Has the Space Force Earned Its Place?

A Monograph

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Abstract

Has the Space Force Earned Its Place? By Lt Col Patrick E. Gruber, US Air Force, 54 pages.

This monograph examines the factors that led to the stand-up of an independent United States Air Force in 1947 and the factors that influenced the development of the United States' space force. In the wake of President Donald J. Trump's order to stand up a Space Force as a sixth armed service, this monograph will contrast the formation of the Air Force and the current United States space forces to determine if the potential military Space Force has met the same milestones experienced by the independent US Air Force. It will also offer recommendations for the US government to enact prior to establishing an independent Space Force.

Contents

Acronyms

AEF	American Expeditionary Force
AFGSC	Air Force Global Strike Command
AFSPC	Air Force Space Command
ARPA	Advanced Research Projects Agency
ASAT	Anti-Satellite (Weapon)
GHQ	General Headquarters
NASA	National Aeronautics and Space Administration
NRO	National Reconnaissance Organization
SDI	Strategic Defense Initiative
US	United States
USSPACECOM	United States Space Command
USSTRATCOM	United States Strategic Command

Has the Space Force Earned Its Place?

Introduction

Early in the 1900s, a young Army officer, passionate about airplanes and forward-thinking regarding airpower, became much more than merely "interested" in the future of aviation in warfare. His revolutionary views on airpower went beyond influencing battles in support of ground troops to instead focus on how aircraft belong in a "separate organization with a mission of its own" to strike the enemy "beyond the front lines and national borders."[1] The outspoken officer was eventually court-martialed, but in time, his views on the importance of airpower and the need for an independent air force came true. Of course, that narrative is the abbreviated career of Italian aviator, Giulio Douhet. Americans may be surprised that airpower zealot Brigadier General William "Billy" Mitchell's storied professional life is not exclusive. Many of the major military powers from the early twentieth century had a dedicated person or small group of pioneers, greatly responsible for their country's growth in airpower. Similarly, the United States was not alone in its genesis of military airpower. By 1884 several countries, including Great Britain, France, Germany, Spain, Russia, Italy, and Japan, integrated balloon corps into their armed forces.[2] And, the United States was not the first of the larger military powers to have an independent Air Force. Sir Hugh Trenchard was greatly responsible for Great Britain standing up the world's first independent air force in 1918.[3] France, at the end of World War I, had the largest air arm in the world and by 1933 was organized into a separate air force, even if it was controlled by an interservice committee.[4] Although German dictator, Adolf Hitler secretly built and

[1] David Nevin and Time-Life Books, *Architects of Air Power* (Alexandria, VA: Time-Life Books, 1981), 18.

[2] Juliette A. Hennessy et al., *The United States Army Air Arm April 1861 to April 1917* (Washington, DC: Office of Air Force History, US Air Force, 1985), 11.

[3] Alan Stephens et al., *War in the Air: 1914-1994* (Maxwell AFB, AL: Air University Press, 2001), 31.

[4] Nevin and Time-Life Books, *Architects of Air Power*, 129.

announced the *Luftwaffe's,* the German Air Force's, existence in 1935, he formally created it in March 1936.[5] An independent US Air Force would not happen until the *National Security Act* of 1947.

In June, 2018, one hundred years after the Royal Air Force became an independent service, President Donald J. Trump directed the Defense Department to establish a Space Force as a sixth military service. The announcement did not receive unanimous support. The House Armed Services Committee failed to get a Space Corps proposal approved in the *National Defense Authorization Act* for Fiscal Year 2018 as the initiative went unsupported by the White House and some Pentagon and Air Force leaders.[6] In October, 2017, James Mattis, US Secretary of Defense, wrote letters to members of Congress opposing "a new military service or additional organizational layers."[7] Something, however, changed the president's reasoning to believe the time is right to update the Defense Department's organizational structure for space.

The air arm development within the US Army experienced significant iterations of responsibility and organizational growth since the first dedicated Aeronautics Division stood up within the Signal Corps in 1907. The United States fought two world wars and grew into a major world power prior to the Air Force's separation forty years later. Since its independence, the Air Force continued to increase in scope and responsibility, developing and incorporating significant technological advances in supersonic flight, nuclear weapons, and stealth abilities. The United States' major efforts in space began after World War II, founding lasting space organizations fifteen years later, including establishing the National Aeronautics and Space Administration in 1958 and the National Reconnaissance Organization secretly in 1961. The Department of Defense

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[5] Nevin and Time-Life Books, *Architects of Air Power*, 101, 103.

[6] Joe Gould, "US Space Corps Could Launch in 3 Years, Key Lawmaker Says," *Defense News*, last modified February 28, 2018, accessed August 20, 2018, https://www.defensenews.com/space/2018/02/28/2021-a-space-odyssey-space-corps-could-launch-in-three-to-five-years-key-lawmaker-says/.

[7] James Mattis to John McCain, October 17, 2017, accessed January 23, 2019, http://static.politico.com/11/99/eab4f5be445fa2d0749ae8b798f1/mattis-ndaa-heartburn-letter.pdf.

took longer for separate space entities, creating an Air Force Space Command in 1982 and a unified Space Command in 1985.

Over the past thirty years, space operations have become increasingly important as the military services are dependent upon many capabilities that space assets provide: communications, navigation, missile defense, weather forecasting, and intelligence, surveillance and reconnaissance. Combatant commanders receive "near worldwide coverage and access" and the advantages of "freedom of action, overflight, and global perspective and responsiveness."[8] However, adversary countries have the potential to interrupt those capabilities, increasing the "risks and costs of intervention."[9]

Independence for a space branch may provide a catalyst to advance space technology as the Air Force advanced in technological capacity post-1947. It also has significant potential to increase defense spending as more personnel and bureaucratic layers are required. Former Air Force Secretary Deborah Lee James warned that a Space Force would "sap time, attention and focus away from the real issue, which is we need to invest more in technology and capability in space."[10] This monograph will attempt to compare whether the current space force organizations have experienced similar historic milestones met by the US Air Force to stand up an independent force. The evolution of the United States' space organizations bears similarities to the evolution of the US Air Force as an independent military service, and while development of space capabilities and dedicated space personnel could benefit from an independent space force, the United States does not currently require an independent force to succeed in space operations.

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[8] US Department of Defense, Joint Staff, *Joint Publication (JP) 3-14, Space Operations* (Washington, DC: Government Printing Office, 2013), viii, accessed August 20, 2018, http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_14.pdf.

[9] Todd Harrison et al., *Harrison Space Threat Assessment* (Washington, DC: Center for Strategic and International Studies, 2018), IV, accessed January 13, 2019, https://aerospace.csis.org/wp-content/uploads/2018/04/Harrison_SpaceThreatAssessment_FULL_WEB.pdf.

[10] Alex Johnson, "Trump's Space Force Faces Trouble Getting off the Ground," *MSN*, August 10, 2018, accessed August 21, 2018, https://www.msn.com/en-us/news/us/trumps-space-force-faces-trouble-getting-off-the-ground/ar-BBLJLBg.

Standing up an independent space force is not fiscally responsible when the desired outcomes of dominating in the space domain and integrating with other warfighting domains can be achieved through less costly means.

This monograph was created using primary and secondary sources and is divided into three sections. The first section is focused on the organizations of the US Army air arm preceding US Air Force independence to determine what were the factors that led to each organization's expansion to a next higher echelon. Examination of leadership, decision makers' motivations, and the political and security environment will highlight why, for example, the air arm became a "Service" and not a "Corps" as it did eventually eight years later in 1926. The second part will analyze the United States' efforts to organize its space forces and the factors that led to evolutionary changes. Most notably, the United States has the National Aeronautics and Space Administration (NASA) as a civilian-led "space force," but there are critical parts of a space arm embedded within the Department of Defense. A significant part of these military space parts resided within the Air Force starting in the 1960s, but have reorganized several times including standing up in 1985 (and de-activating in 2002) a US Space Command and involved legislative efforts to stand up a Numbered Air Force for Space Operations and a Space Corps in 2017, the president's order for an independent Space Force in 2018, and most recently the approved re-establishment of the US Space Command under US Strategic Command.[11] Finally, the third section will correlate the associated change stimulus to compare the Air Force and Space Force situations and contain a recommendation on what needs to happen prior to a change in force structure.

[11] Will Thomas, "Trump Signs National Defense Authorization Act for Fiscal Year 2019," *FYI – Science Policy News from AIP,* no. 98 (August 2018), accessed November 15, 2018, https://www.aip.org/fyi/2018/trump-signs-national-defense-authorization-act-fiscal-year-2019.

Literature Review

The history of the establishment and eventual independence of the US Air Force is well documented with many volumes covering both the entire service history and targeted periods of time, leaders, or events. Belonging to the former category of a complete Air Force history, Robert F. Futrell's *Ideas, Concepts, Doctrine, Basic Thinking in the United States Air Force: 1907-1960* is cited as "the most comprehensive study of the evolution of airpower doctrine."[12] Also in the "complete history" category, and perhaps more readable is *Winged Shield, Winged Sword: A History of the USAF Volumes I and II*, created by the Air Force History and Museums program in commemoration of the Air Force's fiftieth anniversary of independence.[13] The Air Force as an institution values professional military education and many documents are produced through the Air University Press by Air Force members while they served as students or faculty at Air University at Maxwell Air Force Base. An example that would provide insight to anyone looking for a quick "who's who?" of influential Air Force personnel, including many early airpower pioneers, or a guide into specific benchmark Air Force events comes from that very program in *Introduction to the United States Air Force*.[14]

Included in the Air Force story is much of the history of the United States' space program, as the Air Force was tied to the all parts of the space program, whether Department of Defense, NASA, or the National Reconnaissance Organization. *Space Primer, Beyond Horizons: A Half Century of Air Force Space Leadership,* and *Into the Unknown Together: The DOD,*

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[12] James P. Tate, *The Army and Its Air Corps* (Maxwell Air Force Base, AL: Air University Press, 1998), 197; Robert Frank Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force: 1907-1960* (Maxwell Air Force Base, AL: Air University Press, 1989).

[13] Bernard C. Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I* (Washington, DC: Air Force History and Museums Program, 1997); Bernard C. Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume II* (Washington, DC: Air Force History and Museums Program, 1997).

[14] B. Chance Saltzman et al., *Introduction to the United States Air Force* (Maxwell AFB, AL: Airpower Research Institute, CADRE, AU Press and Air Force History and Museums Program, 1999).

