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Key Points

The creation of a US Space Force is the right decision, but a conditions-based approach to determine timing provides a higher likelihood of success. This approach gives the space professional community time to fill intellectual gaps and avoid significant risks.

The intellectual foundations for an effective US Space Force require mature spacepower theory and space strategy. Both are currently inadequate and induce risk to the national security space enterprise should the Department of Defense stand up a separate space service prematurely.

If not created deliberately, a US Space Force will generate an unwieldy bureaucratic load on the Department of Defense. This would risk delay in the development of coherent spacepower theory necessary to guide strategy and acquisition, delay in acquisition of space capabilities to produce direct combat effects in and from space, and delay in the integration and convergence of joint service multi-domain solutions necessary to assure the United States' continued dominance in future conflicts.

Organizing Spacepower: Conditions for Creating a US Space Force

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Abstract

On June 18, in a speech to the National Space Council, President Donald Trump declared his intention to create a US Space Force. While the creation of such a force is the right decision, there are important conditions which must be met in order to ensure this organization will succeed in meeting national security space challenges. The 2018 National Defense Authorization Act directed the Secretary of Defense to contract a research entity not closely linked to the Air Force to "develop a plan to establish a separate military department responsible for the national security space activities of the Department of Defense." The researchers carrying out this task must effectively balance a variety of political, legal, organizational, technological, and budgetary considerations to make sure the timing, construction, and authorities of this presumptive force protect national interests through the exploitation and defense of the space domain.

The purpose of this paper is to identify the conditions where the proposed space force is justified, and identify risks associated with premature implementation. Policymakers should use conditions similar to those met prior to the creation of the independent US Air Force when determining necessity and timing for creating a separate spacepower military department. At the birth of the independent Air Force, Airmen identified four conditions considered necessary to create a separate air service (an unidentified fifth condition was also necessary). Several of these conditions, when applied to spacepower, are met today. However, the unmet conditions—the development of a general theory of spacepower, and the demonstrated capability to produce direct combat effects in and from space in satisfaction of a theory-based spacepower strategy as a co-equal contributor to joint multi-domain operations—are vital to the success of the future force. Failing to meet these conditions prior to implementing significant organizational and bureaucratic changes in the Department of Defense risks waste and delay in developing the ability and capacity to directly contribute combat effects in and from space.

Introduction

On June 18, 2018, President Donald Trump, in a meeting of the newly-reinvigorated National Space Council, announced that he intended to create a new military service, the US Space Force. The announcement built on earlier comments he made this year on the issue, and echoes a similar initiative in Congress—to create a separate space cadre within the Department of the Air Force. During Congressional deliberations over the 2018 National Defense Authorization Act (NDAA) last year, Rep. Mike Rogers (R-AL) and Rep. Jim Cooper (D-TN) led the charge in the House of Representatives to direct systemic reform in the Department of Defense's (DOD) national security space enterprise, by urging the creation of a "US Space Corps" within the Department of the Air Force, similar to the US Marine Corps.[1] The effort fell short and the language was stripped from the final version of the NDAA, but the push motivated planning to create a separate department within the DOD with responsibility for national security space—a future US Space Force—which would be a more consequential organizational change. The purpose of this paper is to argue for a conditions-based approach to the creation of a space-oriented military service, and advocate that policymakers use five specific conditions as markers to determine the timing for the creation of the US Space Force. The US Air Force's creation following World War II contains elements for an effective model to determine the appropriate conditions for creation of this force. In doing so, policymakers may mitigate the significant risks to the purpose of creating such a force, and will help ensure continued US dominance in the increasingly contested space domain.

The US Air Force's creation following World War II contains elements for an effective model to determine the appropriate conditions for creation of a space force.

Five Conditions for a US Space Force

When the Airmen of the US Army in the interwar period between the first and second world wars developed a strategy for the creation of the US Air Force, it included four major conditions. The first condition was societal, and sought to redefine America as an airpower nation rather than a maritime nation. The second, primarily commercial, was to demonstrate the ability of airpower to fulfill peacetime roles. The third was political, to create the idea of a US Army Air Corps and eventually an independent air force through legislation. Finally, the airmen foresaw the need to develop a unique theory of airpower and air warfare.[2] A fifth (unarticulated) condition also proved necessary as well—the demonstrated capability to produce direct combat effects in and from the air using theory-based airpower strategies, that were a co-equal contributor to joint multi-domain operations. This paper attempts to apply these five conditions to spacepower.

