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ESTABLISHING A SPACE PROFESSION  
WITHIN THE U.S. SPACE FORCE

by

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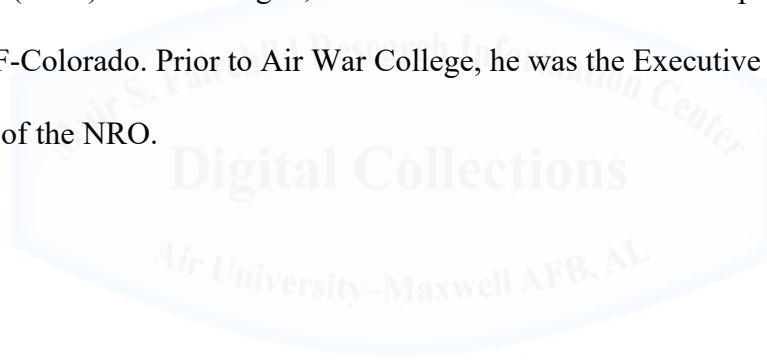
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## **Biography**

Lt Col Bryan Titus is an Air War College student and member of the Space Horizons Research Task Force. Lieutenant Colonel Titus received his commission in 2000 through the Reserve Officer Training Corps program at the University of Florida. He served in a variety of space-related acquisitions, engineering, operations, and staff assignments in the Air Force and the National Reconnaissance Office (NRO). This includes tours as an engineer in the GPS Joint Program Office, Flight Commander at the NRO's Aerospace Data Facility (ADF)-Southwest, National Tactical Integration Officer on the USCENTCOM Director of Space Forces (DS4) staff, Director of Operations for the NRO's West Coast Space Launch Squadron, GPS Program Element Monitor (PEM) at the Pentagon, and Commander of the NRO's Space Operations Squadron at ADF-Colorado. Prior to Air War College, he was the Executive Officer to the Deputy Director of the NRO.



## Abstract

The United States demonstrated its strategic commitment to the space domain by re-establishing U.S. Space Command and creating the U.S. Space Force. For the last two decades, the Air Force wrestled with the imperative to develop a cadre of military space professionals. The emergent Space Force provides an opportunity to revisit the topic of space professionalism and consider its importance within the space service. The Air Force made important strides in space professional development, including training, education, and certification, but its focus centered on the individual space professional rather than the institutional space profession. Professions require a focus not only on competence, but on other factors such as character, commitment, trust, and stewardship at the institutional and individual level. The 2001 Space Commission recognized the importance of developing a space-minded workforce. Despite Air Force efforts to implement Space Commission recommendations, space programs continued to experience significant cost and schedule overruns and multiple government reports identified shortfalls in space workforce expertise, particularly in space acquisitions. The successful development of space professionals at the individual level requires the firm establishment of a space profession at the institutional level, as well as an institutional commitment to properly resource the profession.

The Space Force should formally define and establish a space profession of arms because it provides members with a foundation, it mitigates service tendencies to behave as a bureaucracy, national-level policies and assessments consistently emphasize the need for space professionals, the emerging strategic environment demands an effective space workforce, and the Space Force provides the opportunity to revisit space professionalism. This paper recommends four specific actions for instituting a military space profession within the Space Force.

We're not a profession simply because we say we're a profession.

- *General Martin Dempsey, Chairman of the Joint Chiefs of Staff, 2011*<sup>1</sup>

## **Introduction**

In 2019, the United States demonstrated its strategic commitment to the space domain by re-establishing U.S. Space Command and creating the U.S. Space Force. For the last two decades, the United States, and particularly the Air Force, wrestled with the imperative to develop a cadre of military space professionals. The emergent Space Force provides an opportunity to revisit the topic of space professionalism and consider its importance within the space service. The Air Force made important strides in space professional development, including training, education, and certification, but its focus centered on the individual space professional rather than the institutional space profession. “How can I be a professional, if there is no profession?”<sup>2</sup> This provocative statement came from an Army Major in 1999 as her service assessed the health of Army professionalism, implying that professional development relies on a well-established and accepted profession. The United States Army developed an extensive body-of-work on the topic and showed that establishing and maintaining a profession goes beyond education and training. Professions require a focus not only on competence, but on other factors such as character, commitment, trust, and stewardship at the institutional and individual level. Army scholars observed that a military service, as a profession and a large government bureaucracy, is dual-natured, and that military leaders must ensure that service behavior leans more towards profession than bureaucracy.<sup>3</sup> Army experiences and insights to promoting its profession are instructive towards solidifying a space profession within the Space Force.