NASA, and Early Spaceflight are also all similarly Air University Press publications.[15] *Space Primer* and *Beyond Horizons* provide a comprehensive overview of the Air Force and the United States' space programs while *Into the Unknown Together* focuses on the period from early United States' space efforts to the last 1970s Apollo missions. With the de-classification of portions of the National Reconnaissance Organization and its missions, the Center for the Study of National Reconnaissance, in 2011, published a fifty-year history of the National Reconnaissance Organization, an insightful reading companion to the Air Force space histories.[16]

Documents regarding the creation of a Space Corps or independent Space Force were seemingly non-existent until the mid-1990s. The catalyst for writings on the subject beginning at that time is arguably the significant impact of space and space operations in the success of the US military operations in the Persian Gulf and Iraq in 1991. Additionally, the mid-1990s is around the time when Air Force space officers, growing up in the Air Force Space Command established in 1982, would have promoted through the ranks to the field grades and, when attending professional military education, would be more likely to write on a Space Force. Several of the works written during the fifteen years from 1993 to 2008, post-Gulf War up to China successfully orbiting the moon and shooting down a satellite, focus on the topic of reorganization of space assets for better utilization. A common theme among these military-officer-written monographs, especially in *Expansion or Marginalization, How Effects-Based Organization Could Determine the Future of Air Force Space Command* by Edward J. Tomme, is that space operations are

[15] Curtis E. LeMay Center for Doctrine Development and Education, and Air University, eds., *Space Primer*, 3rd ed. (Maxwell Air Force Base, AL: Air University Press, Curtis E. LeMay Center for Doctrine Development and Education, 2009); David N. Spires et al., *Beyond Horizons: A Half Century of Air Force Space Leadership* (Peterson Air Force Base, CO; Washington, DC: Air Force Space Command in association with Air University Press; Government Publishing Office, 2011); Mark Erickson, *Into the Unknown Together: The DOD, NASA, and Early Spaceflight* (Maxwell Air Force Base, AL: Air University Press, 2005).

[16] Berkowitz, Bruce, *The National Reconnaissance Office at 50 Years: A Brief History* (Chantilly, VA: National Reconnaissance Office, 2001), accessed March 5, 2019, https://www.nro.gov/Portals/65/documents/history/csnr/programs/NRO_Brief_History.pdf.

viewed as combat support, not actual combat operations with space as a warfighting domain.[17] That stance does not fit today's narrative of space operations. Two other documents specifically tackle the idea of an independent Space Force branch and compare the plight to early struggles of airpower advocates. Michael C. Whittington's *A Separate Space Force: An 80-Year-Old Argument* compares the complaints of early airpower advocates to the complaints of space advocates in the year 2000 and accurately warns of a future with competitors and threats in space, something commonly left out of other documents on US space operations of the time.[18] The monograph's final suggestion is that, regardless of the organization solution, in the Air Force, there "must be a significant shift from an airpower to a spacepower culture."[19] The other monograph on Space Force independence, Jeffrey R. Swegel's *Fork in the Path to the Heavens: The Emergence of an Independent Space Force*, suggests that when space forces transition from enablers to warfighters, the "time might be right" for Space Force independence.[20] While both arguments have merit, they do not capture all the requirements to stand up an independent service which are explained later in this monograph.

Interest in space has recently spiked with a regular publication of online news reports and journal articles. This increase is due to President Trump's recent direction to stand up a Space Force, the proliferation of civilian space lift such as *SpaceX*, and the re-emergence of peer competition in space for the United States.

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[17] Edward J. Tomme, *Expansion or Marginalization, How Effects-Based Organization Could Determine the Future of Air Force Space Command* (Maxwell AFB, AL: Air University Press, 2008), 2-5, accessed March 5, 2019, https://www.jstor.org/stable/resrep13836.9.

[18] Michael C. Whittington, *A Separate Space Force: An 80-Year-Old Argument* (Maxwell Air Force Base, AL: Air University Press, 2000), accessed March 5, 2019, http://research.maxwell.af.mil.

[19] Ibid., 15.

[20] Jeffrey R. Swegel, "Fork in the Path to the Heavens: The Emergence of an Independent Space Force" (monograph, School of Advanced Military Studies, US Army Command and General Staff College, 2002), 56, accessed March 5, 2019, https://archive.org/details/DTIC_ADA403851.

US Air Force History

United States military aviation started in the beginning of the Civil War when the Union Army used balloons for the first time, primarily for reconnaissance.[21] From 1863 to 1890 however, the US military had no balloon operations until the Chief Signal Officer, Brigadier General Adolphus Greely included the mission of aerial navigation into the Signal Corps.[22] In 1892, the War Department established a balloon section in the Signal Corps, and a balloon was used for observation in Cuba during the Spanish-American War.[23] Aviation would change forever on 17 December 1903 when "Orville and Wilbur Wright made four successful flights in a biplane powered by a gasoline engine."[24] However, the airplane did not immediately spell the need for an independent service, drive consensus on how airpower would be employed, or even exterminate the dirigible from US Army service. Lighter-than-air flight by ballooning or dirigibles advanced in Europe for observation and even bombing and remained a part of US Army aviation for several years with a "revival of interest in tethered observation balloons just before the United States entered World War I."[25] United States air arm organizations went through an iterative, seemingly stair-step process with several growth stages in the forty years following the airplane's invention, and an independent Air Force was accomplished when key leadership, security, and capability factors emerged.

1907-1918 Aeronautics/Aviation Division

This initial organizational change took place shortly after the invention of "heavier-than-air" flight and although the airplane was a drastic advance over the past fifty years of US military ballooning, it would not drive organizational change until passionate advocates, technological

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[21] Hennessy et al., *The United States Army Air Arm April 1861 to April 1917*, 1.

[22] Ibid., 11–12.

[23] Ibid., 12–13.

[24] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 7.

[25] Ibid., 15.

advances, national security issues, and successes in World War I provided motivation to national leadership to support growth.

Although the Wright Brothers made the first flight at Kittyhawk, North Carolina, in December 1903, it would take the US Army nearly six years and some convincing to purchase their invention and its practical use would initially be limited to observation. Initial growth and advocacy with airplanes in the Army was accomplished from the ground up, with many of the accomplishments attributed to work and innovation by low-ranking officers, slowing its proliferation. Major George O. Squirer, a former theoretical aeronautics instructor, is credited with actions that would lead to the birth of the US Air Force. As executive officer to Brigadier General James Allen, US Army Chief Signal Officer, Major Squirer persuaded Allen to create a new Aeronautical Division of the Signal Corps, with an officer, Captain Charles DeForest Chandler, and two enlisted men.[26] This act would be the first in a chain of organizational changes of what would eventually become the US Air Force forty years later. Perhaps progress would have been faster had death rates from crashes not been so high among the early aviation pioneers and advocates, reducing their numbers. First Lieutenant Thomas E. Selfridge is a prime example of the early aviator losses. Selfridge worked with inventor Alexander Graham Bell on experimental glider flights in 1907 and in 1908, he designed an airplane and was the US Army's first solo airplane pilot. [27] Later that same year, Selfridge was the US Army's first aviation fatality when he died from injuries sustained in a crash while a passenger on a demonstration flight with Orville Wright.[28] During a short time period surrounding 1912, "eight of fourteen qualified military aviators had been killed in crashes."[29] In 1913 "five officers left the cockpit… out of the

[26] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 10.

[27] Hennessy et al., *The United States Army Air Arm April 1861 to April 1917*, 37.

[28] Ibid., 33; Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 13.

[29] DeWitt S. Copp, *A Few Great Captains: The Men and Events That Shaped the Development of U.S. Air Power* (McLean, VA: EPM Publications, 1989), 9.

fourteen on duty when the year began."[30] Even Second Lieutenant Henry H. "Hap" Arnold, who would later become Commanding General of the Army Air Forces during World War II, was shaken following a near-crash in 1912 and requested a leave from aviation duty, not to return until 1916.[31]

The Army accepted the Wright airplane on August 2, 1909, after a series of tests to prove it could meet speed and endurance requirements.[32] Imagination and innovation on aircraft use would quickly grow beyond simple observation. As early as 1910, the Army participated in several "experiments" to drop bombs, fire rifles and pistols from aircraft, and even involved the Remington Arms Company to "help design a rifle sight that would compensate for the rate of travel of the airplane."[33] In 1911, airmen training at an airfield in College Park, Maryland, even tested a wireless telegraph on board a Wright aircraft.[34] United States military aviation technical and tactical advances continued to evolve but they did not make much of an impact on airpower effectiveness or support outside of the Air Division.

During conflicts with Mexico from 1913 to 1916, US Army aviation deployed to Texas each year, but provided minimal combat effectiveness, highlighting a lack of support for airpower growth. Airmen complained of "old and unsafe aircraft" that in 1916 specifically, when tasked to fly communication and observation missions, were not powerful enough to clear the mountains or manage the windy mountain passes and proved ineffective.[35] Brigadier General John J. Pershing, Commanding General of the Punitive Expedition, dismissed these aircraft as "useless either for

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[30] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 26.

[31] Hennessy et al., *The United States Army Air Arm April 1861 to April 1917*, 72; Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 26.

[32] Hennessy et al., *The United States Army Air Arm April 1861 to April 1917*, 34.

[33] Ibid., 47.

[34] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 22.

[35] Ibid., 29–30.

reconnaissance or for maintaining liaison with the advance elements."[36] However, outside of the United States in the same year, airplanes were being used successfully in European theater for air superiority, reconnaissance, artillery observation, and bombardment.[37]

The initial air arm growth mirrored its battlefield use and successes, initially very slow and then rapid by the end of the First World War. "Between October 1908 and 30 June 1914, $430,000 had been spent for aeronautics, including $50,000 of the $250,000 appropriation for 1915 which had been made immediately available. "From these funds, 30 airplanes had been purchased by the Signal Corps."[38] A 1914 law created an Aviation Section within the Signal Corps authorizing an additional sixty officers and 260 enlisted men to serve in aviation in the Signal Corps.[39] Despite these measures, the US Army prewar budget on aviation trailed significantly behind the "great European forces," with Germany spending the most at $45 million and Italy the least at $800,000.[40] The threat of war increased spending on the military, including aviation. "The *National Defense Act* of June 1916 included a modest expansion of personnel in the Signal Corps Aviation Section; large appropriations for Army aviation were included in the fiscal year 1917 appropriation."[41] The additional funding from the war allowed the air arm to expand drastically. Between April 6 1917 and November 11, 1918, the Army air arm grew from 1200 officers and men to nearly 200,000 personnel.[42]

The United States' involvement in World War I proved to be a huge boost to proving the capability of its airpower beyond observation after the failures in Mexico. The beginning of the

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[36] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 30.

