

DECEMBER 1, 2020 | NUMBER 904

## Space Force

### Ahead of Its Time, or Dreadfully Premature?

BY ROBERT FARLEY

#### EXECUTIVE SUMMARY

**I**n December 2019, Congress established the U.S. Space Force as an independent uniformed military service within the Department of the Air Force. Although many defense analysts had long argued for a reorganization of the Department of Defense's space capabilities, few had settled on this particular solution. This policy analysis evaluates the reasoning behind the Space Force's establishment, concluding that the service's creation is premature.

The Space Force is the first new independent U.S. service since the creation of the Air Force in 1947. At its inception, the Air Force had hundreds of thousands of

personnel, several years of battle experience, a coherent body of doctrine, and a robust organizational culture. Even so, the creation of the Air Force sparked bitter interservice conflict for the first decade of its existence.

However, the Space Force lacks a strong institutional basis, an identifiable organizational culture, and an established foundation of strategic theory. In the short term, it runs the risk of disrupting existing procedures and relationships that enable the U.S. military to function. In the long term, it runs the risk of distorting the procurement and force structure of U.S. space capabilities.

“The decision to create the Space Force is premature at best and irresponsible at worst.”

## INTRODUCTION

Does the United States need a military presence in space? Most informed opinions suggest that the answer is yes. Does the United States need a new independent service for managing that military presence? The answer is less obvious. In December 2019, Congress created the U.S. Space Force, which is meant to bolster U.S. military capabilities in a domain that the existing services have not prioritized. The wisdom of creating a new service is uncertain in the best of times, given the need of forces to coordinate across organizational borders. In the case of the Space Force, an even greater degree of uncertainty looms because the precise organizational structure of the service is unsettled. Indeed, most of the arguments against the creation of the Space Force have focused on either the lack of strategic necessity for creating a new service or the price tag associated with standing up a new organization.<sup>1</sup>

To understand the Space Force's inception, this study investigates five interrelated questions. First, how has outer space changed to become a more important domain for military activities? Second, what is the relationship between the Space Force and its antecedents within the U.S. military? Third, how can traditional metrics of military effectiveness apply to the Space Force? Fourth, how will the Space Force affect the international strategic environment? And finally, how will the Space Force interact with civilian government agencies and the civilian space sector?

This analysis initially establishes how the military space environment has changed since the last major U.S. military reorganization in 1947. It then examines how the existing institutions of the U.S. military have managed space up to this point, including a discussion of the theorization of military space power. The details of the establishment of the Space Force come next, followed by an assessment of the new problems its establishment introduces, including questions about military effectiveness and military culture. Finally, the analysis examines the potential implications

of the Space Force for diplomatic, economic, and civilian management of space. This investigation determines that the Space Force's establishment is hobbled by unclear goals and uncertain effects, contending that the Space Force lacks a clearly defined organizational culture and a clear strategic purpose, both core elements of organizational success, and that the decision to create the service is premature at best and irresponsible at worst.

## WHAT IS SPACE, AND WHY DOES IT NEED A MILITARY FORCE?

The Space Force's capstone document, *Spacepower*, defines space as the domain of orbital flight, including vehicles that leave and then reenter the atmosphere without making a single orbit, such as ballistic missiles.<sup>2</sup> While some definitions of space rely on a judgment of where the Earth's atmosphere ends (many multilateral agreements use the Kármán line, which is 100 km above sea level), the Space Force doctrine resists using any specific physical demarcation.<sup>3</sup>

Regarding the militarization of space, *Spacepower* defines it as the use of space for military purposes, whether those purposes include transit of objects (missiles) or the use of satellites for surveillance or communications. The militarization of space began in the final years of World War II, when Germany began to strike England with V-2 ballistic missiles.<sup>4</sup> After the war, both the United States and the Soviet Union used technology and scientists from Germany to establish and develop their own space programs, eventually resulting in a "space race" to achieve various milestones of national prestige.<sup>5</sup>

The complexity and importance of military operations in space have changed considerably since the 1950s, often in unpredictable ways. While the military value of ballistic missiles was immediately apparent, the implications of space-based satellites for military reconnaissance and communication dawned slowly. The first spy satellites entered service in 1960. Though they took lower-quality photographs

compared to existing reconnaissance aircraft, they also could not be intercepted. Prior to the establishment of sufficiently high-bandwidth communications, satellites would drop physical film for ships and aircraft to recover. The United States launched the first dedicated military communications satellite in 1966, significantly easing problems of military signal transfer.<sup>6</sup>

Space quickly became central to maintaining Cold War nuclear deterrence, as both the Soviet Union and United States used satellites to detect any launch or other first-strike activity by the other side.<sup>7</sup> This linked space directly to nuclear warfighting, with the consequence that antisatellite activity carried a high risk of nuclear response. Both the United States and Soviet Union had experimented with anti-satellite weapons in the late 1950s and early 1960s without appreciable success but with considerable lessons learned.<sup>8</sup>

In the 1970s and 1980s the number and sophistication of satellites expanded rapidly. The U.S. military achieved new operational capabilities in space, delivering intelligence, communications, and navigational systems to soldiers. As demonstrated in the Gulf War, the U.S. military could use space to fight more effectively in *conventional* conflicts, essentially making the battlefield transparent.<sup>9</sup> In short order, nearly the entirety of modern U.S. military operations, by all services and at all levels of intensity, required the use of space. Satellites identify targets, track their movement, transfer data to shooters, and monitor the results of the attack. Satellites enable commanders to have a full understanding of the battlefield, allowing them to communicate with their forces and offering information about the size and movements of enemy forces.

Civilian use of space also increased alongside changes in the military use of space. Communications satellites now dominate the international telecommunications industry, providing connectivity to firms and individuals around the world. Businesses, universities, and governments have built this ready connectivity into the basic structure of their daily operations. This has enabled what Richard

Baldwin refers to as the second “Great Acceleration” of globalization.<sup>10</sup> If space went away, so to speak, many people would struggle to find their way to the local grocery store due to a lack of the Global Positioning System. The way knowledge moves between nations, firms, and individuals depends on easy access to space. Preventing such access could cause massive social and economic disruption.

But the military and civilian advantages created by greater use of space have also created new vulnerabilities. The U.S. military has become dependent on space to conduct its basic operations, just as the U.S. civilian economy’s dependence on space has increased. Competitors have access to space and increasingly the technologies necessary to attack U.S. satellites. Consequently, competitors can threaten damage against both the U.S. military and civilian economy by attacking space infrastructure. Moreover, the United States can no longer assume that satellites’ role in the nuclear enterprise will deter foes from attacking satellites tasked with conventional military missions.<sup>11</sup>

In 2007, China destroyed one of its satellites in low-Earth orbit (LEO), demonstrating its ability to threaten core U.S. communications infrastructure. Unfortunately, the satellite’s destruction produced an extensive debris field, some of which remains in orbit today. This field, full of fast-moving orbital objects, poses a long-term threat to the military and civilian use of LEO. As the demonstration made clear, a war in space could result in the long-term loss of some of the most valuable real estate in LEO, which would not only disrupt military operations but could also render civilian space infrastructure inoperable.<sup>12</sup> The United States responded to China’s test with its own antisatellite test, during which it launched a Standard Missile-3 missile defense interceptor from an Aegis weapons system on a U.S. Navy warship.<sup>13</sup> The U.S. test destroyed a satellite but produced a smaller debris field because it occurred at a lower altitude than the Chinese test, with most debris burning up as it reentered Earth’s atmosphere. Russia and India have both

“The way knowledge moves between nations, firms, and individuals depends on easy access to space. Preventing such access could cause massive social and economic disruption.”