The uncoordinated but effective combined efforts of the US government, aerospace corporations, and even the entertainment industry have planted the seeds to satisfy the first condition, to redefine America as a spacefaring nation. President John F. Kennedy solidified the US government's commitment to space by directing what became the Apollo Program, leading to the United States over 45 years later to remain the sole nation to have placed humans on another celestial body. Aerospace corporations such as SpaceX, Virgin Galactic (which built a commercial spaceport in New Mexico), and many others invigorated human spaceflight through their pursuit of commercial space tourism. It should be noted that airpower enthusiasts sponsored similar efforts during the interwar period of the 20th century, in the form of air races and aerial demonstrations to encourage interest in aviation. These demonstrations made powered flight a tangible idea for average citizens, and something that was attainable and worthy of support and investment. Spaceflight, though, is more difficult and not as accessible, so the experience must be abstracted through various media. The entertainment industry, though, has particularly sparked the imagination and inspiration of generations to dream of and pursue space exploration through the *Star Wars* and the *Star Trek* movies, television, and video game enterprises. The result has been an increasing ability for Americans to envision space as a human domain more than ever. The combined effect is the United States, more than any other nation, can claim to be a spacepower nation.

Space fulfills extensive peacetime roles today. The Global Positioning System (GPS), designed to provide position, navigation, and timing (PNT) information to US forces globally, has generated

an industry centered on the unencrypted signal provided as a global public service for professional and recreational PNT services. The use of GPS is ubiquitous today: parents find the new field for their children's next soccer game, surveyors and engineers build new roads and neighborhoods using GPS-enabled equipment, the global banking industry uses precise GPS timing required to ensure accurate transactions, and commercial aircraft deliver passengers all over the globe using GPS navigation. Iridium and Inmarsat offer global satellite-based communication services with the use of handheld phones. Television and internet services are available through satellite communications. Satellite-based remote sensing data and imagery provide valuable information for decisions in agriculture and civil engineering. Space-based telescopes provide the clearest images of deep space for both scientific research and inspiring the next generation to pursue space related studies and employment. The peaceful uses of the space domain and space capabilities have become ubiquitous and clear to the US population over the past several decades, satisfying the second condition to demonstrate space's power and effectiveness definitively.

The DOD…has until now failed to develop an adequate general theory of spacepower on which to base spacepower strategy, doctrine, and develop context-specific approaches for employing space forces necessary to justify creation of a US Space Force.

To at least partially meet the third condition, some political support now exists for creation of a separate military service, as evidenced by President Trump's statements and Congress' efforts. The final language in the NDAA for Fiscal Year 2018 in particular directs the Office of the Secretary of Defense (OSD) to contract a federally funded research and development center not closely affiliated with the Air Force to research and develop a plan to create a separate military department for the national security space enterprise. Directing this study makes clear there are lawmakers with significant political influence interested in driving the process required to create a separate military service for space. The expectation is that the study will address how and when a US Space Force might be created, taking as an assumption that one should be created. President Trump's decision to direct the creation of the new service provides significant political capital for supporters, and may galvanize backing by all but the most ardently opposed. Whether this support is sufficient to pass required legislation remains to be seen, but the idea is now part of serious political discourse.

The fourth condition is the development of a coherent and generally accepted theory of spacepower. The DOD, despite several efforts by strategists, think tanks, academics, and practitioners, has until now failed to develop an adequate general theory of spacepower on which to base spacepower strategy, doctrine, and develop context-specific approaches for employing space forces necessary to justify creation of a US Space Force. The development of a general theory of spacepower is a necessary condition to the success of a space force, but is insufficient without satisfaction of a fifth condition.

In addition to satisfying the first four conditions, prior to becoming a separate military department in the DOD, the Air Force demonstrated the ability to produce significant direct combat effects in and from the air—independent from and in contribution to joint operations as part of the Allies ultimate victory in WWII. The creation of a general theory of spacepower and the demonstrated ability to produce significant direct combat effects remain as unsatisfied conditions for the creation of a space force. This fifth condition is important from a practical perspective. Airpower advocates pushed for a separate service for decades without success. World War II afforded US airpower the opportunity to demonstrate direct combat effects in and from the air, which significantly contributed to victory in both the European and Pacific theaters. The demonstration of direct combat effects in and from the air provided incontrovertible evidence that airpower could do much more than support land forces, and that the US was best served by the creation of a separate service to further develop and mature airpower as an instrument of national power.