[37] Nevin and Time-Life Books, *Architects of Air Power*, 26.

[38] Hennessy et al., *The United States Army Air Arm April 1861 to April 1917*, 112.

[39] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 28.

[40] Hennessy et al., *The United States Army Air Arm April 1861 to April 1917*, 128.

[41] Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force: 1907-1960*, 19.

[42] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 51.

war did not bode well for the Army's air arm, "because of a mix-up in orders, the 1st Division set out for France in June without the Army's only air combat unit, having left the 1st Aero Squadron at Nogales, Arizona."[43] But, by the war's final year, Mitchell successfully commanded nearly 1500 aircraft flown by US and allied pilots at St. Mihiel, "gained vital control of the air which greatly aided the American Expeditionary Force's (AEF) first major push," and earned promotion to brigadier general.[44] This operation represented the first large scale massing of airpower under central command.[45] In the Meuse-Argonne Offensive, Mitchell successfully commanded a bombardment mission of two hundred aircraft behind enemy lines against German troops, dropping seventy-nine tons of explosives, half of the total dropped by the United States in the war.[46] In total, the "AEF Air Service destroyed 776 enemy planes and seventy-two balloons, dropped 138 tons of bombs in 150 raids, and took 18,000 individual photographs of German positions."[47] The British and Germans did use their air forces, which consisted of airplanes and airships, for strategic-type bombing, but without much success. Agreeing with the British analysis of the bombing, one German officer stated: "the destructive effect did not correspond with the resources expended."[48] For now, the airplane "remained basically a battlefield weapon, for it lacked the range and striking power and was not available in sufficient numbers to carry the war far beyond the trenches and demoralize the enemy or cripple his ability to fight."[49]

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[43] Nevin and Time-Life Books, *Architects of Air Power*, 52.

[44] Copp, *A Few Great Captains*, 23.

[45] Saltzman et al., *Introduction to the United States Air Force*, 6.

[46] Copp, *A Few Great Captains*, 23.

[47] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 69.

[48] Nevin and Time-Life Books, *Architects of Air Power*, 30.

[49] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 68.

1918-1926 Army Air Service

As the year 1918 concluded, the war ended through the Armistice and the US Army's air arm proved capable of projecting combat power against an enemy. However, 1918 would not see an independent US Air Force as in Great Britain's creation of the Royal Air Force. The United States did not have the same experiences as Great Britain or Germany, it did not have enemy airplanes or airships bombing its cities, and had vast oceans as borders, reducing the threat of attack. European countries experienced heavy losses in combat through the war, and airplanes offered a potential way to end the stalemate, continue fighting without heavy (friendly) casualties, and provided a way to carry the war beyond the battlefield.[50] Although, Congress did approve a change to military aviation with the *National Defense Act* of 1920, "airpower enthusiasts were disappointed" that the Air Service was still subordinate to the Army.[51] Aviators and traditional, non-flying Soldiers would continue to see the role of the aircraft differently. "The Army saw the airplane as another weapon in service to the ground war. "Postwar air leaders, however, saw a weapon of boundless potential."[52] Regardless of the drastically smaller budgets and the host of adversaries to airpower expansion within the War Department leadership, the years of the Army Air Service contain the "seeds of far greater prosperity."[53] This period following the World War saw several aviators, especially the outspoken airpower advocate, General Mitchell, armed with wartime experience, legislation friendly to an expanded air arm, and technological advancements that led to the Air Service gaining more responsibility in its next, albeit small step in growth in just a few short years.

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[50] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 76.

[51] Tate, *The Army and Its Air Corps*, 14.

[52] Matthew K. Rodman, *A War of Their Own: Bombers over the Southwest Pacific* (Maxwell Air Force Base, AL: Air University Press, 2005), 1-2.

[53] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 72.

Combat leadership and war-time experience provided aviators credibility for their airpower arguments, given at every opportunity. Aviation successes initiated discussion and inquiry boards for possible changes, however these early boards did not produce the results that airpower advocates wanted. Aviators' testimony was not enough to overpower opponents of their cause, prominent men credited with winning the war such as General Pershing and Secretary of War Newton D. Baker.[54] The *National Defense Act* of 1920 was a step forward, giving nearly all but operational control of Army airpower to the Air Service, establishing permanent manpower, and authorizing a major general as the Air Service Chief.[55] Aviation units were distributed to the nine corps area commanders, ground officers, who were "now responsible for the operations and training of all the forces within their assigned geographic regions."[56] The Air Service Chief controlled supply depots and formal schools and was responsible for research and development, procurement, and recruitment of personnel.[57] These changes to increase the Air Services' prominence failed miserably to pacify the opinions and tenacity of airpower advocates. Mitchell asserted that aircraft could keep the United States' coasts safe better than the Navy and in 1921 spearheaded a demonstration to prove airpower alone could successfully sink a modern battleship.[58]

Four more shaping events would take place prior to the next decision to change the Army's air arm, three of which were inquiry boards. The Lassiter Board in 1922, was ordered by Secretary of War John W. Weeks to consider changes proposed by Army Air Service Chief, Major General Mason M. Patrick. The Lampert Committee in 1925, was appointed by the Speaker of the House of Representatives to investigate military aeronautics. And the Morrow

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[54] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 74.

[55] Ibid., 76.

[56] Ibid., 77.

[57] Ibid., 76–77.

[58] Saltzman et al., *Introduction to the United States Air Force*, 8.

Board in 1925, was initiated by President Calvin Coolidge as a "vehicle for reshaping aviation policy and minimizing the public and political impact of the Mitchell trial," which was the fourth shaping event.[59] Mitchell's military career was cut short when President Coolidge called for his court-martial following Mitchell's comments regarding military dirigible accidents and aircraft crashes: he said the incidents were "the direct result of incompetency, criminal negligence, and almost treasonable administration of the national defense by the War and Navy Departments."[60] Aviators' opinions regarding Mitchell's actions range from supportive to condemning and even that they "probably had no effect at all on the development of aviation," but Captains Carl Spaatz and Ira C. Eaker agreed the "episode had been essential to bring to public attention the neglect of military aviation."[61] Perhaps lesser known today, but more significant at the time were General Patrick's suggestions to both the Lassiter and Morrow boards to create an "autonomous" corps inside the Army, similar to the Marine Corps within the Navy.[62]

Despite Mitchell's publicity and the high-level debate on airpower, there was not enough political or military support for an independent service. The House Military Affairs Committee was only willing to make changes similar to those proposed by the Morrow Board, seemingly agreeing with General Patrick's proposal.[63] After the war, funds became unavailable, manning declined, and "like the rest of the Army, the Air Service had entered a period of austerity that would last until the eve of another war."[64]

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[59] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 102.

[60] Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power* (Bloomington, IN: Indiana University Press, 1975), 101, quoted in Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 99.

[61] Tate, *The Army and Its Air Corps*, 45.

[62] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 97, 103. Major General Patrick was an Engineering officer and General Pershing's classmate at West Point. Pershing appointed then-Brigadier General Patrick to Chief of the AEF Air Service during World War I. Patrick returned to the Corps of Engineers following the war, but in 1921, returned as Chief, Army Air Service and continued to serve as Chief, Army Air Corps. Patrick earned his junior military aviator wings at the age of 59.

[63] Tate, *The Army and Its Air Corps*, 47.

[64] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 78.

1926-1941 Army Air Corps

Following the Morrow board recommendation, Congress approved the formation of Air Corps within the US Army in the *Air Corps Act of 1926*.[65] This extremely significant organizational structure change would sustain the US Army air arm to World War II. Though, without independence, this was still not the change serious advocates had hoped.[66] Creation of an Air Corps did give the air arm an "organizational status on par with" the infantry and cavalry.[67] The Act included another air arm expansion of personnel and aircraft, authorization for two more brigadier generals, and creation of an Assistant Secretary of War for Air, assuring representation on the War Department General Staff.[68] But aviation would operationally still align under separate corps commanders, not centrally under an airman to concentrate airpower as Mitchell had done in World War I. The Air Corps in reality was not as autonomous as General Patrick had advocated, and "resembled the Army's Signal Corps or Quartermaster Corps rather than the Navy's Marine Corps."[69] However, it would achieve shadows of independence with the creation of the General Headquarters (GHQ) Air Force and eventual consolidation under Major General Henry "Hap" Arnold resulting from dispassionate arguments by matured aviators presented to Army leaders, commissions, and boards; technological advances and capability improvements; and a credible world threat that increased spending and opportunity for airpower.[70] Creation of the Air Corps at a time of post-war military constriction was done by the efforts of men like Mitchell, who sacrificed himself for the cause, and those like Patrick, Arnold, and Major Horace

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[65] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 103.

[66] Tate, *The Army and Its Air Corps*, 47.

[67] Nevin and Time-Life Books, *Architects of Air Power*, 132.

[68] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 104.

[69] Ibid., 103.

[70] The General Headquarters Air Force or GHQ Air Force was a heritage from the World War I US Army GHQ. With creation of the GHQ Air Force, the Army's air arm would have its authority divided into two with the GHQ responsible for combat effectiveness and the Air Corps responsible for procurement and supply.

Hickam who were able to advocate without alienating themselves to Army and national leadership. Hold-outs countering the use of strategic bombing and an independent air force still existed in the War Department, although they had seemingly softened recently. Army Chief of Staff, General Douglas MacArthur, had provided a boost to long-range bomber development in 1931 when he garnered an agreement with the Chief of Naval Operations, Admiral William V. Pratt for Army ownership of coastal defense. In 1935, General MacArthur commented in his annual report on focusing on the "proven" uses of airpower such as supporting ground troops, air superiority, reconnaissance, and transport versus supporting the "conjecture" of strategic bombardment against an enemy's "unarmed centers of population and industry."[71] Despite MacArthur's annual report, the theory of strategic bombardment "was receiving grudging recognition from the General Staff" and Chief of the War Plans Division, Brigadier General Charles E. Kilbourne, drafted a statement in 1935 endorsing strategic bombardment "should circumstances prove appropriate."[72] "For the Air Corps, strategic platforms amounted to a foot in the door toward a separate service."[73] Unfortunately, to take another step in expansion required a significant threat to the national security. For the sake of independence, that threat would come, providing ample opportunity for strategic bombardment.