“The argument that space is more important now than ever before is strategically sound.”

conducted antisatellite tests subsequently, with the Indian test leaving a debris field similar to that of the 2008 American test.<sup>14</sup>

Several major powers now have the demonstrated capacity to undertake antisatellite attacks that could destroy their opponents' civilian and military communications infrastructures. Most of these antisatellite weapons involve interceptors launched from ground, sea, and air platforms. Moreover, the use of space assets to damage or destroy satellites also appears technically feasible. The argument that space is more important now than ever before is strategically sound. The U.S. civilian economy depends on space for its connectivity, and thus its prosperity. The U.S. military depends on space for communications and reconnaissance. However, concluding that space represents a key strategic interest for the United States does not imply or necessitate any specific institutional framework for pursuing that interest.

### **An Institutional History of Space**

Reviewing the history of U.S. military space institutions gives us both a sense of how these organizations have evolved into the Space Force and a survey of the institutional alternatives to the establishment of Space Force. See Figure 1 for a timeline of U.S. space institutions and major historical events discussed in this section.

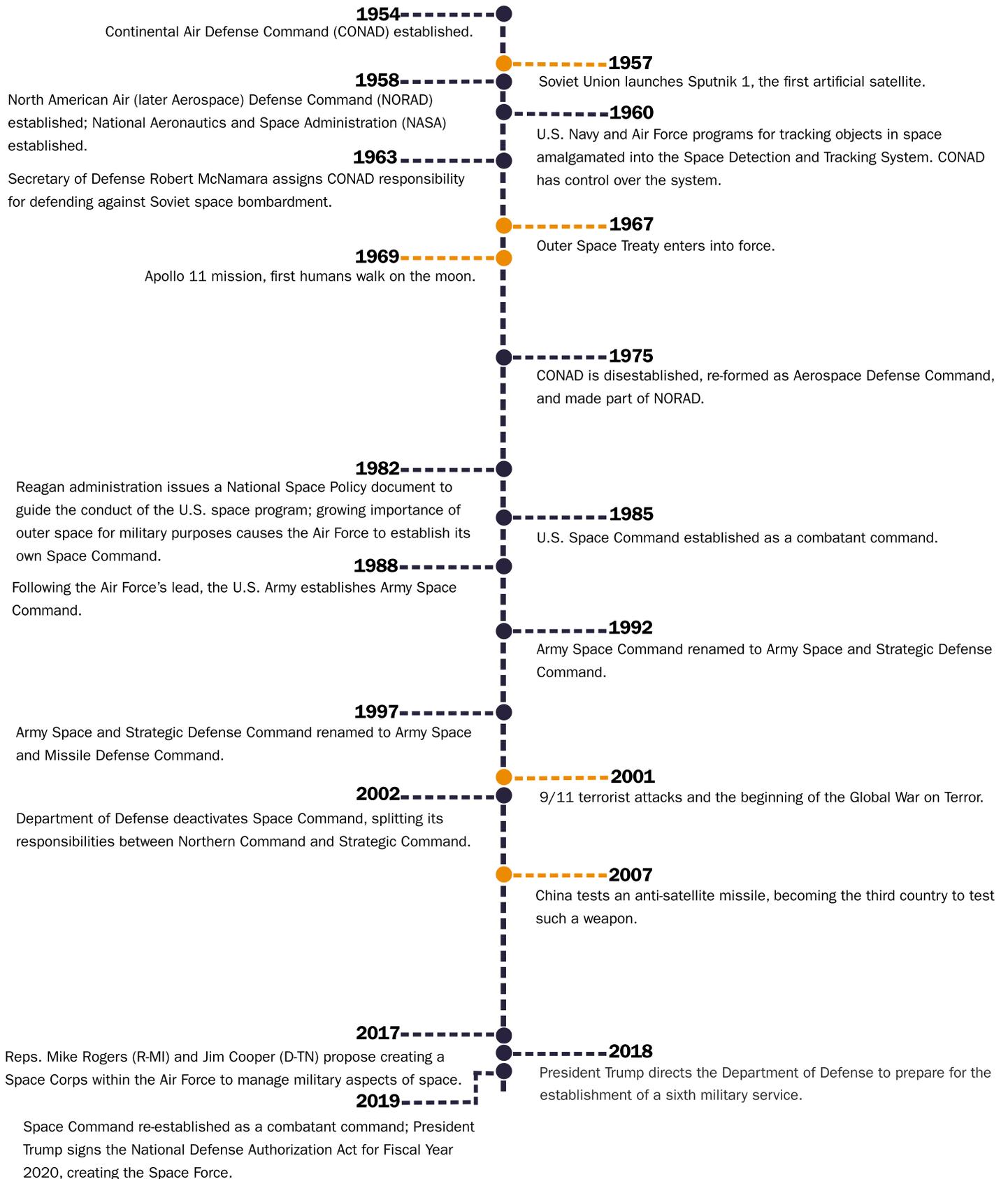
After 1947, the U.S. Army, Navy, and Air Force each began to experiment with ballistic missiles. Initial Air Force skepticism gave way to enthusiasm as it became obvious that ballistic missiles could both deploy satellites and deliver warheads to distant targets. The military implications of space came into clearer view with nuclear-armed ballistic missiles, offering a difficult-to-intercept weapon that could cause catastrophic damage to the enemy homeland. By the early 1950s, the Department of Defense estimated both satellite and ballistic missile projects to enter service before 1960. Sputnik's launch in October 1957 created a crisis, resulting in significant expansion and consolidation of U.S. military space programs, with the

Air Force playing a lead role.<sup>15</sup> Civilian research proceeded along a separate track with the 1958 establishment of the National Aeronautics and Space Administration (NASA), which manages civilian aspects of space travel and exploration.

In 1960, Navy and Air Force programs for tracking objects in space were amalgamated into the Space Detection and Tracking System. The Continental Air Defense Command (CONAD), created in 1954 to defend the continental United States from Soviet air attack, was given responsibility for managing this system.<sup>16</sup> In 1963, Secretary of Defense Robert McNamara assigned CONAD responsibility for defending against Soviet space bombardment. This empowered CONAD not simply to track space objects but to actively plan to defend against them using the Nike Zeus antiballistic missile system. Responsibility for space defense also fell under the North American Air (later Aerospace) Defense Command (NORAD). A 1975 reorganization disestablished CONAD, re-formed it as Aerospace Defense Command, and settled it under NORAD.<sup>17</sup>

In September 1982, the Air Force formed its own Space Command, which picked up a series of disparate threads following a period of disarray in the U.S. space community in the 1970s. The rationale for Air Force Space Command included the increasing threat posed by Soviet ballistic missiles, the Air Force's commitment to the Space Shuttle program, apparent Soviet antisatellite programs, and the growing relevance of satellites to reconnaissance and communication. In addition to managing these priorities, Space Command created a forum for developing expertise in space technologies and established career paths for officers focused on space.<sup>18</sup> In 1988, the U.S. Army established Army Space Command to support Army and Department of Defense operations in space. The name of Army Space Command has changed twice since it was established; in 1992 it became Army Space and Strategic Defense Command, and in 1997 it became Army Space and Missile Defense Command.<sup>19</sup>

Figure 1  
**History of U.S. space institutions**



----- Space institution event      ----- Other historical event

“The wars in Iraq and Afghanistan de-emphasized space’s role in armed conflict.”