Why A General Spacepower Theory?

But why is theory so important to the success of a proposed US Space Force? Strategic theorist Colin Gray explains the important role of theory in warfare as a means for educating strategists and informing the development of

effective strategies for specific contexts in war. Like theory for military power on land, in air, and at sea, spacepower theory must be nested within a general theory of strategy, and shape spacepower doctrines. According to Gray, domain specific theory is partly practical because of its guiding role in designing domain specific strategy.[3] As such, the general theory of spacepower will guide specific spacepower strategies nested within the joint multi-domain strategies to best produce the desired effects required to culminate, in combination with the effects produced in other domains, to create strategic effects desired to achieve the nation's political objectives through the use, or threatened use, of military force.

Four attempts to develop spacepower theory are particularly useful to future efforts, though all fall short of developing a comprehensive theoretical construct sufficient to guide strategies to "exert prompt and sustained influence in or from space for the purposes and furtherance of policy in peace and war."[4] Three significant single author books on spacepower theory include James Oberg's *Space Power Theory*, Everett Dolman's *Astropolitik: Classical Geopolitics in the Space Age*, and John Klein's *Space Warfare: Strategy, Principles, and Policy*.[5] In each of these texts, the author provides a useful framework for understanding spacepower and an important attempt at proposing a general theory of spacepower from which to develop spacepower strategy and doctrine. However, as argued in another volume of essays attempting to develop spacepower theory, *Toward a Theory of Spacepower*, all fall short of developing a spacepower theory on the scale of the maritime power theories of Alfred Thayer Mahan or Julian Corbett.[6] Among the challenges in developing a general theory of spacepower, two are prescient: definitional confusion and a lack of empirical evidence to support theoretical claims.

Current US space policy and strategies for space illustrate the paucity of spacepower theory.

"Spacepower" Defined?

Currently no accepted definition of "spacepower" exists within military or academic communities. Joint doctrine defines spacepower as, "the total strength of a nation's capabilities to conduct and influence activities to, in, through, and from space to achieve its objectives."[7] US Air Force doctrine does not define spacepower, instead blending air, space, and cyberspace powers in the term airpower which is defined as "the ability to project military power or influence through the control and exploitation of air, space, and cyberspace to achieve strategic, operational, or tactical objectives."[8]

The analyses in *Toward a Theory of Spacepower* clearly demonstrate the definitional confusion within the academic community, as they offer multiple definitions of spacepower. Below are some of the definitions offered, highlighted from several chapters of the book:

"…the ability to use space to achieve one's purposes or goals."[9]

"…the ability to use space to influence others, events, or the environment to achieve one's purposes or goals."[10]

"…the ability in peace, crisis, and war to exert prompt and sustained influence in or from space."[11]

"…the total of capabilities that contribute to a nation's ability to benefit from the use of space."[12]

"…the employment of military forces operating in a distinct medium (the space environment) to achieve some national goal or military objective."[13]

"…the pursuit of national objectives through the medium of space and the use of space capabilities."[14]

While some commonality exists among the definitions provided by these authors and analysts, the clear message is that there is no one accepted definition of the term spacepower. Definitional confusion hinders the creation of a general theory of spacepower.

Theory Driven Strategy and Empirical Evidence

Current US space policy and strategies for space illustrate the paucity of spacepower theory. From the *National Space Policy*, to the *National Security Space Strategy*, to DOD Directive 3100.10 *Department of Defense Space Policy*, to US Strategic Command (STRATCOM) strategies for space, it is clear current policy and strategy are based on providing, protecting, and improving current space-based capabilities.[15]

This situation is somewhat understandable though, if one looks at the steady development of US space capabilities over time. Talented scientists

and engineers designed communications satellites, the Global Positioning System, the ability to image the Earth's surface, and missile warning satellites, all to great effect. US policy and strategy grew around these capabilities in an inductive fashion. As space capabilities demonstrated their worth, policymakers and military leaders developed policy and strategy to ensure the United States maintained and protected these systems. The problem with the inductive strategy development process is that it produces deterministic outcomes with less flexibility and imagination. The inductive reasoning favored by non-flying officers for the use of airpower in the US Army during the interwar period produced doctrines for airpower similar to the use of artillery for force application—limited in geography and flexibility in order to service the needs of the surface commander. Airpower theory developed at the US Army Air Corps Tactical School (ACTS) enabled deductive reasoning processes. The resulting theory was the foundation of the airpower strategies which generated strategic effects the traditionalists within the Army could never imagine using inductive reasoning.