Like the period from 1918-1926, the years after 1926 included boards and inquiries, allowing airmen to inform national and Army leadership, leading to further iterative changes and giving aviation more autonomy. The Drum Board, in 1933, was directed by General MacArthur to revise an expansion plan submitted by the Office of the Chief of the Air Corps. The Baker Board in 1934, was initiated by Secretary of War, George H. Dern to examine the condition of

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[71] *Annual Report of the Chief of Staff for the Fiscal Year Ending June 30 1935, included in the Report of the Secretary of War* (Washington DC: GPO, 1935), 62, quoted in Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 149.

[72] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 149.

[73] Rodman, *A War of Their Own*, 4.

military aviation following the Air Corps taking over the US Air Mail operation.[74] One aviator served on the Drum Board out of five total board members and the Baker Board had three aviators of eleven total board members. The Howell Commission, tasked by President Franklin D. Roosevelt to examine all parts of US aviation following the Air Corps' Air Mail operation, was an independent panel "immune to influence by the General Staff" and although it did not include aviators, it heard from many ranks.[75] Except for Mitchell's comments to the board, the Air Corps officers' testimony "was marked by restraint."[76] These panels successively recommended increased responsibility for the Air Corps, culminating in the Howell Commission, agreeing with the Baker Board results, in support of immediate formation of the GHQ Air Force with an airman commander reporting directly to the Chief of Staff in peace and the AEF commander in war.[77]

By the mid-1930s, air power use around the world would add support to the airmen who urged shifts in organization and the importance of an independent air force. The Spanish Civil War between the Nationalist and Republican forces from 1936-1939, also included support from the German, Italian, and Soviet military air arms.[78] Fifty *Luftwaffe* bombers destroyed the town of Guernica in just hours, convincing Great Britain and France that confrontation with Hitler's Germany could spell equal destruction for their cities.[79] "Italian attacks on defenseless Abyssinian villages, Japanese air raids on crowded Chinese cities, and German attacks on Spanish towns fed concerns for national survival that were rooted in the bombings of World War

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[74] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 122-125. In 1934, President Franklin D. Roosevelt cancelled airmail contracts between the post office and commercial airlines. The Chief of the Air Corps accepted the task to temporarily deliver the mail. During the first week of operations, six Army flyers were killed in crashes due to darkness and poor weather.

[75] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 127–128.

[76] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 128; Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force*, 72. Mitchell denounced the GHQ Air Force as a fraud, designed to delay real independence. Most senior Air Corps officers were willing to give the GHQ Air Force a chance, and did not comment on independence.

[77] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 126–128.

[78] Nevin and Time-Life Books, *Architects of Air Power*, 148.

[79] Ibid., 162.

I."[80] President Franklin D. Roosevelt "now turned to the airplane as the visible sign of American resolve" and outlined a program to Major General Arnold to build an Air Corps of 20,000 aircraft and industry to build 24,000 planes annually.[81] "Arnold later described the president's call for expansion of the air arm as the most important event in the history of the Air Corps . . . which liberated military aviation from the arbitrary cielings on manpower by investigative agencies like the Baker board and imposed by legislation."[82]

Furthermore, advances in aircraft capability nullified the arguments of detractors like General MacArthur. There was increasing emphasis upon the offensive principle in war at the Air Corps Tactical School, and the bomber pushed to the front as the chief offensive air weapon, replacing pursuit.[83] Ultimately, development and acquisition of truly strategic bombers finally gave teeth to this argument. The Keystone B-3A bomber, delivered to the Air Corps in 1930, had a maximum speed of 121 miles per hour and a range of 510 miles with a 2,500 pound bomb load, basically the same characteristics as the bombers Mitchell used in his 1921 *Ostfriesland* bombing demonstration.[84] By the middle of the decade, the Air Corps solicited manufacturers for new bombers with a desired range of 2,200 miles, top speed of 250 miles per hour, and bomb load of 2,000 pounds.[85] In 1938 "after nearly a year of service testing the B-17 in the 2d Bombardment Group, Lieutenant Colonel Robert Olds recommended that the B-17 be classified as standard and that the GHQ Air Force's three bombardment groups be equipped with them."[86] These expenditures were made possible during a period of fiscal constraint in part by a sympathetic

[80] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 154.

[81] Ibid., 154–155.

[82] Ibid., 155.

[83] Thomas H. Greer, *The Development of Air Doctrine in the Army Air Arm, 1917-1941* (Manhattan, KS: Sunflower University Press, 1990), 55.

[84] Tate, *The Army and Its Air Corps*, 158.

[85] Ibid., 164.

[86] Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force*, 81.

Congress. In 1934, Congress approved a direct cash appropriation and the Roosevelt Administration made more money available from the Public Works Administration expressly to buy airplanes and "inject life into a dying aircraft industry."[87] By the end of the 1930s, war in Europe would fuel the US government to fund even greater air arm expansion.

1941-1947 Army Air Forces

The conflicts in Europe and the Pacific provided further evidence to the capability of airpower, driving more organizational changes and autonomy. These changes, combined with matured airpower leadership, wartime successes, and technological advancements, allowed airpower, by 1945, to prove its strategic capability and tee up independence. In 1939, General Arnold led both the GHQ and the Air Corps under a unified command. But in 1940, General Marshall, Army Chief of Staff, reversed the order and removed GHQ control from General Arnold. General Marshall, anticipating another overseas employment and replicating the World War I AEF construct, organized an Army GHQ with control over the GHQ Air Force.[88] General Arnold would later be designated as acting deputy chief of staff for air and in June, 1941, the War Department would reorganize the air component and adopt a regulation creating the Army Air Forces consisting of two elements: the Air Corps and Combat Command, both under General Arnold's oversight.[89] This change highlighted the Army leadership's increased trust in airpower, its wartime capabilities, and its leaders. Although unknown at the time, the change also empowered the Army Air Forces' upcoming efforts in the European and Pacific conflicts. A final death knell to hold-out opinions, in 1943, the War Department released Field Manual 100-20, *Command and Employment of Air Power,* which stated "air and ground were co-equal and the

[87] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 136.

[88] Ibid., 180.

[89] Ibid., 181.

gaining of air superiority was the first requirement for success of any major land operation."[90] The Army Air Forces' new autonomy, along with preparing for conflict quieted protest for a separate air force. While money the Army Air Forces needed for new equipment had to be shared with ground forces, it did not have to spend its own money on "housekeeping" and secondary services such as medical, chaplains, engineering, and signal.[91] An important point since, once independent, the future US Air Force could not count on the Army to provide those aspects essential to running a stand-alone service and would have to spend from its own budget to provide them. This proved a problem for the independent Royal Air Force as even facing war, "in 1940, [it] still did not have bombers that had been designed in 1935-36."[92]

In addition to the favorable environment brought about by the war-time expansion, the Army Air Forces capitalized on a leadership corps with the right temperament, not a defiant one forcing independence but one that created positive relationships with the Army leaders, yielding positive results for unified command. Arnold had a "harmonious relationship with Marshall" and was treated as equal to the British Air Staff Chief, "functioning as [his] American counterpart."[93] General Arnold lobbied for and maintained control of the B-29 force's operations against Japan, not letting theater commanders take control and retaining "executive direction" by an airman.[94] By 1945, General Arnold commanded the Army Air Forces that had grown from 51,000 personnel in 1940 to 2,300,000 in 1945, including long-time advocates such as General Carl A. Spaatz, Lieutenant General James H. Doolittle, Major General Ira C. Eaker, and Major General Claire L. Chennault and newcomer superstars, such as Major General Curtis E. Lemay. The US Army air arm had never been so professionally led and so large.

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[90] Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force*, 138.

[91] Tate, *The Army and Its Air Corps*, 179.

[92] Henry H. Arnold, *Global Mission* (New York: Harper, 1949), 160 quoted in Tate, *The Army and Its Air Corps*, 179.

[93] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 180, 190.

[94] Ibid., 342.

The Army Air Forces did not ultimately prove the adage of "the bomber will always get through," in the European Theater, from 1942 to 1945, the Army Air Forces lost more than 5000 bombers to enemy air-to-air and anti-aircraft fire.[95] And, senior air power leaders, along with Army and Navy leadership, agreed that no one service won the war, but without airpower winning was impossible.[96] The United States' bombing of Japanese industry showed that strategic bombing was a success in making an invasion of Japan "unnecessary."[97] Bombers were able to devastate a Japanese "homeland ill-prepared for such an aerial onslaught. The B-29s burned whole cities, in the process razing irreplaceable factories."[98]

Aircraft technology and capabilities employed in 1944 may have been enough to justify airmen's claims of the strategic capability of airpower, and airpower would continue to improve throughout World War II. By the war's end, Germany introduced the Me 262, the first operational turbojet interceptor.[99] The United States employed the massive B-29 to drop the first and the last nuclear weapons used in combat. These innovations showed that a new and more destructive power, delivered through the air, was at the hands of world leaders. Airpower was now able to reach farther, faster and deliver more firepower than was imaginable only fifty years prior and could use that to further expand its influence despite the drastic post-war manning and funding cuts sure to arrive in 1946. Additionally, with the war over, the Army Air Forces could afford to give more attention on reorganization efforts, since the air arm could not fight the war and establish independence at the same time.[100] President Harry S. Truman, not alone in his thinking, but perhaps the most important advocate, was convinced of the value of airpower as well,

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[95] Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force*, 156.

[96] Ibid., 171.

[97] Ibid., 170.

[98] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 367.

[99] Ibid., 312–313.