The growing importance of space led the Pentagon and the Reagan administration to seek a broader institutional structure for space, one that could coordinate among all the services. Established in 1985, U.S. Space Command was a combatant command designed to have joint control of Department of Defense space operations. Combatant commands, which increased in importance after the Goldwater-Nichols Department of Defense Reorganization Act of 1986, manage a region or function that includes units from two or more military services. Examples of combatant commands include Central Command (with responsibility for the Middle East) and Transportation Command (with responsibility for worldwide Department of Defense logistics and transportation). President Reagan heralded the establishment of Space Command in the 1982 announcement of the National Space Policy. The Strategic Defense Initiative (SDI, or “Star Wars”) eventually played a significant role in this policy. The initial vision of SDI included not only reconnaissance satellites but also space-based weapons systems to intercept and destroy Soviet missiles. This would require a more substantial bureaucratic infrastructure than either Air Force Space Command or NORAD possessed. Space Command took over the Aerospace Defense Command portfolio from NORAD and prepared to lay the groundwork for the space components of SDI.<sup>20</sup>

The end of the Cold War, controversy over the strategic value of SDI, and a broad array of technical difficulties with the program relegated the main priorities of Space Command to a bureaucratic afterthought. Moreover, after 9/11 the prospect of strategic attack on the United States via space seemed remote, and in any case, other priorities loomed. The Department of Defense deactivated Space Command in 2002, relegating its defense responsibilities to Northern Command and its duties involving integration of the different service space capabilities to Strategic Command. The wars in Iraq and Afghanistan de-emphasized space’s role in armed conflict

in favor of human-centric “hearts and minds” approaches to counterterrorism.

However, while the Global War on Terror did not involve direct competition in space, it did abet a growing realization that the management of space can affect how conflicts are fought. Both counterinsurgency and counterterror techniques required the integration of surveillance and communications technology at operational and tactical levels, and this required unfettered access to space. As the wars in Afghanistan and Iraq waned and competition with Russia and China waxed, support within Congress and the strategic community for new institutions for the military management of space grew.<sup>21</sup>

In 2017, Reps. Mike Rogers (R-AL) and Jim Cooper (D-TN) proposed the establishment of a Space Corps within the U.S. Air Force tasked with managing the military aspects of space.<sup>22</sup> In March 2018, President Trump expressed strong support for additional attention to space, portending his eventual support for an independent Space Force.<sup>23</sup> In June, Trump directed the Department of Defense to prepare for the establishment of a sixth service, and shortly thereafter “Space Force” became a talking point in his political rally speeches.<sup>24</sup> The Pentagon rapidly re-established U.S. Space Command as a combatant command in 2019, with its initial personnel drawn primarily from Strategic Command.<sup>25</sup> In December 2019, President Trump signed the National Defense Authorization Act for Fiscal Year 2020, establishing the U.S. Space Force, which immediately assumed the responsibilities of Air Force Space Command.

### Theories of Space Power

Armies and navies existed well before the bodies of theoretical writing that laid the foundation for how we think about “sea power” and “land power.” The former emerged in the late 19th century in explicit form, the central tenets set forth by Alfred Thayer Mahan and Julian Corbett. The latter was cobbled together from a broad set of writings, including Carl von Clausewitz, Antoin-Henri Jomini,

Sun Tzu, Thucydides, and a hodgepodge of other authors who provided a framework for thinking about how armies exert political influence and coercion.<sup>26</sup> For its part, “air power” theory began to develop while aircraft were still in their infancy and before the establishment of any independent air forces. The work of Jan Christian Smuts, Giulio Douhet, Hugh Trenchard, Billy Mitchell, John Slessor, and a variety of thinkers at the Air Corps Tactical School provided grist for the employment of aircraft in war beginning in the immediate wake of World War I.<sup>27</sup>

These theoretical frameworks provide ideas not only about how to structure and employ forces on the battlefield but also about the institutionalization of military organizations, the relationships among those organizations within a defense establishment, and the prioritization of particular capabilities by national leadership. In short, theory is necessary for institution building and good strategic decisionmaking.

Yet thus far there has been limited theorization about the militarization of space, arguably in part because of the lack of a dedicated cadre of space thinkers. In contrast to the U.S. Air Force, which had existing examples of independent air forces and a core of personnel that shared the explicit goal of achieving service independence, even the idea of an independent space force is relatively new. Some theorists have attempted to borrow aspects of air power and sea power theory to apply to space.<sup>28</sup> One notable example is the Center for a New American Security’s 2010 report *Contested Commons: The Future of American Power in a Multipolar World*, which included space as one of the “commons” where nations compete for influence.<sup>29</sup> Treating space as a commons made it easier to import some concepts from air power and sea power theory, although analysts have disagreed over which body of theory is more applicable.

One analyst, borrowing a metaphor from sea power theory that distinguishes between naval operations in littoral waters and the open

sea, has characterized “brown water” and “blue water” schools of thought on space theory, with “brown water” theories of space emphasizing the joint dimension of space operations—how space enables the functioning of existing military capabilities on land, at sea, and in the air—and “blue water” theories exploring the potential for new dynamics of space dominance, including extensive exploration and use of space for civilian, economic, and military purposes.<sup>30</sup> An example of the “blue water” theories of space can be found in *The Future of Space 2060 and Implications for U.S. Strategy*, a September 2019 workshop report sponsored by Air Force Space Command that envisions a host of ways in which the United States could dominate different parts of space by the mid-21st century.<sup>31</sup>

On August 10, 2020, the Space Force released its first doctrinal document, which defined “space power” for the first time, delineated the “space domain,” and explained how the Space Force’s assets contribute to national power and national security. According to the document, “military spacepower is the ability to accomplish strategic and military objectives through the control and exploitation of the space domain.” The document makes clear that “spacepower cannot unilaterally win wars” and that the military space power should be used to preserve freedom of action, support the joint force, and provide civilian leadership with “independent options for achieving strategic effects.”<sup>32</sup> This last point is reminiscent of interwar thinking on air power and Air Force independence, but the document offers little detail. Nor does it establish a pathway for thinking about the unique ways that space power contributes to national power, nor of how to assess the relative contribution of space power against air power, land power, or sea power.

Over time, the Space Force may develop the kinds of institutions (such as the Naval War College or the Air Corps Tactical School) that bring people together to develop and test theories of space power and space warfare. Indeed, some work on space warfare is now emerging

“Theory is necessary for institution building and good strategic decision-making. Yet thus far there has been limited theorization about the militarization of space.”

“While some theoretical frameworks for exploring the military relevance of space exist, the Space Force does not seem representative of any clear theoretical position.”

to clarify the parameters of discussion.<sup>33</sup> At the moment, however, while some theoretical frameworks for exploring the military relevance of space exist, the Space Force does not seem representative of any clear theoretical position. This makes it difficult to evaluate the position of the Space Force within the constellation of American defense institutions but also complicates how the service compiles priorities, procures equipment, and trains personnel.

### **THE U.S. SPACE FORCE: A SOLUTION TO SPACE?**

The U.S. Space Force is an independent uniformed service under the authority of the Department of the Air Force. It was established on December 20, 2019, and was expected to be fully operational by 2021. Like the other services, the Space Force is headed by a four-star general (the chief of Space Operations) who is a member of the Joint Chiefs of Staff, and thus a contributor to the National Military Strategy. The official mission of the Space Force is to “organize, train, and equip space forces to protect U.S. and allied interests in space and to provide space capabilities to the joint force. Space Force responsibilities include developing military space professionals, acquiring military space systems, maturing the military doctrine for space power, and organizing space forces to present to our Combatant Commands.”<sup>34</sup>

The Space Force is projected to grow to 16,000 military personnel, with 2,500 active-duty personnel transferred from Air Force Space Command by the beginning of fiscal year 2021. The official headquarters of the Space Force remains undecided. The service will initially include three primary field commands: one responsible for training, one for acquisition, and one for support of combatant commanders. The projected budget for the Space Force in fiscal year 2021 is some \$15 billion, transferred from the Air Force Space Command allocation.<sup>35</sup>

What does it mean to say that the Space Force is a “service?” A service is a largely

autonomous military organization that designs its own doctrine, manages its own systems of recruitment and promotion, and (in the U.S. system) has its own place on the Joint Chiefs of Staff. Services are distinct from subservice designators such as Army “branches” (artillery, armor, or infantry, for example) or Navy “communities” (surface, submarine, aviation).

