations and service behavior for much of the Cold War. Before writing his 1957 landmark *The Soldier and The State*, in 1954 he published a provocative article, *National Policy and the Transoceanic Navy*, which has resonance for today's Air Force. To articulate changes in the US Navy's central purpose over time, Huntington expressed the central challenge a service must address in a simple question: "What function do you perform which obligates society to assume responsibility for your maintenance?"[1]

To secure the resources necessary to organize, train, and equip the forces that it holds at readiness to fight a nation's wars, a military service must clearly articulate a purpose that meets a national strategic need. Unfortunately, the current Air Force suite of strategic documents lacks the statement of purpose, in clear and simple language, that provides the organization with the clarity needed to advance its concepts and doctrine. Department of Defense (DOD) instructions and public law lay out clearly *what* the services must do, but they are designed for internal planning purposes; they do not advocate *why* the Air Force should undertake these tasks, nor do

they explain its value to the nation. For this reason, Air Force strategic documents tend to rewrite fundamental tenets with each change of leadership, leaving Airmen and the public confused about the role the Air Force plays in national defense.

Without a central idea to guide its thinking, the Air Force is left with a broad array of slogans and statements that do not hone Airmen's ability to resolve the service's core problem. Without this clarity, Airmen take diverging paths to achieve the service's strategic ends and are, at best, inefficient. More likely, in a climate of rising strategic competition, this divergence in purpose may lead to the presentation of a force ill-suited to its task and, potentially, failure in battle. Good strategy requires a clear articulation of purpose. Service leadership must provide the clarity necessary to enable the conceptual and physical generation of an Air Force that the United States deserves.

Toward a Theory of Domain Control

Theories of control and dominance are common for those familiar with military thinking. The creation of an independent US Air Force in 1947 was in some ways recognition of the need to husband combat prowess around the three physical warfighting domains of air, land, and sea. The purpose of each service, articulated in differing language, was explicit: to contest its own respective domain for military advantage. Critically, the end of all activity, in all domains, is common: to influence the decision making of an adversary through the threat or application of military force. The contest may take place in any domain, but its effect must be in diminishing the political will and capability of an adversary. As man is a terrestrial animal, the adversary must ultimately feel the impact on land.

With military services established to contest physical domains, it is logical that a service's central operating concept should change as the degree of competition within its domain evolves. The concept must reflect evolving geostrategic conditions and the military balance of power. Figure 1 provides a mechanism to explore the relationship among and within the warfighting domains. Each colored circle represents military operations within that domain, with the aim being to establish a suitable degree of dominance in each domain to conduct military operations under favorable conditions. The graphic indicates that operations solely within a discrete domain are designed specifically to contest that domain to seek superiority. For example, in Alfred Thayer Mahan's theory of command of the sea,[2] or in air-to-air combat, a contest for control of that domain takes place from within that domain.

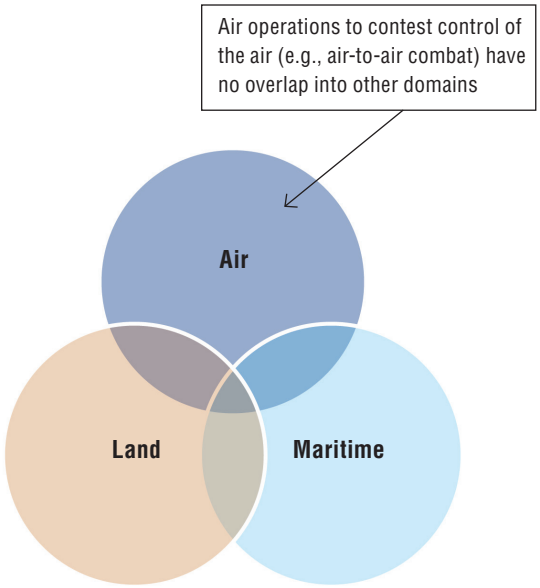

Figure 1: Competition within domains

Where the circles overlap, operations within one domain are leveraged against another. For example, as in Figure 2, where air and land circles overlap, US Army air defense batteries contribute to dominance in the air domain. Conversely, in the air-land overlap, Air Force airborne intelligence, surveillance, and reconnaissance (ISR) assets may directly support the ground commander to achieve advantage in the land domain. In either example, the overlap denotes the services leveraging operations in one domain to create advantage in another.