Over the last 20 years, the United States government issued a myriad of policies and assessments emphasizing the development of a space professional cadre to maintain space

dominance. The 2001 Space Commission recognized the importance of developing a space-minded workforce and recommended that the government “create and sustain...a trained cadre of military and civilian space professionals.”<sup>4</sup> Congress subsequently added a provision to Title 10, U.S. Code for the Air Force to create a career field for space system development, which the service chose not to implement.<sup>5</sup> The Air Force instituted a formal program to build a professional cadre from the space operations and acquisition career fields, primarily through space-focused training and education opportunities and professional certification.<sup>6</sup> Despite Air Force efforts to implement Space Commission recommendations, space programs continued to experience significant cost and schedule overruns and multiple congressional oversight reports identified shortfalls in space workforce expertise, particularly in space acquisitions. The successful development of space professionals at the individual level requires the firm establishment of a space profession at the institutional level, as well as an institutional commitment to properly resource the profession. When space was simply another mission in the Air Force portfolio, it was reasonable to assume that providing space-focused training and education to Air Force professionals was sufficient. However, the elevated strategic importance of the space domain justifies a separate military space service and should also warrant a distinct military space profession.

The Space Force should formally define and establish a space profession of arms because (1) professions provide members with a foundation of purpose, expertise, ethics, identity, and stewardship, (2) military services that do not identify as a profession will tend to behave more like a bureaucracy, (3) national-level policies and assessments of the space workforce consistently emphasize the need for space professionals and indicate that Air Force efforts have not met expectations, (4) the emerging strategic environment necessitates all-domain operating

concepts, requiring an effective space workforce, and (5) the creation of the Space Force provides an opportunity to formally establish the space profession as its foundation. To this end, this paper, first introduces the defining characteristics of professions and identifies the unique aspects and challenges of military professions. Second, it discusses the recommendations and policies of the United States towards developing the military's space workforce and evaluates the Air Force's efforts. Third, it analyzes the strengths, weaknesses, opportunities, and threats that should be considered in firmly establishing a space profession. Finally, it recommends four specific actions for instituting a military space profession within the Space Force.

### **Characteristics of Professions**

Medicine, theology, law, and military service are traditionally considered professionalized occupations.<sup>7</sup> Professions are generally characterized by the following factors:

- Service: Professions provide a useful and vital *service* that society cannot provide for itself.<sup>8</sup>
- Expertise: Professions possess and apply *expertise*, specialized knowledge, and unique skills in their practice.<sup>9</sup>
- Ethics: Professions are guided by a *professional ethic* that is determined by their values, beliefs, laws, and moral standards.<sup>10</sup>
- Identity: Professions are united by a *professional identity* that creates a shared purpose and is influenced by culture, ethos, expected behaviors, customs, traditions, titles, and attire.<sup>11</sup>
- Self-regulation: Professions *self-regulate*; they have a collective responsibility to self-police and certify professionals that are educated, proficient, and ethical.<sup>12</sup>

Professions earn the *trust* of society through effective and ethical application of their expertise, and, in exchange, society grants them a high-level of *autonomy* and *discretion* to apply their expert knowledge and necessary skills in service of society.<sup>13</sup> If a profession does not maintain society's trust, it will gradually begin to lose the autonomy and discretion needed to practice its profession. While the factors outlined above apply to professions in-general, military professions have their own unique characteristics and challenges.

Unlike other professions, military professions are responsible for the coordinated management of violence, and they are required to operate as a profession within a large government bureaucracy. There are currently three distinct warfighting professions in the United States, coinciding with the Army, Navy, and Air Force.<sup>14</sup> Each service provides expertise for its respective warfighting domain; land, sea, or air and space.<sup>15</sup> General Martin Dempsey emphasized that the military profession is unique because of its “expertise in the justified application of lethal military force and the willingness of those who serve to die” for the Nation.<sup>16</sup> Because of the lethal nature of the national defense mission, it is necessary for the services and the Defense Department to preserve the key characteristics of the military profession and ensure service members understand their roles, responsibilities, and obligations as military professionals. It is also important to recognize the dual-nature of a military service. Each of the military services is at once a profession and a bureaucracy, creating a challenge because professions and bureaucracies often have competing perspectives for problem-solving. Professions are primarily concerned with effectiveness while bureaucracies focus more on efficiency.<sup>17</sup> The notion that military services are both a profession and a bureaucracy is not necessarily a negative concept. To compete for resources in the greater bureaucracy, military bureaucracies must co-exist and operate accordingly. However, military leaders should remain vigilant to ensure the bureaucratic tendencies do not dominate over the military profession.<sup>18</sup> It is fair to assume that military members would prefer to see their service behave more like a profession than a bureaucracy. Bureaucratic decision-making is sometimes colored by parochialism, infighting, bargaining, compromise, and resistance-to-change.<sup>19</sup> Military professions are better postured for success in this paradigm when the characteristics of a profession are understood and reinforced at each echelon.