The Space Force is notably different from the other services. It is much smaller than any other service; the next smallest is the U.S. Marine Corps, at some 220,000 active and reserve personnel. It does not yet have its own uniforms, rank structure, bases, or substantial equipment pool. Unlike the Air Force, Navy, or Army, the Space Force does not have distinct representation as a military department within the Department of Defense. The Space Force shares this last attribute with the Marine Corps, an independent service under the authority of the Department of the Navy, a handicap that has not prevented the Marine Corps from developing its own doctrine, civilian support network, and organizational identity.

Much will depend on the eventual configuration of the Space Development Agency (SDA), an agency historically tasked with procurement. Congress has mandated the shift of the SDA into the Space Force by 2022. The SDA, however, has multiple clients within the Department of Defense, and the centralization of space procurement within the Space Force remains controversial.<sup>36</sup> For its part, the Department of the Air Force has argued that the SDA should be moved to the Space Force sooner rather than later, thus bringing the previously independent agency into the Air Force orbit.<sup>37</sup>

### **The Organizational Culture of the U.S. Space Force**

Organizational culture is an important determinant of military effectiveness. It helps create an organization’s identity and establishes how its members should act in given situations.<sup>38</sup> Leonard Wong and Stephen Gerras of the U.S. Army War College have

developed a framework for exploring military culture and assessing how that culture affects organizational effectiveness.<sup>39</sup> Wong and Gerras focus on layers of organizational culture running from the topmost layer of narrative artifacts (in the case of a military organization, these are often literal war stories), through beliefs and values, down to underlying basic assumptions. Summarized and in reverse order, this framework shows how the fundamental causal theories of an organization structure its explicit values and beliefs and how those values are represented in the stories that the organization tells itself.

The point is worth belaboring because culture is intensely important to the functioning of a military organization. Before World War II, the Army Air Corps developed clear, identifiable elements of organizational culture that would guide its behavior during and after the war.<sup>40</sup> Even the harshest critics of the U.S. Air Force admit that a distinct organizational culture existed before 1947 and that this culture deeply informed the behavior of the Air Force after the service's independence from the Army. The concept of "daylight precision-bombing" and using air power for strategic effect provided a clear linkage between organizational identity, doctrine, and procurement.<sup>41</sup>

Given that the bulk of Space Force personnel have and will come from the Air Force, it seems likely that elements of Air Force organizational culture will accompany them. Since the Space Force emerged almost fully formed from Air Force Space Command, it is safe to assume that the service's culture will strongly resemble that of Space Command. The question then becomes how Space Command's personnel differed from those of the Air Force as a whole. The answer to this remains unclear, although interviews with Army space officers suggest that the Space Command is technologically focused, uninterested in operational warfighting, and overly committed to an engineering view of space problems rather than to a vision of strategic competition with foreign countries. Nevertheless, one recent survey indicated

that a large majority (over 85 percent) of Army space officers would leave the Army for the Space Force if they could.<sup>42</sup>

To be sure, the Space Force has undertaken some steps to establish a culture and differentiate itself from the Air Force. The Space Force will dub the structures immediately below the field commands (generally known as "Wings" in the Air Force) as "Deltas," commanded by a colonel or captain.<sup>43</sup> Officials apparently chose the name from a variety of options in order to distinguish the administrative structures of the Space Force from those of other services.<sup>44</sup> The Space Force has also established its own insignia.

Still, the problem is less the specific cultural traits of the Space Force than the apparent absence of any strong organizational culture at all. We have no sense of how organizational culture will contribute to military effectiveness of the service. We have few clues from the antecedents of the Space Force regarding how the beliefs and assumptions of the organization will structure its day-to-day operation. Space Force organizational culture, a critical component of the success of the institution, will be a work in progress.

### **The Determinants of Military Effectiveness**

Security studies scholars have created a vast literature on the determinants of military effectiveness, or the conversion of resources into fighting power. Variables include resources, access to technology, organizational culture, access to and development of personnel, and metrics of effectiveness.<sup>45</sup> The standard literature evaluates organizations on four measures of effectiveness: political, strategic, operational, and tactical. Political effectiveness is an organization's ability to secure resources for itself; strategic effectiveness refers to its ability to plan and coordinate activities in service of national goals; operational effectiveness is its ability to manage and employ forces to accomplish those goals; and tactical effectiveness refers to the techniques the organization uses to fight engagements.<sup>46</sup>

“Space Force organizational culture, a critical component of the success of the institution, will be a work in progress.”

“The ability of the Space Force to command the bureaucratic and fiscal resources needed to conduct its mission is in dire question.”

Assessing the effectiveness of a service that barely exists is difficult for obvious reasons. The nature of the Space Force complicates the problem, since for now it seems primarily to support other parts of the U.S. military. It has taken over a set of missions associated with its direct progenitor, Air Force Space Command, and largely consists of the same equipment, personnel, and doctrine. Though some measures evaluate performance at the granular level, other improvements in effectiveness will only manifest in the performance of other organizations, not in the Space Force itself.<sup>47</sup> For this reason, there is little use in exploring questions of tactical and operational effectiveness at this point, since the Space Force will neither manage forces nor develop techniques for outer space combat. Antisatellite weapons, for example, are still under Navy and Air Force control. In the future, changes in the performance of U.S. military forces that depend on space for communications and intelligence may offer some indication as to the effectiveness of the Space Force, although even this will depend on assessing a bewildering array of confounding factors.

The military effectiveness literature also indicates that metrics of effectiveness are very important to how an organization performs, regardless of the level of analysis. These metrics allow an organization to perform diagnostics on itself, assessing policies that work and those that do not. With respect to the Space Force, we do not yet have a set of metrics (such as loss-exchange ratios, air-to-air combat kill ratios, precision targeting statistics, etc.) to measure the effectiveness of any space military organization. The Space Force will need to develop metrics suitable for a support force; for example, how regularly do “customers” of the Space Force’s products use that product in their daily operations? What rates of operational malfunction in spacecraft can be attributed to internal as opposed to external causes? Developing and using these metrics will be critical for how the Space Force performs in the long term.

Determining the Space Force’s strategic effectiveness is different but no more reassuring. Strategic effectiveness depends on a well-reasoned and articulated theory of space competition, discussed in more detail in the Theories of Space Power section of this paper. Such a theory would allow the Space Force to formulate ways of achieving national goals through doctrine, procurement, and force structure. Although the capstone document points the Space Force in some potentially promising theoretical directions, we cannot evaluate the service’s strategic effectiveness as of yet but may have the means to do so at some point.

There are reasons to worry about the prospective political effectiveness of the Space Force. While the Space Force undoubtedly will have a presence in the defense industrial base, its budget will be much smaller than that of any of the other services. It will lack a base of veterans and a history of success to draw upon. It can offer Congress and state governors less in terms of industry or footprint. Its budgetary decisions will be housed under the same department as the service it is most likely to conflict with over missions and resources (the Air Force). The politicized nature of its birth may leave it a figurative orphan if President Trump does not win a second term. In short, the ability of the Space Force to command the bureaucratic and fiscal resources needed to conduct its mission is in dire question.