It is logical that domain-focused military services will seek to control capabilities that confer competitive advantage within their assigned domain. However, military services also seek organic capabilities to influence or negate cross-domain threats to their operations. For example, where elements in the land domain can contest the air do-

main—such as a ground force's ability to threaten enemy airfields or engage aircraft through the use of long range surface-to-air missiles (SAMs)—it is logical that an air force would seek to possess organic force protection components or a suppression of enemy air defense capability. Similarly, in the maritime domain, where aircraft can target the adversary's fleet, or shore-based radars might illuminate surface ships, a navy will develop tailored organic capabilities to negate an adversary's cross-domain advantage.

It is critical to note that cross-domain effects can only deny access to a portion of another domain. As the earlier example of the Army air defense batteries shows, cross-domain activity can contest, but not exploit the advantages of another domain. To control and then exploit the advantage of a domain, one has to be in it. Indeed, the prevalence of anti-access strategies in Europe, the Middle East, and the Pacific is an attempt by strategic competitors to dissuade USAF exploitation of its asymmetric advantage: control of the air domain.

To maintain their freedom of maneuver and flexibility in decision-making, domain-oriented services will seek to leverage the advantage that another domain offers without having to rely upon a sister service. This addresses the perennial question of why the United States has multiple air forces: the land and maritime services seek organic air capabilities to secure the advantages of airpower to achieve primacy in their domains. The purpose of these organic forces highlights the difference between the Air Force and other air arms: Army and naval aviation's purpose is to leverage the air domain in the land or sea battle. The Air Force, however, is the service charged primarily to contest the air domain.

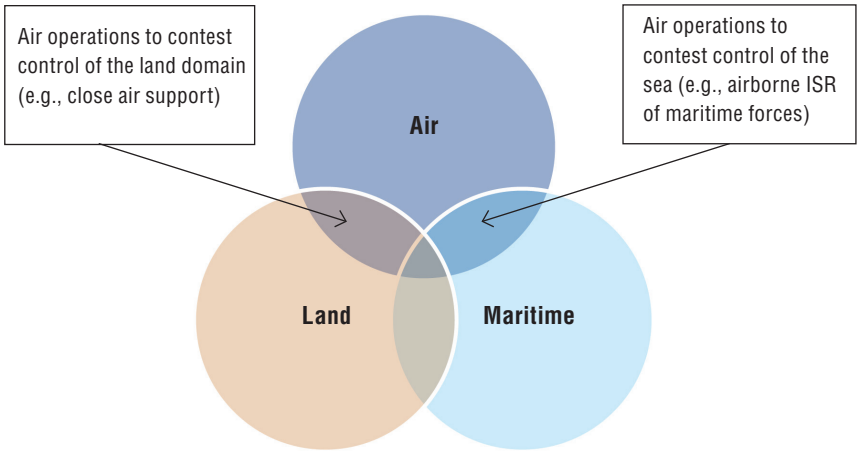

Figure 2: Competition across domains

Contesting Domains

The goal of all military activity is to change the calculus of an adversary. In the vast majority of situations, this will entail a contest over control of the land domain. Without this threat, or the complete devastation of a country, a polity can still maintain control of its population. That said, this observation does not necessitate the presence of a large army of occupation nor negates the importance of the air and maritime domains in offering decisive advantage to conflict resolution. The contention that all military power is ultimately about land power recognizes that the air and maritime domains offer significant opportunities to outmaneuver an adversary and seek contact at a time and place of advantage.

States may fight wars in the air, but the air battle is only a means to an end. The ultimate goal is to establish the required degree of control to bring to bear the advantages of the air domain against an adversary's will and capability to resist on land. The decisive event may take place on land, but might have support from the air or originate there. Since the end goal of military power is to force change in the calculus of an adversary, the ways and means to achieve this against a determined foe necessitates contests in all domains.

To subordinate the air and maritime domains to land is to cede advantage in those critical domains to an adversary. As British Field Marshal Bernard L. Montgomery noted during World War II, "If we lose the war in the air, we lose the war and lose it quickly." Montgomery recognized that while forces on land may decide the contest, the battle for control of the air will fundamentally shape its scale and nature. Rather than seeing the air or maritime domains as supporting, and merely substituting for land power, a more complete appreciation of cross-domain leverage recognizes that it augments or amplifies the capability of the land force already in place.