Of all the military services, it appears the Army has the greatest body-of-work on the topic of military professions. The Army made its first modern assessment of the state of its profession towards the end of the Vietnam War in 1970. A second major assessment of the Army profession was initiated in 2000 and found that by the end of the 1990s, Army “strategic leaders had allowed bureaucracy to dominate profession.”<sup>20</sup> Since then, Army scholars have published a wealth of information on their profession, and the Army codified many of these findings in service doctrine. The Army War College offered a concise description of attributes that professions should strive for at the institutional and individual levels.

**Table 1. Attributes of Professions and Professionals<sup>21</sup>**

<i>Profession</i>	<i>Professional</i>	<i>Description</i>
Expertise	Skill	Professions require expertise, demonstrated as unique skills in the professional
Trust	Trust	Trust is the currency of professions, both externally and internally
Development	Leadership	Professions require continuous development of individuals, manifested as leadership by professionals
Values	Character	Professions require a value-based ethic, demonstrated in the character of individual professionals.
Service	Duty	Professions provide a vital service, manifested in the duty of the individual professional

Army doctrine instituted these concepts into the essential characteristics of the Army profession (trust, honorable service, military expertise, stewardship, and esprit de corps) and the certification criteria for Army professionals (competence, character, and commitment).<sup>22</sup> The recommendations of the Army War College, the characteristics of the Army profession, and the certification criteria of the Army professional directly correlate with the characteristics of professions described earlier in this section. The Army’s model could be tailored to meet the unique requirements of military professions in other warfighting domains.

The decision to establish the Space Force provides an opportunity for the new service to solidify a profession of arms for the space warfighting domain, like the warfighting professions

of the air, land, and sea. Though aspects of a space profession are evident in the Air Force, there is still room for growth. The Air Force's reluctance to create a space acquisition career field and the lack of a clearly defined space profession limited space professional development and impacted the execution of Air Force space programs, which arguably contributed to the need for an independent space service. The nature of the military space mission puts Space Force members several steps removed from the "fighting and dying" aspect of the profession of arms, and while physical courage may not be as relevant, moral courage and character remain essential to mission success. This unique nature of the space mission creates an even greater imperative to institute a military space profession, providing the service with an overarching construct for establishing its own culture, values, and system for developing and certifying professionals. Like the Army, space professional certification should go beyond competence and incorporate the elements of character and commitment. This paper ultimately provides specific recommendations for solidifying the military space profession, but first, it reviews the major developments over the last twenty years in the quest for creating a cadre of space professionals.

### **The 2001 Space Commission**

The Fiscal Year (FY) 2000 National Defense Authorization Act (NDAA) formally established the Space Commission to assess the management and organization of National Security Space (NSS).<sup>23</sup> The resulting "Rumsfeld Commission" report provided five key recommendations; leverage space to modernize US forces, enhance intelligence collection from space, shape the space regulatory environment, promote technology investment, and create a trained cadre of military and civilian space professionals.<sup>24</sup> The Commission recognized that to fully exploit the complex technology and operational concepts of future space, the government would need a deep pool of expertise in science, engineering, and systems operations.<sup>25</sup> It also

acknowledged that while this assessment applied to all the military services, the Air Force had the most critical need for a space cadre, and Air Force Space Command (AFSPC) would be the focal point for space professional development and advocacy.<sup>26</sup> The Commission highlighted the importance of appointing leaders with space experience and extending tour lengths for key leadership positions.<sup>27</sup> Additionally, the Commission emphasized developing space professionals with a depth of experience in their field and a breadth of understanding across the range of space mission areas.<sup>28</sup> Congress reinforced the Commission's recommendations by creating a law for the Air Force to develop an officer career field with the technical competence to develop and operate space systems. Space Command moved-out quickly to address the Rumsfeld Commission recommendations.