As a point of comparison, when the Air Force won its independence from the Army in 1947, it had already completed the *United States Strategic Bombing Survey*, which evaluated the effectiveness of the bombing campaigns against Germany and Japan at tactical, operational, and strategic levels.<sup>48</sup> The very act of compiling the survey was evidence of political effectiveness, as it gave Air Force leaders and their allies the tools needed then to fight for independence and then to fight post-independence battles for resources and bureaucratic turf. The Space Force has nothing remotely comparable to the *Strategic Bombing Survey*, and it is difficult to imagine

how a document measuring effectiveness in such a way could be compiled.

### **The Air Force Comparison, and the Broader Implications of the Space Force for the Department of Defense**

The last new uniformed service that the United States created was the Air Force in 1947.<sup>49</sup> Governments establish new services because they believe that certain kinds of capabilities do not receive the necessary institutional support from existing military organizations. The establishment of new services and separate commands (the U.S. Air Force or Special Operations Command, for example) provides protection for specific capabilities, as well as a greenhouse in which those capabilities can reach their full potential.

However, new institutions come with costs, both literal (in terms of bureaucratic overhead, redundancies, and procurement distortions) and figurative (interservice conflict and bureaucratic competition). The Air Force built upon the foundation of the Army Air Forces, the Army Air Corps, and the Army Air Service. Because of this, the creation of the Space Force necessarily evokes comparison with the independence of the earlier service. However, while there are certain surface similarities, the two cases are dramatically different in many key respects.

Like the Space Force, the founding of the Air Force came at a point when expectations of the future of war were rapidly changing, most notably the belief that nuclear weapons (delivered primarily by Air Force bombers) would dominate future conflicts. As with the Space Force, Air Force advocates argued that existing institutions (in both the Army and the Navy) were insufficient to facilitate the emergence of new capabilities and new modes of warfighting. As with space, the air represented a new domain of warfighting, theoretically requiring the creation of a new military organization. As previously noted, the inclusion of a Space Force officer on the Joint Chiefs of Staff will give space a voice

in the formulation of the National Military Strategy, which describes the strategic goals of the uniformed military.

Those are the similarities. The differences are dramatic. The Air Force emerged from a long process in which aviators argued for the liberation of air power from the control of ground commanders and freedom from subservience to the needs of ground forces. At its founding the Air Force was enormous, with 304,000 personnel and thousands of aircraft.<sup>50</sup> It had large bodies of theory that it had developed in the interwar period and experience honed through multiple campaigns in the Second World War. It held strongly to a set of theories of strategic air power that gave guidance to procurement, force structure, and doctrine. It also had a strong sense of its importance and a willingness to fight the other services for its priorities. The U.S. Air Force could also draw upon the example of numerous other independent air forces, including most notably the Royal Air Force.

The introduction of the U.S. Air Force created substantial interservice conflict, which has persisted. The causes and consequences of tensions among the Air Force, Navy, and Army are too complicated to deal with here, but they have often involved the pursuit of autonomy and disputes over shared missions.<sup>51</sup> By comparison, the Space Force may introduce even more substantial problems, as it currently exists primarily as a support organization for the other services. The Air Force could at least conceptualize operations that would produce independent, decisive military effects, shorn of the need to work with the other services. The Space Force, at this point, cannot.

Air Force independence was an earthquake in the U.S. military establishment, for better or worse. An independent Air Force catalyzed the creation of the Department of Defense and the establishment of a new system of managing national security. By contrast, the Space Force begins with a handful of personnel, no agreed-upon strategic theory, and little history or experience to draw upon. Moreover, separating the Space Force from the Air Force does

“The Space Force begins with a handful of personnel, no agreed-upon strategic theory, and little history or experience to draw upon.”

“The Space Force, without any of the advantages of the Marine Corps, will likely struggle to protect its slice of the budgetary pie.”

not even win the former independence from the Department of the Air Force. For good or ill, the independence of the Space Force does not bear much comparison with the independence of the Air Force.

### Budgets

We have little sense thus far of the size or significance of the Space Force budget. As noted, the initial budget for the Space Force runs at \$15 billion, which is by far the smallest of any independent service; the Marine Corps, the closest analogue to the Space Force, will have a budget of \$46 billion in 2021.<sup>52</sup> The Department of Defense projected new costs for establishing the Space Force at roughly \$500 million per year for the first five years. The Congressional Budget Office, by contrast, estimated one-time costs at between \$1 billion and \$3 billion, with annual cost increases between \$840 million and \$1.3 billion.<sup>53</sup> Another estimate, developed for Air Force Secretary Heather Wilson in 2018, projected a \$13 billion five-year price tag for establishing and operating the Space Force.<sup>54</sup> Because of the size of the force, personnel costs occupy a relatively small part of the budget; although, this could grow rapidly due to the need for maintaining technical expertise.

Beyond these estimates, we have little concrete information to go on. The establishment of a service without its own department gives the Space Force less bureaucratic leverage than any of the other services apart from the Marine Corps. The Marine Corps enjoys an established tradition, a large community of veterans, and a strong relationship with Congress, all of which the Space Force lacks. Nevertheless, the Marine Corps budget as a percentage of the overall Department of the Navy allotment has tended to vary considerably, with percentages of the overall Navy budget varying from as low as 13 percent to as high as 23 percent.<sup>55</sup> This variance stands in contrast to the relatively stable allotments across the three established military departments.<sup>56</sup> The Space Force, without any of the advantages of the Marine Corps, will likely

struggle to protect its slice of the budgetary pie, which means it could struggle to protect the very capabilities it was established to field.

### POLITICAL, ECONOMIC, AND DIPLOMATIC IMPLICATIONS OF THE SPACE FORCE

One of the most exciting implications of the Space Force's creation involves its relationship to civilian space agencies and private space firms. For its part, the Space Force maintains that its existence is necessary to enable and protect the civilian exploitation of space, both in terms of economic development and scientific exploration.<sup>57</sup> At the same time, the Space Force can draw on the experience of civilian-government and private-sector space organizations. For example, NASA's experience is considerably valuable with respect to maintaining the health of personnel stationed in space.<sup>58</sup> The integration of NASA's wealth of tacit and explicit knowledge about space flight will be one of the Space Force's most important challenges. At the same time, Space Force research regarding space will potentially have beneficial civilian spillovers.

The ties between NASA and the military agencies managing space are extensive and cross-cutting, including personnel, technology, and various communications platforms. The establishment of the Space Force is not expected to have any direct impact on NASA, although second-order effects associated with the militarization of space may have some effect on how the agency handles its responsibilities.<sup>59</sup> The Space Force could also draw funding and expertise from NASA if it takes responsibility for any dual-hat civilian-military missions. Some space infrastructure could also contribute to both the Space Force and NASA missions.<sup>60</sup> Undoubtedly, a tighter relationship between NASA and the Space Force carries some dangers, as existing civilian missions could become targets for enemy action if they are too closely associated with the Space Force. Pressure from the Space Force could also

compromise elements of NASA's scientific mission by prioritizing military goals.

Part of the point of the Space Force is to create pathways for personnel to develop expertise in space issues, making it particularly appropriate for facilitating outreach to the civilian space sector. Several analysts have suggested the potential for significant gains from the development of a Space National Guard or a Space Reserve.<sup>61</sup> Part-time service members in a Space Force guard or reserve could bring the know-how developed in the military to the civilian world and could bring civilian innovations into their military organizations. They could also assess the needs and capabilities on either side of the divide and figure out how to meet those needs. We do not yet know whether the Space Force will have a guard or reserve component. The Department of Defense and the 50 states maintain Army and Air National Guard formations. In a few states (Colorado, for example) members of the National Guard participate in space-oriented activities.<sup>62</sup> Given the extent to which space activities cross over with the civilian space-maintenance infrastructure, the idea of taking advantage of civilian expertise through some form of guard or reserve component makes a great deal of sense.