In an environment where a domain is contested, such as in the skies during World War II's Battle of Britain, a service must frame its operating concept around domain superiority. To do otherwise is to invite defeat. The civil-military question Huntington would pose is: "What function do you perform that obligates society to assume responsibility for your maintenance?" The answer is, a military service's very reason for being is to achieve dominance in its given domain in time of war. If it does not have the freedom to maneuver within its own domain, then the service has ceded the initiative and must allocate precious resources to defense rather than offensive action.

However, when a service holds a monopoly of control in its own domain, as the US Navy enjoyed post-1945, that service must adapt its central operating concept to perform a demonstrable, vital function across domains. Failure to do so is to invite obsolescence. The United States faced a Cold War adversary in the Soviet Union that had a limited deep-water navy, but recognized the necessity to project power onto the Eurasian land mass. Thus, the Navy had to alter its strategic concept. Confident that it had assured command of the sea, the Navy reoriented maritime power, including naval aviation, to support a fight for the land domain. Since all military power must ultimately bring about a change on land, it is logical to prioritize resources to the nation's strategic ends and not divert them to needless single-service expenditures if domain control is already in hand.

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Accordingly, in the air and at sea, the primary task of a service is to establish sufficient domain control and then bring all available resources to bear against the adversary from all domains. For the Navy after 1945, its sphere of activity changed. A portion of the Navy remained devoted to maintaining command of the sea, but the maritime service's primary emphasis shifted to bringing military power to bear ashore. The development of the carrier strike group concept and cruise missile-equipped submarines and ships was the manifestation of the Navy's altered purpose. This insight should heavily inform appreciation of the Air Force's current predicament.

Competition as the Norm

The Navy's experience is not merely of historical interest, but is also of direct relevance to the Air Force today. A generation of Americans has grown up in an unprecedented era of monopoly. The collapse of the Soviet Union and end of the Cold War left the United States in an artificial and temporary position of advantage on the world stage, and presented a series of false lessons for today's strategists and security practitioners. Americans came to expect the advantage afforded by this unipolar moment, when it was, in fact, an aberration.

A more historically representative model is a cycle of competitive advantage. The story of the sword and shield is timeless: a perceived advantage will not last against a determined adversary. In any competition, an adversary will attempt to negate an advantage that its opponent gains, either directly or by attempting to alter the way the contest is conducted.

For this reason, the Cold War was less static than many describe. In avoiding thermonuclear war, both sides sought to find chinks in their adversary's armor to deter offensive action, while shoring up any perceived weakness of their own that might invite attack. By fighting wars with limited political aims, and through proxies, the United States and Soviet Union were able to manage their strategic competition without clashing directly. Similarly, the United States' "second offset strategy," was an attempt to counter Soviet numerical advantage in Europe in the mid-1970s through advances in technology and doctrine. Since the Soviet scheme was to send waves of massed armor through West Germany, if direct confrontation ever occurred, NATO and US planners faced a significant overmatch that necessitated an asymmetric approach.

The NATO allies sought emergent technologies, combined with a novel doctrine designed to outflank Soviet mass. The development of battle networks, or the Soviet-termed "reconnaissance-strike complex," relied upon an advantage in information technology (IT), along with sensors that could find targets at depth and enable preci-

sion strikes against them with standoff munitions. To negate the Soviet advantage, the aim was to achieve the type of military effect with conventional weapons that was previously possible only with tactical nuclear weapons.[3] A more detailed appreciation of the adversary's disposition, together with effective command and control (C2), would allow air and land components to possess the information to maneuver to a point of advantage and achieve decisive effects. What developed into the AirLand Battle concept in the 1980s was the doctrinal articulation of this NATO plan to counter Soviet mass with decisive maneuver and firepower.

Information Age War

The advent of a US-led reconnaissance-strike complex relied upon its advances in space and in miniaturizing IT devices. Although the Soviet Union's *Sputnik* spacecraft in 1957 became the first manmade body to orbit the Earth, it set the precedent for unhindered national overflight in space that the United States subsequently capitalized upon. The Outer Space Treaty of 1967 effectively established space as a sanctuary from militarization, enabling the expansion of space-based military force enhancement capabilities, absent the threat of targeting by an adversary.