### **The Space Professional Development Program**

In response to the Rumsfeld Commission, Air Force Space Command aggressively pursued the Space Professional Development Program (SPDP) to identify and develop a cadre of space experts from the operations and acquisition career fields. AFSPC defined space professionals as “skilled and knowledgeable in the development, application and integration of space concepts, doctrine and capabilities to achieve national security objectives.”<sup>29</sup> The SPDP provided continuous learning opportunities towards professional certification and documented individual space experience to inform future assignments in military space. Space Command made SPDP its top priority and accomplished several significant milestones towards achieving its vision.<sup>30</sup> It stood-up the Space Professional Management Office, gained Secretary of the Air Force approval for the SPDP strategy, established the National Security Space Institute to provide basic, intermediate, and advanced space courses, formalized a professional certification program, redesigned the space operations badge as “space wings,” and codified the SPDP in Air

Force policy.<sup>31</sup> By the end of 2004, over seven thousand Air Force members were identified as space professionals.<sup>32</sup> Though widely embraced by the workforce, SPDP was somewhat limited in its ability to formally establish a space profession within the Air Force institution.

Despite the SPDP's efforts, two key elements are missing from the Air Force's approach; the formal establishment of a space profession and the creation of a space acquisition career field. First, the characteristics and attributes of a space warfighting profession are not defined in Air Force policy or guidance. A central assumption is that the effective development of professionals requires the formal establishment of a well-defined profession. Professionals should understand the distinct characteristics of their profession and comprehend their role in fulfilling the profession's obligation to society. The five characteristics of the Army Profession and the three components that are used to certify Army professionals are codified in Army doctrine. Similarly, the Air Force's Profession of Arms Center of Excellence established definitions for the Air Force profession and professional in its 2015 Strategic Roadmap.<sup>33</sup> However, a 2017 RAND study commissioned by the Air Force found "little shared understanding of the meaning of Air Force professionalism" within the service.<sup>34</sup> Training and education criteria for certifying space professionals are outlined in Air Force policy, but the distinct characteristics of the space profession are not defined.<sup>35</sup> Space professionals will find it difficult to self-regulate if these key factors are not codified and effectively communicated.

Second, the Air Force did not establish a separate space acquisition career field. Assuming that operations *and* acquisition expertise are necessary for the end-to-end success of a military space program, establishing a distinct career field would strengthen the acquisition arm of the space cadre. The lack of a space acquisition career field limited the development of space-experienced acquisition officers as space professionals. Space acquisition lifecycles and

operating environments are inherently different than the acquisition lifecycles and operating environments for non-space weapon systems. Building space acquisition experts warrants successive assignments delivering space systems, rather than rotating between space and non-space programs. The 2001 Space Commission recommended building a cadre of space professionals with the necessary depth and breadth to effectively develop and deliver space capabilities, but the Air Force did not commit to a space acquisition career field and multiple space programs have experienced significant cost and schedule overruns over the last twenty years. Acquisitions career field managers have argued that “the acquisition skills needed for an acquisition program—such as those for program management, engineering, and contracting—are largely the same regardless of the product type.”<sup>36</sup> This dynamic illustrates the struggle between bureaucratic efficiency and professional effectiveness. From the bureaucracy’s perspective, identifying a subset of members as space acquisition officers limits the flexibility of the Air Force to assign acquirers to non-space programs, and is therefore inefficient. From the profession’s standpoint, establishing a space acquisition career field enables the service to develop and manage the careers of its space-experienced scientists, engineers, and program managers, increasing the effectiveness of its major space acquisition programs. The Air Force wants to develop acquisition officers with breadth in multiple weapon systems, while the space profession needs acquirers with depth in space weapon systems. Ultimately, the Air Force decided to manage its acquisition workforce at the corporate level, with secondary consideration for tracking space-experienced acquirers to space assignments. While the Air Force resisted external calls to create a separate acquisition career field, military space programs and the space workforce remained under heavy scrutiny.

## Subsequent Assessments of the Space Workforce

In addition to the 2001 Space Commission, the White House, Congress and the Government Accountability Office (GAO), the “congressional watchdog,” generated numerous policies and reports on space programs and the space workforce. The following list provides a snapshot of major developments over the last two decades, highlighting cost and schedule challenges associated with the Space-Based Infrared System (SBIRS) and the Global Positioning System (GPS), although several other space acquisition programs experienced significant challenges as well.