[100] Tate, *The Army and Its Air Corps*, 179.

proposing to Congress, in 1945, a defense reorganization with three coequal departments, Army, Navy and Air, then in 1946 again "insisted that there would be a single department of defense with coequal army, navy, and air force branches."[101]

1947 Independent US Air Force

The quest for independence was not dashed despite the drastic cuts following the war; Army Air Forces manning reduced from more than two million personnel in 1945 to 300,000 in 1947, but the air arm was able to gain independence due to the vision and foresight of its leaders and an emerging global threat. General Arnold provided his vision to the Army Air Forces in 1945 with a prediction that soon new weapons and techniques would emerge and "aircraft, piloted or pilotless, will move at speeds far beyond the velocity of sound. Guided missiles would travel thousands of miles to destroy their intended targets."[102] The Army Air Forces, even after Arnold's retirement, had a leader who continued his ideas and prepared the Army Air Forces for its seemingly inevitable separation from the Army. General Spaatz "hoped to avoid a postwar reorganization as part of the Army followed by a second restructuring once independence had been gained…by creating components that could be absorbed by an independent air force."[103] "He set up three major operating commands: the Strategic Air Command, the Tactical Air Command, and the Air Defense Command, reflecting not only the three basic combat missions that had evolved during World War II but also the basic organization that [General] Eisenhower favored."[104] General Spaatz also assured the next Army Chief of Staff, General Omar N. Bradley that the Air Force would always honor commitments of tactical air and support the Army's needs.[105] For years, starting before war's end, military members and politicians discussed service

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[101] Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force*, 193–194.

[102] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 373.

[103] Ibid., 375.

[104] Ibid.

[105] Ibid.

organization and responsibilities. “During 1946, lengthy hearings before congressional committees and numerous Army-Navy conferences enabled the services to develop their respective positions and determine what Congress was likely to approve in the way of armed service reorganization.”[106] Forty years after the first aeronautics organization in the US Army, the *National Security Act* of 1947, signed in July, created the independent US Air Force.[107]

US Space Forces Organization History

Space force organization by comparison saw a much faster rise to definitive structure in the United States. Rockets had interested the military for years, but capable ballistic missiles only appeared near the end of the World War II. Initiating the timing of US space efforts in 1945 following the war, the United States took only sixteen years’ effort to reach an initial space organization formation driven by national security threats and presidential policy on space. By 1961, the United States had not created one space force, but two, NASA and the National Reconnaissance Organization (NRO), and gave major responsibility to an existing third, the US Air Force. Space asset organization can be separated into five periods since 1945. The years from 1945 to 1957 were a race among participants among the three service organizations until a singular event drove direction and organization. 1958 to 1982 saw the initial formation of the space agencies, including NASA’s formation in 1958 and the NRO in 1961 (albeit secretly), and then followed with the “space race.” From 1982 until 1991, the Department of Defense created two space commands, the Air Force Space Command (AFSPC) and US Space Command (USSPACECOM) during President Ronald Reagan’s increased pressure on the Soviet Union. The period beginning in 1991, although it included a space-fueled military triumph in the Persian Gulf War, saw a de-emphasis of space with the fall of the Soviet Union and subsequent USSPACECOM deactivation and mission reorganization among Air Force Major Commands.

[106] Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force*, 193.

[107] Ibid., 196.

The final period began in 2018 with an organized reemphasis and commitment on space and the (re)approval of USSPACECOM.

1945-1957 Disorganized Efforts

The years immediately following World War II involved a disjointed space effort from military services along with civilian companies, each working with no effective alignment until the Soviet Union provided a catalyst with *Sputnik*, the first-ever artificial satellite successfully launched into orbit on 4 October, 1957. Initial efforts on missile programs, the genesis for space programs, were not centralized and appeared as a "three-tined fork composed of military, scientific, and industrial interests."[108] Aligning with early airpower arguments that airpower is strategic and should be led by airmen, Air Force leadership was vocal that they should have principal space mission responsibilities. Air Force Vice Chief of Staff, General Hoyt S. Vandenberg, in January, 1948, said: "the US Air Force, as the service dealing primarily with air weapons, especially strategic, has logical responsibility for the satellite."[109] However, it would be the US Army's modified Jupiter program that had the first success in space launch in 1958 with Explorer 1.[110]

Until 1958, the United States relied solely on its bomber force for a nuclear deterrence capability, "since bomber aircraft were the only delivery systems that could carry the large weapons."[111] In 1949, the Soviets became the second nuclear armed nation with their successful detonation and by the mid-1950s thermonuclear weapons had come onto the world's stage. Not only was there a capability to hit another country with a rocket as Hitler had with the V-2, but

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[108] R. C. Hall and Jacob Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century* (Fort Belvoir, VA: Defense Technical Information Center, January 1, 1998), 19, accessed November 15, 2018, http://www.dtic.mil/docs/citations/ADA442852.

[109] Paul B. Stares, *Space Weapons and US Strategy* (London: Croom Helm, 1985), 28, quoted in Air University et al., *Space Primer*, 55.

[110] Mark Erickson, *Into the Unknown Together: The DOD, NASA, and Early Spaceflight* (Maxwell Air Force Base, AL: Air University Press, 2005), 4.

[111] Air University et al., *Space Primer*, 8.

now existed the potential to put a nuclear payload onto that rocket and even launch a satellite to monitor Soviet actions and provide information on what they were doing.[112] Nuclear technology advanced quickly and by early 1953, successful testing "led experts to predict the advent of thermonuclear warheads weighing only 1,500 pounds with a yield of one megaton."[113] But, even with these potential threats, the United States' "pre-Sputnik space enterprise remained minuscule compared with expenditures on other civil and military government activities."[114] The nation's space organization and efforts would require a greater push than a *perceived* threat; it would take an actual Soviet lead to push the United States to make significant moves.

1957-1982 The Space Race

The Soviet Union's successful launch into orbit of the world's first satellite, *Sputnik*, on 4 October 1957, provided a catalyst to root the United States and Soviet Union into a space race as part of the Cold War.[115] The launch showed the United States a credible threat from Soviet intercontinental ballistic missiles, as the missile that delivered the satellite could have been used to deliver a weapon and the defense system employed by the United States at the time could not stop it.[116] Not until the US Army successfully launched its Explorer satellite in 1958 did the United States' situation seem not so dire. But the initial scare and the space race it spurred provided significant national security threat, and with clear presidential direction that followed, enough energy for rapid changes in organization driving space force growth and composition for

[112] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 21.

[113] Ibid., 34.

[114] Ibid., 25-26. Prior to the Soviet Union's Sputnik launch in 1957, the US Defense Department did not allow military leaders to publicly discuss military uses of space and Donald Quarles, Secretary of the Air Force even denied full funding for the Air Force's satellite project at Lockheed Martin, only allowing subsystem design work. See Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century* for more detailed information.

[115] Air University et al., *Space Primer*, 14.

[116] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume II*, 60–61.

twenty years. By 1961, three major entities had emerged to lead national space operations and associated support.

Only months after Sputnik's launch, the United States moved frantically to organize its space efforts. Defense Secretary, Neil H. McElroy, ignored military services' objections and established the Advanced Research Projects Agency (ARPA) in February, 1958, to handle all aspects of research and development, with scientists playing the leading role in guiding the space program.[117] ARPA would lose status as the central Defense Department agency for space activities by 1959 and "faded from importance in the space field," but continued in cutting-edge research and development.[118] "Although short lived, ARPA was essentially the first official US space agency."[119] The *National Space Act* of 1958 created another agency, NASA, purposefully civilian, to operate one space effort arm, "while the Air Force and other military services and agencies jockeyed for position within the Defense Department and the overall national space program."[120] President Dwight D. Eisenhower was committed to a "space for peace" policy and decided that the United States' leader for space exploration and development needed to be a civilian program and not run by the Defense Department.[121] Similarly, Eisenhower agreed with an evaluation led by his science advisor, George Kistiakowsky, that reconnaissance satellites were a vital national asset and too important for one service to both direct and control.[122] He endorsed a proposal to establish another civilian agency that "would soon become responsible for all reconnaissance satellites and be formally named the National Reconnaissance Organization in 1961, early in the administration of President John F. Kennedy."[123] Also in 1961, the Air Force

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[117] Futrell, *Ideas, Concepts, Doctrine Basic Thinking in the United States Air Force*, 590–591.

[118] Erickson, *Into the Unknown Together*, 65.

[119] Air University et al., *Space Primer*, 10.

[120] Spires et al., *Beyond Horizons*, 2.

[121] Air University et al., *Space Primer*, 10.

[122] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 30.

[123] Ibid.

took responsibility for all "research, development, test, and engineering of Department of Defense space development programs or projects."[124] For the foreseeable future, the United States' space organization would also have three heads: civilian, military, and the classified NRO.

Presidential direction was key to shape the progress and organization efforts that quickly formed in the late 1950s and early 1960s. President Eisenhower provided the space program's policy and vision, shaped by his earlier life experiences, with President Kennedy following through on the initiatives and sentiment that his predecessor started. "As president, his scientific advisor, James Killian, remarked that Eisenhower remained 'haunted' . . .'throughout his presidency' by the threat of surprise nuclear attack on the United States. To avoid this horror, intelligence data on Soviet military capabilities became essential." [125] After Central Intelligence Agency pilot Francis Gary Powers was shot down over the Soviet Union in 1960, an increased need to mitigate U-2 overflights of the Soviet Union, space, and the freedom it provided to observe the Soviet Union was an attractive alternative for the United States' intelligence needs.[126] Additionally, "Eisenhower's deeply-held beliefs about the danger of excessive government spending and his conception of the Cold War as a long-term struggle meant that he followed a more measured course."[127] The Kennedy Administration continued with Eisenhower's theme of "space for peace," notably killing off some Air Force's projects such as "Dyna-Soar," a rocket powered space bomber, that might have provoked the Soviets to target the United States' reconnaissance satellites.[128]

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[124] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 30.

[125] Spires et al., *Beyond Horizons*, 30.

[126] Francis Gary Powers, a U-2 pilot, was shot down over Soviet Union airspace while flying a reconnaissance mission for the CIA. He was convicted of espionage and imprisoned in the Soviet Union for nearly two years until returned to the United States in a prisoner exchange.

[127] Erickson, *Into the Unknown Together*, 527.

[128] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 70.

An independent Space Force is not a new concept, and was opposed by the Air Force in the early days of the space race, leading to the Air Force's primacy in US space operations. Providing a contrasting view of organization was Chief of Naval Operations, Admiral Arleigh Burke, who "projected large-scale space operations in the near future" and "proposed creating a single unified military space command," versus Air Force leaders who opposed with the belief that the policy is to integrate weapons within an existing unified or specified command.[129] Air Force leaders, perhaps skeptical after years of airpower being a part of the Army, felt that their service should "own" the military aspects of space. As reflected in General Vandenberg's statement in 1948, Air Force leaders have traditionally viewed space as an operating area in which the Air Force would have principal mission responsibilities.