In parallel with a network of space-based information technology, the Advanced Research Projects Agency Network (ARPANET), and defense IT infrastructures began to proliferate around the globe, with ARPANET becoming the technical foundation of the Internet. Cyberspace networks of interdependent IT proliferated in civil and defense enterprises and became central to the ability to find targets, fix on them (i.e., positively identify to engage), and command. Networked information technology enabled the western allies to see farther than their adversary, share situational awareness more rapidly, and make decisions more swiftly. This led to a qualitative military advantage for NATO over Soviet bloc forces. What NATO lacked in mass, it gained in maneuver. The Alliance could leverage its space and cyber advantage into the land, air, and sea domains to achieve an amplifying effect. The proliferation of potent hardware allowed for seductively masking space and cyber capability, albeit unwittingly.

A central element of elegant design is that it conceals a product's true constituent components from the user.[4] Consider the modern smartphone, a portable multimedia networked device masquerading as a telephone. The user interface is simple, and the ability to install applications on the device converts it into a transformational social tool. However, when one loses network access, the telephone becomes an expensive calculator. What smartphone design has masked is the power of its network, and the applications that leverage that connectivity.

A similar analogy is the "second offset" force where dominance in the air and land domains masked the space and IT networks that were actually the advantage in the elegant design of the American way of war. The hardware was seductive, but distracting: the power lay in interconnected networks, not individual platforms.[5]

Figure 3 offers a representative model of the warfighting domains in the information age. Significant overlap exists between them, enabling the US military to leverage the strengths of one domain into another. Interdependence, not independence, has become the hallmark of effectiveness. The synergy created enables operations at a higher tempo, at greater standoff ranges, with greater precision, and with a significantly reduced expectation of casualties. Crucially, activity in one domain does not simply substitute for activity in another. However, the United States can leverage advantage in space into the air domain to augment the air

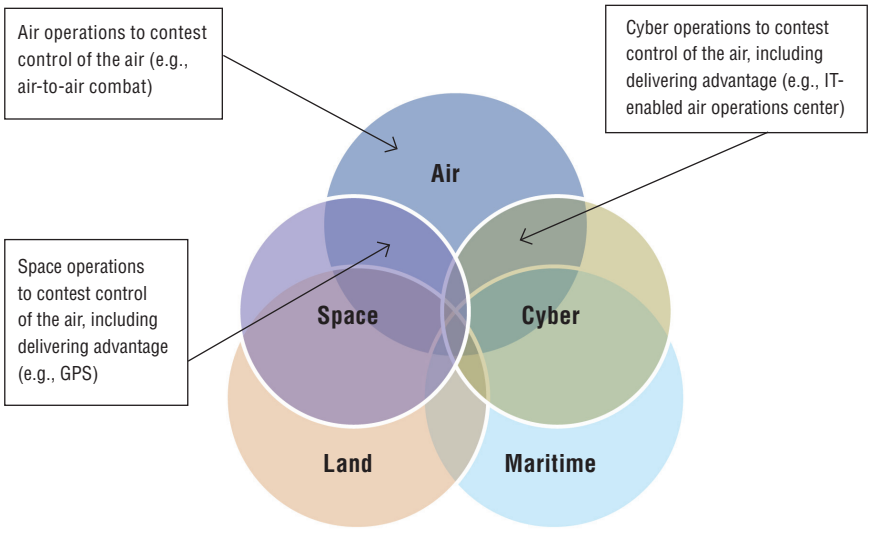

Figure 3: Air Force experience in information age conflict

competition, and amplify the capability of air forces to better their adversary. Space activity does not replace air activity wholesale. Achieving advantage in the air domain is possible by leveraging cross-domain capability; however, to exploit that advantage, one must be operating in the air domain.

Information Age War and the Air Force

The 1991 Gulf War against Saddam Hussein's Iraq afforded the opportunity to test the AirLand Battle hypothesis and proved its utility. The decimation of the Iraqi army, the fourth-largest land military in the world at the time, by an information age force validated the concepts and technology created for information age warfare. With a monopoly in space and cyberspace, the US-led coalition was able to leverage its advantage into the land, air, and maritime domains to enable high-tempo offensive operations.

In the air domain, the competition for control was short and sharp. Elements including land-based attack helicopters, maritime-launched cruise missiles, and stealth aircraft delivered a blinding attack on Iraq's C2 architecture, and coalition aircraft swept the Iraqi air force from the skies. With air superiority achieved prior to the land offensive, the coalition was able to shift its air forces' weight of effort into the land domain, with devastating effect. Victory in the conflict signaled the advent of a new American way of war.