As space capabilities demonstrated their worth, policymakers and military leaders developed policy and strategy to ensure the United States maintained and protected these systems.

Inductive and deductive reason both have value in developing theory. Inductive reasoning draws conclusions from specific details gleaned from deep analysis to identify the most important factors determining outcomes in social phenomena, such as war. Those salient factors are then used to develop theory about the social phenomena which is useful in the specific context studied. Deductive reasoning begins with propositions about the social phenomena to produce theory and hypotheses tested against empirical evidence across a variety of cases to produce general theory which is applicable broadly regardless of context. Current US space policy and strategies attempt to assure access to (and protection of) those capabilities provided by current space-based systems and services without vision to guide concepts for how to use the space domain for purposes other than combat support. The inductive reasoning is evident. What is missing is a broader, strategic, deductive theory articulated through a strategy for meeting national security objectives with spacepower.

Inductive reasoning artificially limits strategic options. Deductive reasoning in developing spacepower theory and strategy should acknowledge current capabilities and context and expand beyond them to consider new capabilities able to produce novel advantageous effects in new contexts. Technology and adversaries change and adapt with time; thus, strategists and policymakers must conceive of means to change the context to the US' advantage. The present context and current space capabilities lead to strategies for providing critical services to land, sea, and air forces; intelligence, surveillance, and reconnaissance (ISR) for national strategic, operational, and tactical decision making; protection of the space environment from long-term harm; and programs that lead to long satellite life cycles and higher costs to place capabilities on orbit. While these capabilities are important, they are also incomplete, as potential adversaries are changing the context of warfare with the addition of new threats, such as the Chinese anti-satellite weapons program. A deductive general theory of spacepower will better guide the creation of spacepower strategy and doctrines, and context-specific strategies for spacepower employment as part of joint multi-domain operations.

The previously mentioned fifth condition—to demonstrate direct combat effects which accumulate into strategic effects in and from space—is necessary to provide empirical evidence to support the claims of any general theory of spacepower. During WWII, the US Army Air Forces clearly demonstrated the ability and particular expertise in producing direct combat effects in and from the air, contributing significantly to the strategic effects required to achieve the unconditional surrender of both Germany and Japan. In Europe the Combined Bomber Offensive tested and refined the Air Corps Tactical School's Industrial Web Theory and decimated the Luftwaffe, opening the door for land forces to advance, nearly immune to enemy air attack. In the Pacific the bombing campaigns changed Japanese perceptions of invulnerability by attacking major industrial cities and finally delivering atomic weapons which, combined with other effects in other domains, convinced the Japanese government to capitulate. This fifth condition was necessary to provide empirical

evidence to support theoretical claims of airpower's ability to produce significant independent strategic effects and justify the creation of the US Air Force. Spacepower advocates should likewise expect to demonstrate the ability to create direct combat effects in and from space as part of a joint multi-domain campaign before the creation of the US Space Force.

Some critics of this approach express concern that the lack of empirical evidence from the use of spacepower in warfare threatens the development of spacepower theory, which overstretches technological capabilities much as airpower theory did during the interwar period, they argue.[16] However, unlike the interwar period, the DOD possesses robust wargaming, experimentation, modeling and simulation tools today which can be used to test concepts and capabilities, generating empirical evidence to support the development of effective spacepower theory short of war. Using a variety of analytical techniques, US Air Force Space Command (AFSPC) strategists and analysts can test and refine spacepower theory and strategy. While not satisfying the fifth condition in actual combat, using these analytical techniques can help inform theory development required by the fourth condition, so when the time comes to produce direct combat effects in and from space the general theory of spacepower (and the strategy and doctrines which result) will be more mature and more likely to lead to successful context-specific strategies to achieve national security objectives.

Any weapon system capable of sensing and successfully engaging a ballistic missile in the boost phase will have the capability to engage space systems.