Contrasting the whirlwind growth in space operations of the 1960s, "in the early 1970s, the American space community found itself in disarray."[130] The country was drawing out of the unsuccessful Vietnam War and President Richard M. Nixon changed national policy to one of détente to ease tensions with the Soviet Union. This "throttling back" restricted the military's ability to project space supremacy. In effect, by decade's end, budgetary pressures and the impact of the Vietnam War compelled the Air Force to return to more traditional institutional interests. A blow to the Air Force's plans in space, in 1969, due to budget cuts, the Nixon Administration cancelled the Air Force's Manned Operating Laboratory, a planned orbiting spacecraft to test the capabilities of military crews and spacecraft.[131] It also canceled the last three planned Apollo missions due to cost and lack of public interest.[132] The money and appetite for lucrative research and development for the Air Force began to dry up. "However desirable improved

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[129] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 40.

[130] Spires et al., *Beyond Horizons*, 174.

[131] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume II*, 177.

[132] David W. Compton, *Where No Man Has Gone Before: A History of Apollo Lunar Exploration Missions*, NASA SP-4214 (Washington, DC: Government Printing Office, 1989), chapter 12, quoted in Erickson, *Into the Unknown Together*, 525.

communications and navigation might be, space projects seemed more a luxury than a necessity."[133]

1982-1991 Department of Defense Reorganization - Increased Space Emphasis

By the early 1970s, the Air Force had lost the last of its manned space flight initiatives to NASA; the service realized it needed a change to retain primacy within the Defense Department and put "more focus on operational organizational and management decisions."[134] Due to the disarray following the Apollo program demise, "beginning in the mid-1970s Air Force leaders began a long process of building consensus for some type of centralized space organization, integrating military space requirements into mission and system architecture planning."[135] By the 1980s, although NASA and the NRO remained organized in the same manner, a changing presidential policy and resurgence of emphasis on Soviet threats to national security again drove changes in the military branches of US space force organization with the creation of AFSPC in 1982, and shortly after, USSPACECOM in 1985.

In 1980, Ronald Reagan was elected president, and as a staunch anti-communist, he brought a change in policy to the nation with an emphasis on defeating the Soviet Union. "With the arrival of the Reagan administration in early 1981, the pace of events threatened to outrun the ability of Air Force leaders to control it."[136] "The military space budget expanded and new missions and capabilities appeared, all driven by the Soviet threat and a worldwide proliferation of high technology weapons."[137] Then, in 1982, the US Air Force created its Air Force Space Command to "operationalize and normalize space operations, recognizing the intersection of a

[133] Spires et al., *Beyond Horizons*, 133.

[134] Ibid., 173.

[135] Ibid., 175.

[136] Ibid.

[137] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 147.

growing reliance and increased vulnerability of the space domain."[138] "Both critics and opponents of arms control agreements increasingly came to rely on space systems to provide crucial national technical means of surveillance and verification ."[139] For AFSPC, it was a win-win situation: space was required both to project power against the Soviets, and to ensure they were meeting the terms of any limitation treaties.

Space operations were not just emphasized in the Air Force. "Joint exercises in 1982 and early 1983 involved elaborate space scenarios for the first time."[140] The creation of AFSPC was a catalyst for a unified command to "to centralize and maximize space operational effectiveness" of all services' space activities.[141] "Above all, the planning and support for a unified space command received a crucial boost from President Reagan's Strategic Defense Initiative (SDI)," since a unified command would be a logical choice for SDI "planning and systems operations."[142] On the heels of the new AFSPC, in 1985, USSPACECOM was established as a unified command for space operations directly responsible to the Joint Chiefs of Staff.[143] "Space activity no longer seemed primarily developmental in nature but, rather, an operational element whose systems could fulfill Air Force missions in a manner comparable to the service's traditional activities."[144] The operations focus established in the 1980s would show its benefit very soon during Operation Desert Storm, against Iraq in 1991.

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[138] Thompson et al., "Space as a War-Fighting Domain" *Air and Space Power Journal* 32, no. 2 (Summer 2018): 1, accessed August 20, 2018, https://www.airuniversity.af.edu/Portals/10/ASPJ/journals/Volume-32_Issue-2/SLP-Thompson.pdf.

[139] Spires et al., *Beyond Horizons*, 175.

[140] Ibid., 218.

[141] Ibid., 217.

[142] Ibid., 218.

[143] Ibid., 217.

[144] Ibid., 241.

1991-2018 Consolidation and De-emphasis of Space

The year 1991 showcased increased space capabilities when assets, honed over the reorganizations of the 1980s, dominated during the Gulf War, but also witnessed a change in the perspective of the threat that had led to US space pre-eminence. Success in the Persian Gulf both revealed that the US military relied on space and inadvertently identified its space infrastructure as a vulnerability to be attacked in future conflicts.[145] After the Soviet Union's collapse, the United States would stand as the world's only superpower, no country stood to challenge the United States' dominance in space.[146] The elimination of any major space competitor or peer enemy and the rise of the Global War on Terror de-emphasized strategic deterrence and along with a potential lack of advocacy, drove consolidation of the military's space assets.

Not twenty years had passed since USSPACECOM creation when, in 2002, the command deactivated due to a completely changed security environment and its mission was transferred to US Strategic Command (USSTRATCOM). This reorganization would not reduce the US military's dependence upon space assets; "space systems had shown their ability to apply strategic assets to tactical contingencies."[147] However, when military focus following the September 11, 2001 terrorist attacks shifted to non-state actors and non-peer military forces, space operations took a back seat to combat operations in the Global War on Terror until threatening competitors would re-emerge ten years later.

2018-Present Re-emphasis on Space, Advocacy and Expansion to USSPACECOM

In June 2018, President Trump announced that he wanted to stand up a sixth armed service, the US Space Force. Congress disagreed in part and approved via the *National Defense Authorization Act* for Fiscal Year 2019, the establishment of USSPACECOM to take the lead,

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[145] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 94.

[146] Kendall K. Brown, *Space Power Integration: Perspectives from Space Weapons Officers* (Maxwell Air Force Base, AL: Air University Press, 2006), 5.

[147] Spires et al., *Beyond Horizons*, 283.

once again, on space as a warfighting domain. While President Trump's major push for a space force and the re-approval of USSPACECOM occurred in 2018, the roots for these changes happened as early as 2004 when President George W. Bush announced a new direction for NASA.[148] Since then, each president has increased the emphasis on space, space has been acknowledged as a warfighting domain, and most importantly, there is a re-emergence of competition in space.

The current period of space force organization seems to be influenced most significantly by President Trump, but each of the three recent presidents have had significant influence on getting increased emphasis for space organizations seen today, even if not specifically support for a Space Force. Although unlikely to occur on schedule, in 2004, President Bush announced that NASA will return to the Moon, setting a timeline of 2020.[149] And, in his 2006 *National Space Policy*, President Bush takes a more "adversarial" tone than he previously had, plainly stating that the United States would take action to preserve its space capabilities against adversaries' use of hostile space capabilities.[150] President Obama, in his 2010 *National Security Strategy*, emphasized the need to "promote security and stability in space" and to "encourage cutting-edge space technology."[151] Most recently, President Trump emphasized the space program in two of his official directives. His *National Security Strategy* acknowledges the critical nature of access and freedom to operate in space, and *Space Policy Directive-1* formally instructed NASA to work toward returning astronauts to the Moon as a stepping stone to Mars.[152] President Trump's efforts

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[148] Air University et al., *Space Primer*, 22.

[149] Ibid.

[150] US Army Command and General Staff College, *US Army CGSC Space Reference Text* (Fort Leavenworth, KS: US Army Command and General Staff College, 2016), 10.

[151] Barack H. Obama, *National Security Strategy*, *National Security Strategy of the United States of America* (Washington, DC: The White House, 2010), 31, accessed February 5, 2019. http://nssarchive.us/NSSR/2010.pdf.

[152] Donald J. Trump, *National Security Strategy of the United States of America* (Washington, DC: The White House, 2017), 31, accessed August 21, 2018, http://www.dtic.mil/docs/citations/AD1043812; Mike Wall, "Trump's New Space Policy Directive 2 Could Make Life Easier for SpaceX and Others,"

culminated with his as-of-yet unfilled direction, in the summer of 2018, for the United States to stand up a sixth military service, the Space Force.

Since 2009, the Air Force reorganized AFSPC and removed non-space aspects from the command, allowing it to focus on space operations. Following a series of embarrassing errors by the strategic nuclear forces assigned to the Air Force's Air Combat Command, the Air Force activated the Air Force Global Strike Command (AFGSC) in 2009 to improve oversight of the service's nuclear assets. Over the months following standing up, AFGSC assumed control of ICBMs from AFSPC and the cyber mission transitioned to Air Combat Command in 2018.

An emphasis on threats and competition in space has been building in recent years, adding fuel to the resurgence of support for space programs and space (re) organization. China demonstrated the capability to destroy a satellite in low earth orbit when, in 2007, it destroyed one of its own satellites at an altitude of 865 kilometers and has continued testing more direct ascent anti-satellite (ASAT) technologies.[153] China also completed its goal to land a probe on the Moon and has a goal to put a person on the Moon by 2020.[154] In addition to increased space exploration and physical presence, China has been accused of malicious behavior by the United States including 2008 and 2014 hacks of NASA Terra Earth and a National Oceanographic and Atmospheric Administration satellites respectively.[155] Although Russia's progress in space capabilities has slowed since the Cold War, Soviet-era ASAT technologies give Russia a substantial advantage in the development of kinetic physical counterspace systems.[156] In March, 2018, Russia tested an anti-satellite missile system that US intelligence determined is for

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Space.Com, accessed October 16, 2018, https://www.space.com/40700-trump-space-policy-private-spaceflight-deregulation.html.

[153] Todd Harrison et al., *Harrison Space Threat Assessment* (Washington DC: Center for Strategic and International Studies, 2018), 8, accessed January 13, 2019, https://aerospace.csis.org/wp-content/uploads/2018/04/Harrison_SpaceThreatAssessment_FULL_WEB.pdf.

[154] Air University et al., *Space Primer*, 22.

[155] Todd Harrison et al., *Harrison Space Threat Assessment*, 11.