Success begets success, and the Air Force rightly doubled down on the concepts that it validated in Iraq in 1991. The reconnaissance-strike complex advanced as information technologies became more ubiquitous and affordable. The absence of a credible air force as an adversary, along with extended participation in low-intensity conflicts in regions such as the Balkans and Africa, led the Air Force to recognize that it held effective domain monopolies in air, space, and cyberspace.

The devastating attacks of Sept. 11, 2001 jolted the West into taking the threat posed by the al Qaeda terrorist organization seriously. The United States exploited its dominance of air and space to find, fix, and finish terror cells and leaders. Operating in a permissive air environment, and with national policy and public opinion wholly wedded to the Global War on Terror (GWOT), the strategic concept guiding the Air Force became the rapid projection of American power into a complex land environment. In order to sustain operations around the globe, the Air Force was the United States' asymmetric advantage. To support the joint force, the Air Force prioritized resources to maximize effects in wide-area security campaigns. It heavily invested in ISR, precision strike, and the IT infrastructure to allow rapid information sharing and access.

With no threat in air or space, the Air Force could bring its entire weight to bear on the land-centric campaign. To win the close fight, it would prioritize cross-domain activity and forces over service-centered domain programs. The Air Force still held the role of dominating the air fight in a future war, but the nation's and joint force's immediate need was in land-centric campaigns. Critically, this demonstration of information age warfare was not an Air Force-imposed model, but rather had a strong demand signal from the joint force.

In the complex, wide-area security operations that the United States conducted, understanding the environment was key. The US military fought population-centric counterinsurgency (COIN) campaigns with a huge reliance upon overhead ISR and air mobility. This approach had significant merit in that it tested the hypothesis of the AirLand Battle doctrine again: cross-domain operations would have decisive amplifying effects. However, it also came at significant institutional cost to the Air Force.

The downsides included the diminution of the nuclear mission's importance; expenditure on immediate needs vice medium-term recapitalization, and relegation of the core mission of air and space superiority. The result was an Air Force with reduced capability, capacity, and readiness to prevail in contests for the air, space, and cyberspace domains. In the strategic environment the Air Force faced, this change in purpose was an appropriate choice. However, like most strategic decisions, service officials had yet to appreciate the second-order effects.

Newton's Third Law of Motion

In a cycle of competitive advantage, for every action, there is an opposing reaction to counter

perceived weakness. While the United States was accelerating its new way of war, its adversaries were adapting to the new reality. The proliferation of information technologies went global, and even non-state actors could exploit the benefits that US space-based military applications, such as GPS, offered. To contest the American way of war, adversaries would both emulate and deny US advances in air and space.

While the premise of the Outer Space Treaty still stands, the idea of space as a sanctuary is defunct. With the US way of war so entirely reliant upon space capabilities, the space domain is too vulnerable for an adversary to ignore. For that reason, Chinese advances in anti-satellite (ASAT) missile technology, and satellite damage through the electromagnetic spectrum, should come as no surprise in a cycle of competitive advantage. While targeting orbiting assets may have collateral effects for all players in future conflict, there is little doubt that the greatest impact would be upon any nation, such as the United States, that has to project force.

A period of monopoly has seduced the United States into thinking about conflict in the air, land, and maritime domains without recognizing the fundamental strength it has been leveraging: information advantage delivered through space and cyber operations.

For forces operating from domestic bases, developing resilient terrestrial networks significantly mitigates the difficulties of fighting a war without space assets. Indeed, as a mechanism to deter a nation from projecting force, an adversary may hold its opponent's space assets at risk. This can pose a threat to the world economy or the functioning of a society, such as the United States', due to the dual-use nature of many space assets and the United States' reliance upon products like space-based precision navigation and timing. For these reasons, space is no longer a domain in which the United States can claim to hold a monopoly or even enjoy assured access.

While the Air Force is not the executive agent for cyberspace at this time, one cannot ignore cyber as a critical domain. Interwoven into all aspects of military operations, cyber is also the backbone of national infrastructure and the world economy. The reach and coercive might that Brig Gen William "Billy" Mitchell, Italian Army Gen Giulio Douhet, and Royal Air Force Marshal Hugh M. Trenchard envisioned airpower offering is available today in cyberspace. For this reason, the advance in cyberspace capability by belligerent states potentially poses the greatest threat to the United States. Targeted cyber attacks upon critical nodes could potentially deliver effects equivalent to tactical nuclear weapons, but with a conventional type of weapon that the "second offset" force promised.[6] This time, the target could be US domestic polity and not just fielded military forces. Of all warfighting domains, cyberspace is perhaps the United States' greatest vulnerability, and the most competitive.