### Space Force and Multilateral Space Governance

The increasing militarization of space has spurred discussion of the need for additional space governance.<sup>63</sup> War in space could threaten the long-term health and usability of the "space commons" by distributing fragments of destroyed satellites across a wide range of orbits, including those commonly used by civilian spacecraft. This could result in severe short-term economic dislocation, even for noncombatants, and pose a long-term obstacle to the human exploitation of space. Two combatants could cause catastrophic damage to the infrastructure that enables modern social and economic life, making the establishment of some "rules of the road" imperative.

The primary legal instrument for managing the militarization of outer space is the

1967 Outer Space Treaty.<sup>64</sup> The treaty regulates space exploration and colonization and establishes rules for the peaceful use of space and the heavenly bodies therein, including the moon. The treaty bans the deployment of weapons of mass destruction in space, although it does not prohibit military operations altogether.<sup>65</sup> While the prospects for multilateral governance of space seem grim, especially in context of current American policymaking, the inception of the Space Force necessarily raises questions about the future of multilateral management of space. Will the institutionalization of the Space Force make it easier or more difficult to develop mechanisms for multilateral space governance?

Military services tend to warily view arms control arrangements that affect their autonomy in their specialized domains. The events described in the 1964 film (and 1962 novel) *Seven Days in May*, in which an Air Force general seeks to topple an arms control-minded American president in a coup, are overstated, but services have historically opposed arms control limitations that affect their core priorities. The Royal Air Force's preference for offensive bombing doctrines during the interwar period, and its belief that the realities of war would rapidly blow past any legal limitations, undoubtedly influenced the United Kingdom's approach to international law in the 1920s and 1930s.<sup>66</sup> Similarly, the U.S. Navy (and its counterparts in Britain, Japan, and elsewhere) resented the Washington Naval Treaty process because it limited the construction of their most prized vessels.<sup>67</sup>

Even in the prehistory of the U.S. Air Force, Billy Mitchell warned about the threat that international arms control might pose for aerial bombardment. However, opposition to arms control was not always automatic or immediate; the Army Air Forces chiefs offered qualified support for nuclear arms control in the immediate aftermath of World War II.<sup>68</sup> By the early 1960s, however, the Air Force senior hierarchy resolutely opposed most multilateral arms control, including the Limited Test Ban Treaty, the Outer Space

“The inception of the Space Force necessarily raises questions about the future of multilateral management of space.”

“Given that services tend to pursue autonomy, the Space Force could pose some obstacle to future efforts for multilateral arms control in space.”

Treaty, and the Nuclear Nonproliferation Treaty.<sup>69</sup> In part because of generational change, the Air Force had minimal influence over the early Strategic Arms Limitation Talks negotiations between the United States and the Soviet Union. Later activism on the part of the Air Force and of the Navy focused on the protection of specific systems, such as the B-1 Lancer bomber, the LGM-118 Peacekeeper ballistic missile (then the Missile, Experimental, or MX), and the Trident submarine-launched ballistic missile.<sup>70</sup>

The reasoning behind this opposition is clear: Strategic bombing (and later the delivery of nuclear payloads through intercontinental ballistic missiles) provided the rationale for the autonomy, independence, and primacy of the Air Force. Limitation of these weapons would not only require significant revision of doctrine and force structure but also would strike at the core cultural stories that undergirded the services. Moreover, compliance with the restrictions of a multilateral governance regime can be onerous in terms of financial, human resources, and intelligence demands.<sup>71</sup> Most modern arms limitation regimes demand transparency on the part of the participants, which services tend not to welcome.

Given that services tend to pursue autonomy, the Space Force could pose some obstacle to future efforts for multilateral arms control in space. To be sure, neither the navies nor the air forces of the 20th century managed to prevent arms control. Nevertheless, if the Space Force manages to acquire the bureaucratic heft it needs to accomplish its core missions, it could act as an interest group within government to prevent the execution of strong multilateral arms control agreements. The record offers qualified reasons for concern about the role that the Space Force could play in future arms control negotiations. Services tend to resent the imposition of external limits on their procurement and force structure, although the extent of this resentment depends on organizational priorities. Still, the Space Force is unlikely to spearhead a drive for arms control within the U.S. government and probably will

resist limitations imposed by such arms control on its core interests.

## CONCLUSION

Decisions on institutional reorganizations are necessarily political, in addition to whatever technocratic impetus might drive them. A service's creation reveals the political priorities of Congress and the president, especially as it incurs substantial costs and substantial risk. But the creation of a service is rarely political in the sense that it stems largely from an interest in generating a talking point that a president can use at political rallies. Although the Space Force has some roots in theories of bureaucratic behavior, as well as considerable support from some actors within the defense community, it seems to have caught the president's attention through his belief in its public appeal.<sup>72</sup>

This leaves analysts in an unusual situation, insofar as we have relatively little information with which to generate good expectations about whether the Space Force will perform its mission effectively, how it will get along with other services, or how it will affect the international environment. We have only a vague sense of the answers to many of the questions that will determine the success of the Space Force as an institution. We have reason to suspect that the Space Force will negatively affect multilateral arms limitation negotiations; we do not know how well the Space Force will be on traditional metrics of military effectiveness; we can guess that the presence of a Space Force officer on the Joint Chiefs will increase the prominence of space considerations in the National Military Strategy; and we have some reason to expect that the Space Force will increase demands on the military budget. This very uncertainty is an indictment of the decision to create the Space Force now. The Air Force, for better or worse, had answers to all these questions at its birth. As it now exists, the Space Force appears to be a kludge designed to protect the political aspirations of the president while not encroaching too much on the institutional prerogatives of the Air Force.

Provisionally, many aspects of the Space Force seem problematic. Space is, if anything, a more intractable domain than air in terms of interservice conflict in that space assets are the sinews of the day-to-day activities of the services on land, at sea, in the air, and in cyberspace. The inclusion of the Space Force within the Department of the Air Force raises questions about how independent the Space Force will really be, and thus whether it will realize any of the promised gains. Finally, the lurking problem of the development of an independent space doctrine, which has in some historical cases resolved in favor of doctrines that favor independent, offensive operations, remains a long-term concern insofar as it would threaten to endanger peaceful use of the “space commons.”

Space Force’s establishment as an independent service is premature. Even for an institutional system in which services have domain-specific responsibilities (rather than a system that asks services to think holistically about how to accomplish missions across multiple domains), the Space Force is immature. Creating the Space Force at this point does not necessarily create the conditions under which the service can mature in a healthy fashion. Rather, it introduces the Space Force into a political arena where it lacks the resources and the political heft to effectively establish its prerogatives among the other services. In effect, it is a service in name only; in reality, it remains Air Force Space Command, and there is little in its birth that suggests it will grow beyond this any time soon.