[156] Ibid., 13.

targeting global positioning and communications satellites.[157] Additionally, for more advanced countries, new technology is emerging such as hypersonic missiles and directed energy weapons, requiring the United States to increase research into defense from these systems.[158] "Many other countries and non-state actors have developed technologies that are dual-use in nature or are directly intended as counterspace weapons."[159] India, Pakistan, Egypt, North Korea, Ukraine, and even non-state actors have developed kinetic, electronic, non-kinetic physical, and cyber methods to disrupt space systems.[160]

Perhaps because of this increase in competition, space has become increasingly understood as a warfighting domain by civilian and military leaders, with support from all organizational levels in both words and actions. President Trump consistently stated in the 2017 *National Security Strategy* that space is a warfighting domain along with land, maritime, air, and cyberspace.[161] On 1 December 2017, USSTRATCOM additionally strengthened space operations, establishing a joint force space component commander. "This new four-star level component command elevates the command and control of joint space forces to create parity with other component commanders found in geographic combatant commanders for air, land, and sea."[162] Furthermore, the Air Force included space with other traditional areas of warfighting. Space weapons officers are now more prominent, with the Air Force Weapons School training specialized instructors in warfighter integration, standing up a dedicated "division" for space in 1996 and formally replacing it with the 328th Weapons Squadron in 2003.[163] Additionally, in 2013, the Air Force separated the Space and Missile Officer career field into the 13S Space

[157] Johnson, "Trump's Space Force Faces Trouble Getting off the Ground."

[158] Thomas, "Trump Signs National Defense Authorization Act for Fiscal Year 2019."

[159] Todd Harrison et al., *Harrison Space Threat Assessment*, 22.

[160] Ibid., 23–25.

[161] Trump, *National Security Strategy of the United States of America*, 31.

[162] Thompson et al., "Space as a War-Fighting Domain," 6.

[163] Brown, *Space Power Integration*, 177.

Operations and the 13N Nuclear Missile Operations to better develop officers in these highly-specialized career fields.[164] These officers will be even more prepared to meet the original challenge posed to the Air Force in 1961 "to develop a military space program vital to the nation's defenses and provide for it a position in its own ranks equal to aviation."[165]

Analysis and Recommendations

The Air Force stood up at a time when airpower had helped win World War II, then led the nation's new nuclear deterrence mission, a perfect combination of opportunity and capability. For US space forces, the year 1991 was tremendous for space power, when advanced space capabilities such as global positioning systems and satellite-based missile launch detection enabled US military success against Iraq. Perhaps if the Soviet Union had not crumbled, eliminating the United States' sole peer competitor, the Space Force would have evolved. Despite a peer competitor absence, the US military has relied on space for combat success since 1991. Additionally, the last three US presidents have increased the scope of their space strategies. Each service's history is unique, but in both the stand-up of the US Air Force and the evolution of the United States' space forces, patterns emerge among significant threat and capability changes corresponding to growth, national interest and direction, and a mature senior cadre for advocacy.

In the 1930s, the United States developed and purchased its first capable strategic bomber, the Boeing B-17. Until then, the use of airpower for strategic use was merely theoretical, or "conjecture." This strategic airpower capability further developed during World War II and proliferated around the world to allies and competitors. When paired with nuclear weapon developments, airpower formed both an immense capability and credible overall threat to the United States. This threat changed some of Douhet's and Mitchell's airpower theories into a

[164] Patrick Air Force Base, "AF Splits Space, Missile Career Field for Officers," 45th Space Wing, accessed February 2, 2019, https://www.patrick.af.mil/News/Article-Display/Article/329890/af-splits-space-missile-career-field-for-officers/.

[165] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 45.

tangible reality, and fashioned a call to action that required the United States to react for its own security. Similarly, ten years after the US Air Force's independence, with the 1957 launch of *Sputnik*, the Soviet Union's demonstrated and growing capabilities in space created a threat to the United States that pushed the country to act quickly.

The US military services and civilian agencies worked separately on rocket propulsion and satellite development until the Soviet Union executed the capability of launching an object into space and orbiting it around the world. In less than twelve months, President Eisenhower established NASA and within three years, the rest of the space organizations formed and remained basically the same for the next twenty years. When the threat went away (or was perceived to go away) in 1991 with the collapse of the Soviet Union, so did the United States' thrust for further evolution of its space enterprise.

United States military services and civilian departments do not simply take drastic action on their own in response to a capability or threat, especially when standing up a new service component or agency. In these two histories is a shared understanding by those in power, a clear vision or policy from the president combined with an understanding and agreement by Congress to fund the program. During the successive Army air arm reorganizations, studies and boards informed leaders to make choices on what the air arm was capable, and how it could best organized. The Howell board in 1935, while it recommended a GHQ Air Force, it also informed the president that "further grant of independence beyond the creation of the GHQ Air Force might someday prove necessary."[166] President Eisenhower, in the late 1950s, provided even clearer policy guidance with his direction on avoiding another surprise attack reminiscent of Pearl Harbor, but also staunchly keeping "space for peace."

Airpower pioneers complained of lack of advocacy, and there are shadows of an advocacy vacuum in space organization as well, but not enough to hinder success in space

[166] Nalty, *Winged Shield, Winged Sword: A History of the USAF Volume I*, 128.

operations. Early airpower advocates were viewed as wild-eyed visionaries with expectations that did not fit the capabilities of their force. By the 1940s, these same aviators had grown into a mature, respected and knowledgeable cadre, trusted with the war's airpower execution. Equally, space power advocates have had since the 1960s to evolve and grow a cadre of space-oriented general officers in each military service. But, due to a lack of advocacy, some lawmakers argue that the Air Force has neglected space and used space systems as a slush fund to pay for other systems when budgets tightened. "Over the years, the Air Force has used space programs as a money pot to reach into and subsidize air-dominance programs when they feel like Congress has not given them enough for tankers, fighter jets, whatever," said Representative Mike Rogers (R-Alabama), Chairman of the Strategic Forces Subcommittee, a Space Corps proponent.[167] Secretary of the Air Force, Heather Wilson attributes Air Force readiness deficiencies on the defense budget sequester, citing cuts of 30,000 personnel, reduced numbers of fighter squadrons, and pilot retention problems stemming from the sequester.[168] Manpower cuts in the early 1990s and again in the late 2000s did shrink manpower of all Air Force specialties, but with General John Hyten, USSTRATCOM Commander, as the preeminent space officer in the Air Force and Department of Defense, it is hard to argue that there is a shortage of advocacy for the space mission and its officers.

United States Air Force independence was not directly tied to federal budgets, but funding did correlate to space organization evolution, both positively and negatively. Increased funding typically came when threat to the nation appeared, growing the force. The years corresponding to World War I, World War II, the Korean War, and the Vietnam War all saw significant air arm personnel increases. Even periods marking the beginning of the Air Force's

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[167] Gould, "US Space Corps Could Launch in 3 Years, Key Lawmaker Says."

[168] Jose Ibarra, "SECAF: Accelerating Defendable Space, Multi-Domain Operations Key to F," U.S. Air Force, accessed February 13, 2019, https://www.af.mil/News/Article-Display/Article/1471997/secaf-accelerating-defendable-space-multi-domain-operations-key-to-future-readi/.

primacy in the 1960s space race and the space resurgence in the early 1980s experienced increases in personnel, with a recent peak in 1986 of 608,000 personnel.[169] Conversely, the *Air Service* and *Air Corps Acts* of 1920 and 1926 respectively both mandated aircraft and troop levels, but post-war budget cuts kept the Army from actually receiving enough funds to reach those mandated levels. Post-Cold War, in 2002, with a lack of perceived threat to our space assets and funds needed for the War on Terror, consolidation efforts to save money eliminated USSPACECOM. However, one positive aspect is when research and development money started drying up in the 1970s, the Air Force realized that it needed to shift its space focus from research and development to management to continue leading space efforts for the United States.

President Trump provided new direction in space for the United States, amending President Obama's 2010 directive with an update to "lead the return of humans to the Moon for long-term exploration and utilization, followed by human missions to Mars and other destinations."[170] The president continued his emphasis on the need for the country to remain in the lead in space saying, "We do not want China and Russia and other countries leading us. We have always led. We have gone way far afield for decades now."[171] To stay in the lead, the collective US space forces require an enduring space policy and the entire military force (to include a potential Space Force) needs to have the military capability to deter any action or compel a response when required. This enduring space policy is accomplished with a unified

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[169] Air Force Magazine, "The Air Force in Facts and Figures," *Air Force Almanac* (May 2011), 43, accessed February 2, 2019, http://www.airforcemag.com/MagazineArchive/Magazine%20Documents/2011/May%202011/0511facts_figs.pdf.

[170] Donald J. Trump, "Presidential Memorandum on Reinvigorating America's Human Space Exploration Program," The White House, December 11, 2017, accessed October 16, 2018, https://www.whitehouse.gov/presidential-actions/presidential-memorandum-reinvigorating-americas-human-space-exploration-program/.

[171] Kyle Rempfer, "Russia Warns of a 'Tough Response' to Creation of US Space Force," *Air Force Times*, last modified June 22, 2018, accessed August 27, 2018, https://www.airforcetimes.com/flashpoints/2018/06/21/russia-warns-of-a-tough-response-to-creation-of-us-space-force/.

understanding of the threats and capabilities among the space power advocates, the president, and the legislative branch to link the vision, funding, and execution.

Competition for supremacy in space is increasing for the United States, with China specifically taking profound strides in recent years. China's first lunar mission, Chang'e 1, orbited the Moon in October 2007 and a rover landed on the Moon in 2013. Its future plans include a new space station, a manned lunar base, and possible missions to Mars to land and return samples to Earth.[172] So far, much of China's space efforts can be argued as peaceful with the one notable exception of its successful ASAT demonstration in 2007. Both the United States and Russia (then the Soviet Union) have successfully performed ASAT demonstrations but never used the technology against each other, acknowledging the "destabilizing effects an attack in space would have on the balance of power on Earth."[173] China's advances in space become potentially ominous when viewed through the same lens as its recent actions in the South China Sea, where it built reefs into islands complete with military fortifications and challenged freedom of navigation and sovereignty in the area.[174]

Since the first satellite, *Sputnik*, circled the globe, countries have recognized the free flight of objects orbiting the Earth. The United States' did not protest *Sputnik* orbiting over its territory, additionally, "no other country objected to the overflight of their territory either, thus establishing the first custom in outer space law, that is, the free flight of objects in outer space."[175] The 1967 Outer Space Treaty formalized rules for space, including principles such as "outer

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[172] Wendy Whitman Cobb, "Will China's Moon Landing Launch a New Space Race?" *The Conversation*, accessed January 15, 2019, http://theconversation.com/will-chinas-moon-landing-launch-a-new-space-race-109359.