In the air domain, the US monopoly on stealth and fourth and fifth generation fighter aircraft has eroded. Similarly, with SAM and air-to-air missile (AAM) technologies, the cycle of comparative advantage is obvious. While the Air Force in the past has placed its faith in the next generation of technology as a qualitative advantage, the service's capability edge has waned. Compounding this, DOD's decision to halt continued production of the F-22 Raptor stealth fighter—wholly necessary to meet the short-term needs of conducting two simultaneous COIN campaigns in Afghanistan and Iraq—reprioritized pilots and financial support from the air superiority mission to tactical ISR. Whereas the Air Force formerly may have met parity in quality through quantity, that alternative is now also removed due to a significant reduction in fleet size.

Considering competition in the air, space, and cyberspace domains separately, however, fails to recognize the importance of Figure 3 and the realms' interdependence in information age war; an image of them as independent is defunct. A period of monopoly has seduced the United States into thinking about conflict in the air, land, and maritime domains without recognizing the fundamental strength it has been leveraging: information advantage delivered through space and cyber operations. To operate at a disadvantage in these domains is not to retrograde to industrial age warfare, as Gen John E. Hyten, head of Air Force Space Command, has asserted, but far worse.[7] Figure 4 illustrates that, absent advantage in space and cyberspace, the United States does not retro-

grade to industrial age war, but rather is completely denied operations in its chosen way of war: at the point where domains overlie.

Without access to GPS, or if an air and space operations center suffered a deliberate denial of service attack, the Air Force would lose capability to operate in the air. Denied this freedom to maneuver, US adversaries could leverage a significant advantage in a physical environment—theater airspace—through cyber or space action. This denial of operational freedom is an advantage the Air Force would seek for itself against a foe and it would certainly want to mitigate the chance of losing it for itself. Critically, as the Air Force is below the force size necessary to fight attritional industrial age war, and Airmen's skills to operate in an analog battlespace have atrophied, an adversary would rapidly and decisively defeat the service or deny it access to a joint operations area. While talk of a devastating cyber "Pearl Harbor" event may be hyperbole, from a military perspective, adversarial advantage in cyberspace and space, or denied access to these domains, would be catastrophic.[8]

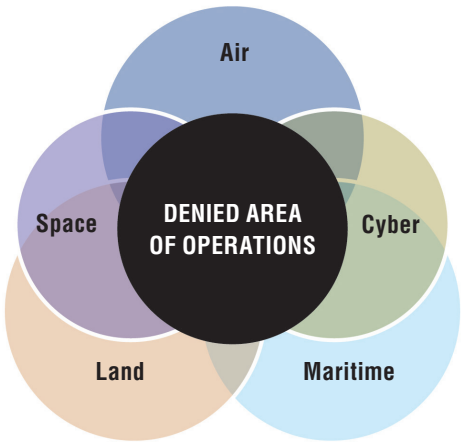

Figure 4: Implications of losing in space and cyber

It is therefore critical to recognize the primacy of information, and cyberspace and space as its conduits, in the US way of war. Air, land, and maritime operations are largely dependent upon the passage of information. To succeed in future operations against a peer means that the Air Force must establish the requisite advantage in cyber and space, geographically and temporally, in order to attain advantage in the air. Subsequently, the service can exploit advantage in air and space, and through cyberspace, to meet the demands of the joint force.

The Air Force Awakens

The success of the Air Force's reconnaissance-strike complex has changed the conduct of war. However, as the space and cyberspace warfighting domains are dual use, they have allowed for the diffusion of technological power to the civilian sector and have emboldened both state rivals and malevolent non-state actors. By lowering the bar for entry to military operations, they have significantly enhanced the lethality and reach of actors, such as the Islamic State in Iraq and Syria (ISIS) and al Qaeda, as well as offering a gray area for competition by state actors like China and Russia. The United States has set the game in which this competition takes place. The difference is that its adversaries seek to play by their own rules. To succeed in a long-term strategic competition, the United States must wrest the initiative from them and ensure that it fights the competition on terms in its favor.