The Risks of Premature Separation

The primary risk in prematurely separating the national security space enterprise from the US Air Force is in delay, manifested in three ways. The creation of a US Space Force will necessitate a cascade of decisions ranging from the complex—such as proper organizational structures, identifying individuals to lead the change at all levels, and how to present forces to the combatant commands (COCOMs)—to the benign, such as uniform standards. The bureaucratic tasks for the staff of the Secretary of Defense, the Joint Chiefs of Staff, the Air Force, the new Space Force, the combatant commands, the intelligence community, and lawmakers will be profound. The heavy bureaucratic load will detract from and delay development of effective spacepower theory, and the acquisition of space capabilities to produce direct combat effects in and from space, unless handled deftly by all levels of the defense bureaucracy. Additionally, the space professional community will be further removed from their fellow warfighters at a time when the rest of the US military is moving to integrate and converge on joint multi-domain solutions necessary to assure continued dominance in future wars.

First, lacking a general theory of spacepower, the development of spacepower strategies may be limited to inductive reasoning, only building on what is done today, or reactive approaches to adversary innovations which affect space strategies. Recent policy decisions support this claim. First, the new *National Security Strategy* offers little new regarding space, but builds and strengthens previous administrations' view that unfettered access and freedom to operate in space are vital national interests.[17] The new *National Defense Strategy* states, "The Department will prioritize investments in resilience, reconstitution, and operations to assure our space capabilities," implying that DOD intends to only provide assured access to and operations in space for current space capabilities.[18]

Most concerning is the FY 2018 NDAA's direction to the US Missile Defense Agency (MDA) to develop a space-based layer for the missile defense system to defeat ballistic missiles in the boost phase. The NDAA encourages live testing as early as 2022, and potential operational deployment within a decade. Any weapon system capable of sensing and successfully engaging a ballistic missile in the boost phase will have the capability to engage space systems. The 2018 NDAA forces the national security space enterprise to accept a space weapon without a broader framework for how the system will best contribute to national interests, or the potential negative consequences of deploying the system. The *National Security Strategy*, *National Defense Strategy*, and the 2018 NDAA collectively demonstrate a continued lack of strategic vision for space, partly due to the paucity of spacepower theory. To amend this dangerous

situation, policymakers, military strategists and practitioners, technologists, and legal experts are required to shape a general theory of spacepower which can endure changing contexts. Expending human intellectual capital and financial resources on designing and establishing a US Space Force will detract from resources available to develop and test spacepower theory, further delaying satisfaction of a primary condition to justify this force. A delay in spacepower theory development extends the period in which spacepower is relegated to a support function, and the timeline to produce direct combat effects in and from space will lengthen unnecessarily.

The second risk of early separation is to the acquisition of appropriate space capabilities. The Air Force garners approximately 90 percent of the non-intelligence related space budget, which ranges from $9 billion to $11 billion annually.[19] The Government Accountability Office (GAO) published a report in July 2016 titled *Defense Space Acquisition: Too Early to Determine If Recent Changes Will Resolve Persistent Fragmentation in Management and Oversight*. The report summarizes the results from four major commissions tasked to assess the DOD space enterprise, focusing on the impact to space acquisitions. The collective findings fit in six categories, with the last four focusing on acquisition reform to increase speed and efficiency in the delivery of space capabilities.[20] The first category stipulates that the US should establish space as a national security priority, a recommendation President Trump satisfied in his *National Security Strategy*.[21] The second category focuses on leadership, authority, and effective management by the Air Force of the space enterprise.

The push to integrate and converge on multi-domain solutions builds on several efforts across the US military services.

The 2018 NDAA unified leadership for DOD space in the commander of Air Force Space Command (AFSPC), consolidating responsibility and authority from a variety of now-defunct offices within the national security space enterprise. Effectively organized and managed, the AFSPC commander has the opportunity to improve the coordination, budgets, planning, and acquisition processes which can lead to meeting the US STRATCOM commander's vision to move fast in space enterprise innovation in order to meet new and emerging threats to US dominance in space. The fast, innovative acquisition processes desired by the STRATCOM commander and Air Force leadership will also be delayed, as intellectual and administrative resources will be focused on transitioning elements of the Air Force acquisition architecture to the US Space Force to produce what will likely be the same result with the same people in different uniforms—later than if the Air Force disciplines, streamlines, and funds its existing space acquisition bureaucracy. Essentially, this is the same outcome the DOD would get by keeping the space enterprise within the Air Force, only it would arrive much later. The most significant impact will be a delay in the ability to deliver capabilities to produce direct combat effects in and from space in pursuit of national interests.