[173] Harrison, *Harrison Space Threat Assessment*, 25.

[174] "US Warships Sail Near Disputed Islands in South China Sea Angering Beijing," *ABC News,* accessed February 2, 2019, https://www.abc.net.au/news/2018-05-28/us-warships-sail-near-disputed-islands-in-south-china-sea/9805576.

[175] Delbert R. Terrill, *The Air Force Role in Developing International Outer Space Law* (Honolulu, HI: University Press of the Pacific, 2004), 28. In 1976, eight equatorial countries claimed sovereignty over the geostationary orbital arc above their territory. Most other countries, including all major space powers, rejected the claim.

space is free for use by all countries; a country may not establish military bases, installations, or fortifications; and outer space, the Moon, and other celestial bodies are not subject to appropriation by claim of sovereignty, use or occupation, or any other means."[176] China has demonstrated the capacity to disregard norms in laws of the sea, perhaps it would do the same in space if no one was willing or able to deter them.

Ready and affordable access to space will increase the United States' capabilities and provide security and deterrence from enemy attack *in* and *through* the space warfighting domain. In *Future War*, the author, Colonel Jeffery Barnett, former Military Assistant to the Director, Net Assessment, provided two fictional examples of peer and niche competitor conflict. Both include realistic threats to the United States' space structure that, if attacked, would cost millions of dollars to replace or repair, adding cost to any immediate impact to the nation's defense capacity. "Given our dependence and that of our allies and partners on space, the loss of critical assets today could prove decisive to our ability to monitor critical events like missile launches or nuclear tests, or to successfully prosecute a military campaign" said retired Air Force General Robert Kehler, the former Chief of USSTRATCOM.[177] United States space assets are vulnerable to competitor attack, either kinetically with ASATs or through means like jamming and cyber-attacks.[178] Colonel Barnett argued that rapid replenishment is the most important aspect to ensure survivability of the satellite architecture.[179] Traditionally, launch costs have been a major hinderance to getting cargo into low earth orbit. Launch costs typical for the space shuttle could

[176] US Army Command and General Staff College, *US Army CGSC Space Reference Text*, 2-4. The full name of the 1967 Outer Space Treaty is the *Treaty on the Principles Governing the Moon and Other Celestial Bodies*.

[177] Harrison, *Harrison Space Threat Assessment*, IV.

[178] Ibid., 1.

[179] Jeffery R. Barnett, *Future War: An Assessment of Aerospace Campaigns in 2010* (Maxwell Air Force Base, AL: Air University Press, 1998), 44, accessed August 20, 2018, https://media.defense.gov/2017/Apr/05/2001727342/-1/-1/0/B_0005_BARNETT_FUTURE_WAR.PDF.

reach $34,000 per kilogram of cargo.[180] Civilian companies are working to bring this cost considerably lower, making rapid replenishment a more likely possibility with the cooperation of civilian space lift. In addition to the cost, military acquisition schedules and drawn out timelines hinder progress. Representative Rogers has been critical of the Air Force's handling of space, but supports "more agile acquisition authorities for the Air Force."[181] General Hyten apparently agrees with Representative Rogers regarding streamlining acquisition processes, "My biggest fear is actually not about the Russians or the Chinese. My biggest fear is that our country seems to have lost the ability to go fast, and our adversaries are going fast, and if we do not fix that, we will not stay ahead of them."[182] Major General David D. Bradburn, former Director of Space Systems and Director of the Office of Special Projects, was assigned to the Air Force's first satellite project and highlighted the same sentiment from early in the space program, "the decision to keep our space projects on the research and development track and thus to make fast changes from generation to generation was a significant one. I think it gave us a lead over the Soviet Union."[183] To ensure the US military remains in the lead and can keep China or another competitor from negating one of its nationally relied-upon capabilities, it must project a clear and commonly understood direction for its space force, then have the agility to act and react in a manner that integrates the nation's military and civilian space capabilities. Any power imbalance from competitors' credible threats to disrupt or destroy US space assets could be offset with increased accessibility and responsiveness in acquisition and fielding.

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[180] Albert Defusco and Christopher Craddock, "Affordable Access to Low Earth Orbit," *DSIAC Journals 4*, no. 4 (Fall 2017), accessed January 16, 2019, https://www.dsiac.org/resources/journals/dsiac/fall-2017-volume-4-number-4/affordable-access-low-earth-orbit.

[181] Gould, "US Space Corps Could Launch in 3 Years, Key Lawmaker Says."

[182] Joe Gould, "Space for a Space Corps? Congress Lays Groundwork for Controversial Plan," *Defense News*, last modified November 21, 2017, accessed January 14, 2019, https://www.defensenews.com/space/2017/11/21/space-for-a-space-corps-congress-lays-groundwork-for-controversial-plan/.

[183] Hall and Neufeld, *The U.S. Air Force in Space 1945 to the Twenty-First Century*, 65.

Conclusion

President Trump is adamant in his policy: “The United States considers unfettered access to and freedom to operate in space to be a vital interest.”[184] But, operations in the space domain are increasingly contested, degraded, and operationally limited.[185] Although war is historically thought to be fought on land, on the sea, or in the air, space is an arena in which the United States could win or lose its next conflict. Space power advocates, the president, and legislators need to work together to determine the correct path through a balance of capability and threat. In doing so, they may emulate the Howell Board and determine one solution, but caveat that there is another step waiting. The space domain and the forces that operate in it earn highlights in the president’s National Security Strategy and newly revised Joint Publications. The United States deserves the right force to meet the president’s strategy; that force may exist already. The United States already employs three space organizations, NASA, the NRO and AFSPC with their fifty thousand professionals. Soon, USSPACECOM will activate as a subordinate unified command under USSTRATCOM. Former Secretary of the Air Force for President Obama, Deborah Lee James said a separate Space Force would be counterproductive, because "military services do not do the war-fighting in this country. Those are done by combatant commands and unified commands."[186] Not enough legislators and military leaders are convinced that an independent Space Force is required or beneficial and it will continue to fail in legislation until it does. Its creation will not outweigh the costs, both literally and figuratively. Utilizing a combatant command for space or even a Space Corps as part of the Air Force, the Department of Defense avoids the cost of creating ancillary support positions and infrastructure to support an independent space service. Air Force estimates from 2018 put creation of a Space Force at $13

[184] Trump, *National Security Strategy of the United States of America*, 31.

[185] US Joint Staff, *JP 3-14, Space Operations 2013*, vii.

[186] Johnson, “Trump’s Space Force Faces Trouble Getting off the Ground.”

billion dollars over five years.[187] Finally, creating an independent Space Force could upset the balance of power in space with our competitors without a return on capability. Victor Bondarev, head of the Russian Parliament's Upper House Committee on Defense and Security states that "militarization of outer space is the path to disaster" and "if the United States withdraws from the 1967 treaty banning nuclear weapons in outer space, then, of course, not only ours, but also other states, will follow with a tough response aimed at ensuring world security."[188]

The US Air Force independence was preceded with a nearly systematic growth of size, capability, and autonomy gained as senior military and civilian leaders' belief in air power capability matched actual abilities. The US space forces, organized into NASA, the Department of Defense, and the NRO had a much faster rise with subsequent military reorganizations. A military Space Force had two better, prior chances to stand up already with the first in 1961 and the last thirty years after. In 1961, the United States had both a space capability and a space threat from the Soviet Union, but did not have support of the Air Force or the executive branch. Additionally, there were no senior space personnel who had grown up with space, no mature advocates as the Air Corps had in the mid-1930s. In 1991, the United States' space capabilities were superb in the Persian Gulf war, but after the Soviet Union collapsed, the country seemingly lacked a threat. Currently, the United States has a capability and a credible threat from our competitors, and even direction from the president to stand up the Space Force. But, the initiative is missing widespread support of its mature space power advocates; if the Space Force is to stand up, it needs their support.

For now, an independent US Space Force will continue to remain on hold, possibly until a practical space ship becomes reality, like the US Air Force had to wait until the B-17 came

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[187] Valerie Insinna, "Air Force Secretary: Space Force Will Cost $13B in New Expenses," *Defense News*, last modified September 19, 2018, accessed February 2, 2019, https://www.defensenews.com/digital-show-dailies/air-force-association/2018/09/17/air-force-secretary-space-force-will-come-with-13b-in-added-costs/.

[188] Rempfer, "Russia Warns of a 'Tough Response' to Creation of US Space Force."

along to perform the strategic bombing missions that Douhet and Mitchell had championed. General Hyten once relayed a quip of a former supervisor: "I had a boss one time that told me that you do not need a space corps until you have got X-Wing fighters. That's about the timing I think you would need when you get the need for a Space Corps. It just adds more bureaucracy."[189] In addition to what other countries may do or how they would react to the United States standing up an independent Space Force, how will the rest of the US military branches need to evolve when the Space Force is created? Perhaps before Space Force achieves independence, the United States needs to study what will happen to the US Air Force (and Navy and possibly Army) when economical, reliable space ships appear, when space operations becomes "cheap" and there exists a vehicle capable of routinely operating in space. One could assume that the technology and power necessary for routine space flight would also lead to weapons of the same power level, bringing into question the lifespan of traditional vehicles, including planes, ships, trucks and even tanks.

Like the tank and the aircraft, a new weapon would not make others obsolete, but military leaders will be presented with new challenges to try to exploit the strengths and vulnerabilities of the new weapon to live in the evolved environment.[190] Aircraft did not make the naval fleet obsolete, it did not eliminate the tank. The same was even true for nuclear weapons, their invention and widespread proliferation did not eliminate all war or make the infantry, for example, obsolete. However, when the Space Force is created, how do other services respond? We can see no more clearly all the utility and implications of spaceships than the Wright Brothers could see fleets of B-29s bombing Japan and air transports circling the globe."[191]

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[189] Gould, "Space for a Space Corps?"

[190] Barnett, *Future War: An Assessment of Aerospace Campaigns in 2010,* 16.

[191] Project RAND, *Preliminary Design of an Experimental World-Circling Spaceship* (Santa Monica, CA: Douglas Aircraft Company, 2 May 1946), 1, quoted in Spires et al., *Beyond Horizons*, 1.

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