Faced with the loss of monopoly in the air and space domains, the instinctive reaction would be for the US military, and therefore the Air Force, to back away from its cross-domain applications and focus upon rebuilding domain-specific superiority via platforms that contest the air domain. This challenge is perhaps manifesting itself in the debates over the future of the A-10 ground attack aircraft and recapitalization of the E-8C JSTARS ground surveillance platform, for example.

Understanding the relationship between and across domains is critical to addressing this challenge effectively. Technological advancements, adversaries' improvements, and the current US fiscal environment will prevent the Air Force from solving most domain-specific problems with domain-specific solutions. This is also precisely how US adversaries would have the United States behave, as it denudes the cross-domain leverage that is the nation's grand strategic advantage.

Indeed, domain control, for cross-domain effect, is the Air Force's reason for being. This is not new thinking; it is the articulation of the ideas contained in the Air Force Future Operating Concept

(AFFOC) document of September 2015, elevated to joint warfare. At the heart of the AFFOC is the idea of operational agility, which is defined as the ability to generate rapidly and shift among multiple solutions for a given challenge. It supposes that the service's core missions will remain foundational, but that the way in which Airmen approach domain superiority will evolve over time.

According to the document, by 2035, the term "air and space superiority" is likely to change into "adaptive domain control," in which fully integrated forces across air, space, and cyberspace team up to gain superiority at times and places of their choosing. While this is a new conceptual description, the Air Force has mastered this technique in practice in its current cross-domain action. What service officials have failed to do is recognize it for what it is: the leveraging of information superiority through space and cyberspace.

To contest the air domain in scenarios against the littoral in Europe and Asia, the Air Force must leverage the advantages of cyberspace and space into the air. Failing to contest these domains would be tantamount to denying the United States of its maneuver advantage and facing, at best, numerical parity, but against an adversary with home-field advantage. In this instance, the fight would be one of attrition, and the limited number of US high-value airborne assets and fifth generation combat airplanes would be unable to compete. Were the United States to opt to husband carefully these platforms by standing off, it would cede airspace and therefore the air domain to its adversary. In either case, the end result is strategic failure.

Conclusion

The way to return the Air Force—and the United States, and its partners—to a position of enduring advantage is to develop new concepts, capabilities, and arrangements that increase the service's ability to generate military solutions *across* domains. To succeed in an era of technological parity, the Air Force must keep its adversaries on the horns of a dilemma: to leverage cyberspace to achieve advantage in the air, to leverage air to achieve advantage in space, and to compete at a tempo and complexity with the Air Force they cannot match.[9]

Across the spectrum of war, in concert with allies, and in support of diplomatic, informational, and economic instruments of power, the Air Force's purpose must be to gain, then exploit, advantage in air, space, and cyberspace in pursuit of US national security interests. Air Force strategy must now explicitly state this purpose to ensure coherence in all internal and external narratives. With this simple building block established, the conceptual development and unpacking of adaptive domain control can begin in the joint arena.

To retake the initiative, the successor to a future AirLand Battle construct must double down on the capabilities which gained the United States its initial advantage. To do this effectively, the Air Force must see clearly the primacy of information in war and the interdependence of warfighting domains. A theory of domain control, grounded in an appreciation of the service's purpose, presents an opportunity to clearly articulate and offset the service's growing strategic competition.

Footnotes

1 Samuel P. Huntington, "National Policy and the Transoceanic Navy," *United States Naval Institute Proceedings*, 80, No 5 (1954), 483-93, https://blog.usni.org/2009/03/09/from-our- archive-national- policy-and- the-transoceanic-navy-by-samuel-p- huntington, accessed March 28, 2016.

2 Mahan in 1890 used historical cases, such as the rise of Great Britain, to argue that the growth of a nation's naval power paved the way for that nation's emergence globally as a dominant military, political, and economic force.

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9 The conceptual home for this thinking is the late Col John Boyd, creator of the Observe, Orient, Decide, and Act (OODA) Loop model for explaining winning and losing in conflict. While no formal record of Boyd's theory exists, a collection of his lectures is available online at http://www.projectwhitehorse.com/boydsarchive.htm. An excellent secondary source is: Grant T. Hammond, *The Mind of War: John Boyd and American Security* (Washington, DC: Smithsonian Books, 2012).

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