**“Space Force’s establishment as an independent service is premature.”**

## NOTES

1. Eric Gomez, "Space Force: An Unwise Solution to an Overhyped Threat," *Orlando Sentinel*, August 28, 2018.
2. U.S. Space Force, *Spacepower: Doctrine for Space Forces* (Colorado Springs: Headquarters, U.S. Space Force, June 2020), pp. 3–4.
3. U.S. Space Force, *Spacepower*, p. 10; and Paul Voosen, "Outer Space May Have Just Gotten a Bit Closer," *Science*, July 24, 2018.
4. David N. Spires, *Beyond Horizons: A Half Century of Air Force Space Leadership* (Colorado Springs: Air Force Space Command in association with Air University Press, 1998), p. 7.
5. Douglas M. O'Reagan, *Taking Nazi Technology: Allied Exploitation of German Science after the Second World War* (Baltimore: Johns Hopkins University Press, 2019), p. 249.
6. Spires, *Beyond Horizons*, p. 94, 140.
7. Todd Harrison, "The Risks a War in Space Poses for Nuclear Stability on Earth," in *America's Nuclear Crossroads: A Forward-Looking Anthology*, eds. Caroline Dorminey and Eric Gomez (Washington: Cato Institute, July 2019), pp. 29–36.
8. Justin Paul George, "History of Anti-Satellite Weapons: US Tested 1st ASAT Missile 60 Years Ago," *The Week*, March 27, 2019.
9. Spires, *Beyond Horizons*, pp. 244–5.
10. Richard Baldwin, *The Great Convergence: Information Technology and the New Globalization* (Cambridge, MA: Harvard University Press, 2016), p. 4.
11. James M. Acton, "Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War," *International Security* 43, no. 1 (Summer 2018): 56–99; Michael P. Gleason and Luc H. Riesbeck, *Noninterference with National Technical Means: The Status Quo Will Not Survive* (El Segundo: Aerospace Corporation, 2020), p. 2; and Harrison, "Risks a War in Space," p. 34.
12. Gregory Kulacki and Jeffrey G. Lewis, "Understanding China's Antisatellite Test," *Nonproliferation Review* 15, no. 2 (2008): 335–47.
13. Brian Weeden, "The Space Security Implications of Missile Defense," *Space Review*, September 28, 2009.
14. Ashley J. Tellis, "India's ASAT Test: An Incomplete Success," Carnegie Endowment for International Peace, April 15, 2019.
15. Spires, *Beyond Horizons*, pp. 18, 25, 44, and 51–53.
16. Spires, *Beyond Horizons*, p. 87.
17. Edward J. Drea et al., *History of the Unified Command Plan: 1946–2012* (Washington: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, 2013), pp. 25 and 32.
18. Spires, *Beyond Horizons*, pp. 176, 179, 182, 197, and 207.
19. Historical Office, *A Chronological Review of 60 Years* (Huntsville, AL: U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, 2018).
20. Drea et al., *History of the Unified Command Plan*, pp. 55 and 56.
21. Todd Harrison, "Is Congress Creating a Military Space Corps?," Center for Strategic and International Studies, November 8, 2017.
22. FY18 National Defense Authorization Bill, H.R. 2810, 115th Cong. (June 22, 2017), <https://docs.house.gov/meetings/AS/AS29/20170622/106134/BILLS-115HR2810ih.pdf>; and Kaitlyn Johnson, "Space Force or Space Corps? Competing Visions for a New Military Service," Center for Strategic and International Studies, June 27, 2019.
23. Donald J. Trump, "Text of a Memorandum from the President to the Secretary of Defense Regarding the Establishment of the United States Space Command," White House, December 18, 2018.
24. ABC15 Arizona, "'The SPACE FORCE! Very serious!' President Trump at Rally," October 19, 2018, YouTube video, 1:09.
25. Aaron Mehta, "Space Command to Launch Aug. 29," *Defense News*, August 20, 2019.
26. W. T. Johnsen, "Theory of War and Strategy Directive," in *U.S. Army War College Academic Year 2019 Core Curriculum* (Carlisle, PA: U.S. Army War College, 2018).
27. Robert M. Farley, *Grounded: The Case for Abolishing the United States Air Force* (Lexington: University Press of Kentucky, 2014).
28. John J. Klein, "Corbett in Orbit: A Maritime Model for

- Strategic Space Theory,” *Naval War College Review* 57, no. 1 (Winter 2004): 59; and James W. E. Smith, “Corbett Offers More on Space Than Mitchell,” *War on the Rocks*, December 11, 2019.
29. Eric Sterner, “Beyond the Stalemate in the Space Commons,” in *Contested Commons: The Future of American Power in a Multipolar World*, eds. Abraham M. Denmark and James Mulvenon (Washington: Center for a New American Security, January 2010), pp. 105–36.
30. Peter Garretson, “A Historic National Vision for Spacepower,” *War on the Rocks*, September 9, 2019.
31. Air Force Space Command, *The Future of Space 2060 and Implications for U.S. Strategy: Report on the Space Futures Workshop* (Colorado Springs: Air Force Space Command, September 5, 2019).
32. U.S. Space Force, *Spacepower*, p. 28.
33. See, for example, Bleddyn E. Bowen, *War in Space: Strategy, Spacepower, Geopolitics* (Edinburgh, UK: Edinburgh University Press, 2020); Joan Johnson-Freese, *Space Warfare in the 21st Century: Arming the Heavens* (London: Routledge, 2016); and John C. Wright, *Deep Space Warfare: Military Strategy Beyond Orbit* (Jefferson, NC: McFarland & Company, 2019).
34. “United States Space Force Mission,” U.S. Space Force, <https://www.spaceforce.mil/About-Us/About-Space-Force/Mission/>.
35. Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, *Defense Budget Overview: Irreversible Implementation of the National Defense Strategy* (Washington: U.S. Department of Defense, May 13, 2020), p. 5-2.
36. Sandra Erwin, “Acquisition in State of Confusion: Questions Loom on the Role of the Space Development Agency,” *SpaceNews*, March 6, 2020.
37. Sandra Erwin, “Air Force Says Space Development Agency Should Be in the Space Force Now, Not Later,” *SpaceNews*, May 19, 2020.
38. Peter R. Mansoor and Williamson Murray, eds., *The Culture of Military Organizations* (Cambridge, UK: Cambridge University Press, 2019), p. 2.
39. Leonard Wong and Stephen J. Gerras, “Culture and Military Organizations,” in *The Culture of Military Organizations*, p. 19.
40. Perry McCoy Smith, *The Air Force Plans for Peace, 1943–1945* (Baltimore: Johns Hopkins University Press, 1970).
41. Robert Farley, “U.S. Air Force Culture, 1947–2017,” in *The Culture of Military Organizations*, pp. 428 and 430.
42. Sandra Erwin, “Survey: Most Army Space Officers Would Transfer to the U.S. Space Force,” *SpaceNews*, April 28, 2020.
43. Oriana Pawlyk, “Major Space Force Units to Be Called Deltas, Officials Announce,” *Military.com*, June 30, 2020.
44. Joseph Trevithick, “Here Are the Names Space Force Rejected in Favor of Calling Its New Units ‘Deltas,’” *War Zone*, July 8, 2020.
45. Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914–1945* (Princeton, NJ: Princeton University Press, 2009); and Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, NY: Cornell University Press, 1994).
46. Allan R. Millett, Williamson Murray, and Kenneth H. Watman, “The Effectiveness of Military Organizations,” *International Security* 11, no. 1 (July 1986): 37–71.
47. Brian A. Hill, “Assessing ISR: Effectively Measuring Effectiveness,” *Air & Space Power Journal* 31, no. 3 (Fall 2017): 34–43.
48. Gian Peri Gentile, “Advocacy or Assessment? The United States Strategic Bombing Survey of Germany and Japan,” *Pacific Historical Review* 66, no. 1 (1997): 53–79.
49. Philip Caruso, “A Space Force & Experiences with Airpower and the Great War,” *Lawfare*, September 7, 2018.
50. Herman S. Wolk, *Reflections on Air Force Independence* (Washington: Air Force History and Museums Program, 2007), p. 77.
51. Farley, *Grounded*, pp. 40–41.
52. Caitlin M. Kenney, “Marines See Funding Dip, Personnel Reductions in \$46 Billion in Budget Request for 2021,” *Stars and Stripes*, February 10, 2020.
53. Jason Coleman, Adam Talaber, and F. Matthew Woodward,

*The Personnel Requirements and Costs of New Military Space Organizations* (Washington: Congressional Budget Office, May 2019).