The third risk is in the possible disconnection of space forces from the Air Force and the broader joint warfighting community. Army Gen David Perkins, the now-former commander of US Army Training and Doctrine Command (TRADOC), and Air Force Gen James Holmes, commander of USAF's Air Combat Command (ACC), worked to direct activities in their commands toward collaboratively designing multi-domain solutions to future combat challenges through the integration of capabilities in their respective domains.[22] The push to integrate and converge on multi-domain solutions builds on several efforts across the US military services. The Army continues to develop multi-domain battle concepts for land forces to create or support effects in multiple domains.[23] There is recent precedent for this type of cross-service collaboration, notably the Air Force and Navy's effort to develop the AirSea Battle concept, designed to defeat potential adversary Anti-Access/Area Denial (A2/AD) strategies.[24]

The Air Force is currently developing concepts and systems for Multi-Domain Command and Control (MDC2), which is designed to enhance warfighting effectiveness and efficiency across all domains, to include space.[25] The TRADOC and ACC plan to integrate and converge on joint multi-domain solutions builds on the foundations of previous work in this area. Disconnecting the space enterprise from the US Air Force before the space community matures its warfighting culture risks disruption and delay which will challenge

integrated and converged multi-domain joint solutions in favor of domain specific solutions, which is precisely counter to important trends in the joint warfighting community focused on increasing combat capability across domains. Keeping the responsibility for space within the Air Force provides an opportunity to keep the domains organizationally and operationally integrated, an effort which has produced significant dividends for joint forces since the value of space capabilities made their first significant tactical and operational impacts during Operation Desert Storm in 1991.

The current *National Security Strategy* provides a hint to the strategies envisioned to provide assurance of access to space and deter potential adversaries from taking action against US space assets through, "…a deliberate response at a time, place, manner, and domain of our choosing."[26] The US will not confine itself to response-in-kind for attacks on its space systems, instead taking advantage of its current dominance across domains to provide multi-domain deterrence to protect its space architectures. The development of concepts for joint service, multi-domain operations is the result of hard lessons learned over the past 25 years, and a common vision for the future. Separating the space enterprise is a move away from joint multi-domain operations. No doubt space professionals will return to the joint warfighting community, but only after carrying the unnecessary bureaucratic load of creating their own service without a general theory of spacepower as a guide, or the credibility afforded services able to produce direct combat effects.[27] Now is a time for greater integration across domains, not distractions from efforts to increase combat capability through multi-domain integration.

The creation of a US Space Force is in the United States' best interests in the long term, but must be planned and executed deliberately.

Conclusion: A Conditions-Based Approach to Spacepower

The creation of a US Space Force is in the United States' best interests in the long term, but must be planned and executed deliberately. The current situation is one where an old US Marine axiom—"slow is smooth, and smooth is fast"—applies well, and should inform future space-related policies and initiatives. A conditions-based approach is needed to determine the timing for creation of a separate space service. The five conditions leading to the separation of the US Air Force from the US Army offers clear, tested markers to indicate for policymakers that the theory and application of spacepower are sufficiently mature to justify a US Space Force. Two of the five conditions for spacepower are already clearly met. The third condition, political backing, is now partially met through the discussion begun by President Trump, now amplified by his announcement at the National Space Council, and a vocal group of lawmakers on Capitol Hill. The final two conditions, an accepted general theory of spacepower and demonstrated direct combat effects in and from space, remain unmet. Spacepower theorists and practitioners need the opportunity to mature a general theory of spacepower while remaining integrated within a multi-domain force—the US Air Force. Political leaders considering the creation of a US Space Force should require the demonstration of direct combat effects to justify adding bureaucracy and cost to the defense establishment rather than disciplining the Air Force to make the appropriate internal changes required to properly organize and fund the space enterprise. Congress must also ensure that the nation's air, space, and cyber capabilities are all properly funded going forward, as the Air Force must recover from decades' worth of funding shortfalls that have left the service with diminished and aged aircraft inventories.

Given these realities, funding challenges facing the Air Force's space capabilities are not unique. Budget shortfalls are the result of a broader resource debate that affects not only spacepower, but aerospace power writ large. Currently, no Air Force mission is resourced adequately to meet the demands articulated in the *National Security Strategy*. By itself, standing up a US Space Force will not necessarily improve the resource deficiencies a robust space architecture demands. Separation from the Air Force before these final two conditions are met will extract space professionals from the community of warfighters they worked so hard to integrate with over the past 25 years. This extraction will delay important ongoing efforts to continue to provide the United States with dominant combat power, with military services capable of joint, integrated, and synchronized multi-domain operations. ✪

Endnotes

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16 Author's note: Airpower analyst Ben Lambeth argues that a theory of spacepower is premature and runs the risk of suffering the same pitfalls early airpower theory suffered. Alternatively, Lambeth proposes that a unified theory for air, space, and cyberspace powers is the most appropriate means for developing meaningful theory for the functions performed by the US Air Force. The domains of air, space, and cyberspace are profoundly different with regard to the limitations of physics, chemistry, engineering, geography, and temporal aspects of what can be done in each domain. A unified theory, while perhaps useful as technology develops to overcome current limitations, will fall short if it must ignore the differing dynamics of each domain. To go further, if a unified theory is actually the most effective path for theory development, then the most effective path will be to a unified theory of warfare which encompasses all domains from sub-surface to outer space beyond the Moon's gravitational pull. As with physics, a unified theory is a worthy goal but particularly problematic in the scope of phenomena the theory must explain, so perhaps there is room and need for domain specific theories on which to build the proposed broader unified theory of war. A domain specific theory of spacepower is necessary.

17 Donald J. Trump, *National Security Strategy of the United States of America* (Washington, DC: The White House, December 2017), 31.

18 James N. Mattis, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge* (Washington, DC: Department of Defense, January 2018), 6.

19 Cristina Chaplain, *Defense Space Acquisitions: Too Early to Determine If Recent Changes Will Resolve Persistent Fragmentation in Management and Oversight,* GAO-16-592R (Washington, DC: Government Accountability Office, July 2016), 17.

20 Chaplain, *Defense Space Acquisitions: Too Early to Determine if Recent Changes Will Resolve Persistent fragmentation in Management and Oversight*, 2-3. Author's note: The report was the result of research into the DOD space enterprise primarily from an organizational perspective to determine the current challenges of the acquisition process. Over the previous 15 years four major commissions assessed the DOD space enterprise. The GAO report summarizes the collective findings as fitting within six categories:

1. Space as a national security priority – the United States policy should establish space as a priority within the national security enterprise.
2. Unified leadership and authority – authority within the national security space enterprise is spread across too many agencies to allow for coherent unified leadership.
3. Improved coordination between defense space entities – within the DoD the space enterprise suffers from a lack of coordination between agencies.
4. Budget issues
5. Planning
6. Acquisition process

The last three categories are tightly integrated and operate together to limit and delay capabilities due to cost overruns and delays in administrative processes resulting in an unresponsive acquisition process unable to keep pace with technological innovation and emerging threats.

21 Donald J. Trump, *National Security Strategy of the United States of America*, 31.

22 Gen David G. Perkins, USA, and Gen James M. Holmes, USAF, "Multidomain Battle: Converging Concepts Toward a Joint Solution," *Joint Forces Quarterly,* Vol. 88, First Quarter 2018, 54-57.

23 US Army, *Multi-Domain Battle: Evolution of Combined Arms for the 21st Century, 2025-2040, Version 1.0* (Fort Eustis, VA: US Army Training and Doctrine Command, December 2017), http://www.tradoc.army.mil/multidomainops/docs/MDB_Evolutionfor21st.pdf.

24 Department of Defense, *Air-Sea Battle: Service Collaboration to Address Anti-Access & Area Denial Challenges* (Washington, DC: Department of Defense, May 2013), https://www.defense.gov/Portals/1/Documents/pubs/ASB-ConceptImplementation-Summary-May-2013.pdf. Author's note: This document is an unclassified summary of the classified Air-Sea Battle Concept, version 9.0, and the Air-Sea Battle Master Implementation Plan (FY 2013).

25 US Air Force Chief of Staff Gen David Goldfein, "*CSAF Focus Area: Enhancing Multi-Domain Command and Control…Tying It All Together,*" (CSAF Focus Area memorandum, Washington, DC: US Air Force, March 2017), http://www.af.mil/Portals/1/documents/csaf/letter3/CSAF_Focus_Area_CoverPage.pdf.

26 Trump, *National Security Strategy of the United States of America*, 31.

27 Author's note: Culture is important within the US military services as warfighting organizations designed to meet national security objectives. Keeping the responsibility for space within the Air Force maintains a connection between space professionals and other warfighters to continue to foster a warfighting culture and normalize space operations with joint service operations. Three efforts in education and training provide platforms for developing warfighting culture in the space professional corps—the US Air Force Weapons School, the National Security Space Institute, and Air Force Space Command's new Space Warfighting Construct.

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