54. Sandra Erwin, "Wilson: \$13 Billion Space Force Cost Estimate Is 'Conservative,'" *SpaceNews*, September 18, 2018.

55. Erin Duffin, "Budget of the U.S. Navy and the U.S. Marine Corps from Fiscal Year 2001 to 2021," *Statista*, March 9, 2020.

56. For a breakdown of the evidence, see Mackenzie Eaglen, "Is Army Richest Service? Navy? Air Force? AEI's Eaglen Peels Back Budget Onion," *Breaking Defense*, February 5, 2020.

57. U.S. Space Force, *Spacepower*.

58. Michael Klesius, "Sick in Space: It's Not Just a Problem for Astronauts Anymore," *Air & Space Magazine*, March 8, 2009, <https://www.airspacemag.com/space/sick-in-space-56746153/?no-ist>.

59. Wendy Whitman Cobb, "Would a Space Force Mean the End of NASA?," *The Conversation*, October 18, 2018.

60. Clifford M. Theony, "Infrastructure Readiness in the United States Space Force," *OTH: Over the Horizon*, April 20, 2020.

61. "Adjutants General Advocate for Space National Guard," National Guard Association of the United States, February 18, 2020; and Brent D. Ziarnick, "An Aggressive Space Force Begins with a Space Force Reserve," *The Hill*, May 1, 2020.

62. Andrew Diederich and Jacqueline E. Whitt, "What Should a U.S. Space Force Look Like?," *War Room*, July 23, 2019.

63. Rajeswari Pillai Rajagopalan, "It Is Time for Space Governance Talks," *The Diplomat*, May 21, 2020.

64. For discussion, see Jen Patja Howell, "The Lawfare Podcast: The SpaceX Launch and the Future of Space Law," *Lawfare*,

May 26, 2020; and United Nations Office for Outer Space Affairs, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>.

65. Marko G. Markoff, "Disarmament and 'Peaceful Purposes' Provisions in the 1967 Outer Space Treaty," *Journal of Space Law* 4, no. 1 (Spring 1976): 3–22.

66. Peter Gray, *The Leadership, Direction and Legitimacy of the RAF Bomber Offensive from Inception to 1945* (London: Bloomsbury Publishing, 2012), p. 54.

67. Richard W. Fanning, *Peace and Disarmament: Naval Rivalry and Arms Control 1922–1933* (Lexington: University Press of Kentucky, 1995), p. 8.

68. Michael O. Wheeler, "The United States Air Force and Arms Control: The Early Years," in *Milestones in Strategic Arms Control, 1945–2000: United States Air Force Roles and Outcomes*, eds. James M. Smith and Gwendolyn Hall (Colorado Springs: U.S. Air Force Academy, 2002), pp. 6 and 20.

69. Edward Kaplan, "Peace through Strength Alone: U.S. Air Force Views on Arms Control in the 1950s and Early 1960s," in *Milestones in Strategic Arms Control*, p. 28.

70. Jeffrey A. Larsen, "Strategic Arms Control and the U.S. Air Force: The SALT Era, 1969–80," in *Milestones in Strategic Arms Control*, pp. 101 and 102–104.

71. Forrest E. Waller Jr., "National Security Strategy, Arms Control, and the US Air Force: The Reagan Years, 1981–88," in *Milestones in Strategic Arms Control*, p. 183.

72. Sean Gallagher, "Polls Show Little Support for Trump's Space Force," *Ars Technica*, August 16, 2018.

## **RELATED PUBLICATIONS FROM THE CATO INSTITUTE**

**The Navy's Plan for 530 Ships Is All Washed Up** by Brandon Valeriano and Eric Gomez, Commentary (September 30, 2020)

**Are America's East Asia Allies Willing and Able to Host U.S. Intermediate-Range Missiles?** by Eric Gomez, *Cato at Liberty* (blog) (August 19, 2020)

**Building a Modern Military: The Force Meets Geopolitical Realities** by Eric Gomez, Christopher A. Preble, Lauren Sander, and Brandon Valeriano, White Paper (May 26, 2020)

**The Evolution of "Building a Modern Military"** by Brandon Valeriano and Eric Gomez, *Cato at Liberty* (blog) (May 26, 2020)

**Assessing International Threats During and After the Cold War** by John Mueller, Study (May 6, 2020)

**The Future of Space** by Robert Zubrin and Berin Szóka, Policy Report (January/February 2020)

**When Debating Base Closure, Look at the Data** by James Knupp and Christopher A. Preble, *Cato at Liberty* (blog) (January 15, 2020)

*America's Nuclear Crossroads: A Forward-Looking Anthology* edited by Caroline Dorminey and Eric Gomez (July 30, 2019)

**Space Force: An Unwise Solution to an Overhyped Threat** by Eric Gomez, Commentary (August 28, 2018)

## **RECENT STUDIES IN THE CATO INSTITUTE POLICY ANALYSIS SERIES**

- 903. **Despite Modi, India Has Not Yet Become a Hindu Authoritarian State** by Swaminathan S. Anklesaria Aiyar (November 24, 2020)
- 902. **Government in a Pandemic** by Thomas A. Firey (November 17, 2020)
- 901. **Qualified Immunity: A Legal, Practical, and Moral Failure** by Jay Schweikert (September 14, 2020)
- 900. **Democrats and Trade 2021: A Pro-Trade Policy for the Democratic Party** by James Bacchus (August 11, 2020)
- 899. **Health Care Workforce Reform: COVID-19 Spotlights Need for Changes to Clinician Licensing** by Shirley Svorny and Michael F. Cannon (August 4, 2020)
- 898. **How Property and Civil Rights Help Forest Tribes Modernize and Prosper: Lessons from India** by Swaminathan S. Anklesaria Aiyar and Neeraj Kaushal (July 30, 2020)
- 897. **Neo-Malthusianism and Coercive Population Control in China and India: Overpopulation Concerns Often Result in Coercion** by Chelsea Follett (July 21, 2020)
- 896. **Tariffs by Fiat: The Widening Chasm between U.S. Antidumping Policy and the Rule of Law** by Daniel J. Ikenson (July 16, 2020)
- 895. **Testing the “China Shock”: Was Normalizing Trade with China a Mistake?** by Scott Lincicome (July 8, 2020)
- 894. **Kicking the Habit: The Opioid Crisis and America’s Addiction to Prohibition** by Josh Bowers and Daniel Abrahamson (June 29, 2020)
- 893. **Nuclear Anti-Proliferation Policy and the Korea Conundrum: Some Policy Proposals** by John Mueller (June 22, 2020)

### **CITATION**

Farley, Robert. “Space Force: Ahead of Its Time, or Dreadfully Premature?” Policy Analysis no. 904, Cato Institute, Washington, DC, December 1, 2020. <https://doi.org/10.36009/PA.904>.



The views expressed in this paper are those of the author(s) and should not be attributed to the Cato Institute, its trustees, its Sponsors, or any other person or organization. Nothing in this paper should be construed as an attempt to aid or hinder the passage of any bill before Congress. Copyright © 2020 Cato Institute. This work by the Cato Institute is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.