- 2001: Congress established a law mandating an Air Force career field for space development.
- 2005: SBIRS was \$6 billion over cost and delayed 6 years against its program baseline.<sup>37</sup>
- 2006: *National Space Policy* emphasized space professional development and expertise in space-based science, engineering, acquisitions and operations.<sup>38</sup>
- 2007: GAO warned of expertise shortages in the space acquisition workforce.<sup>39</sup> Congress created the Allard Commission and highlighted the need for a space acquisition career field.<sup>40</sup>
- 2008: The Allard Commission recommended the Air Force modify its personnel policies to promote technical competence, experience, and continuity for space acquirers.<sup>41</sup>
- 2009: SBIRS was \$7.5 billion over cost and delayed 7 years against its program baseline.<sup>42</sup> GAO noted significant expertise shortages in major space programs.<sup>43</sup>
- 2010: *National Space Policy* directed the development and retention of space professionals.<sup>44</sup>
- 2011: The first SBIRS satellite launched, but the program was nearly \$14 billion over cost and 9 years behind schedule.<sup>45</sup> The *National Security Space Strategy* emphasized space cadre development.<sup>46</sup>
- 2012: GAO turned its attention towards cost and schedule growth on the GPS program.<sup>47</sup>
- 2013: GAO identified disconnects between synchronizing satellite, ground control systems, and user equipment for multiple space programs, including GPS.<sup>48</sup>
- 2015: The GPS ground segment schedule slipped 4 years.<sup>49</sup> The SBIRS ground segment schedule delayed the usability of on-orbit sensor data for 5 years.<sup>50</sup>
- 2017: The GPS program was \$3.4 billion over cost and delayed 5 years against the baseline.<sup>51</sup> GAO highlighted concerns with synchronizing GPS space, ground, and user segments.<sup>52</sup>
- 2019: GAO questioned whether the Air Force had sufficient space expertise to manage its space programs and noted that the space acquisition workforce was not routinely monitored.<sup>53</sup> President Trump directed the establishment of the Space Force.

Despite strong support from congressional and national leadership for the development of a space professional cadre, space program execution indicates that Air Force efforts did not meet

expectations. Concern for the management of the space acquisition workforce is a recurring theme, driven by the cost and schedule challenges experienced by several major space programs. Since 2001 Air Force programs that provide missile warning, satellite communications, and satellite navigation breached Nunn-McCurdy acquisition thresholds multiple times, and yet, the Air Force never created a space acquisition career field. Dr. John Stopher, a former space policy advisor to the Secretary of the Air Force, noted that the Air Force's space acquisition challenges were used as justification for creating the Space Force.<sup>54</sup> These cost and schedule challenges are multi-faceted and complex. A separate space acquisition career field would not necessarily solve the Air Force's acquisition challenges, but the GAO consistently identified the lack of depth in space expertise as a key contributing factor. It illustrates an institutional reluctance to dedicate a portion of Air Force acquirers to focus on space. The intent to staff the Space Force with its own acquisition officers creates a new opportunity to develop space-focused acquirers alongside their operator counterparts.<sup>55</sup> For the Space Force to effectively establish a strong team of acquisitions and operations professionals, it is appropriate to first assess the strengths and challenges facing the profession.

### **The Space Profession – Strengths, Weaknesses, Opportunities, and Threats**

As the Space Force begins its journey, it is prudent to analyze key factors influencing the establishment of an associated military space profession. Each military service defines, to some extent, what it means to be in the Army, Navy, or Air Force profession of arms. A Strengths, Weaknesses, Opportunities, and Threats (SWOT) framework is used by organizations to gauge how internal strengths and weaknesses and external opportunities and threats may impact strategic planning and decision-making. A SWOT analysis is a useful tool to evaluate the space profession and identify key influencing factors.

## **Internal Strengths**

The decision to establish an independent Space Force provides a strong forcing function towards developing a space profession. First and foremost, independence from the Air Force enables the space service to solidify the Space Force profession of arms. The Air Force profession of arms is defined as, “A vocation comprised of experts in the design, generation, support and application of global vigilance, global reach and global power serving under civilian authority, entrusted to defend the Constitution and accountable to the American people.”<sup>56</sup> Now there is an opportunity to define and characterize the Space Force profession of arms independent from the broader Air Force. Second, it permits the Space Force to manage and develop its members independently from the Air Force. This provides space professionals with the opportunity to focus on the space mission rather than rotating between space and non-space assignments, which enhances expertise and identity within the profession. Third, the space experts within the Air Force are genuinely excited, at all ranks and positions, to be on the ground floor of the Space Force. These professionals will be equally enthusiastic about formally instituting a space profession that is on-par with the warfighting professions of other domains. Finally, the space profession can borrow heavily from the professional ethic of the Air Force. The Space Force will most likely mirror the Air Force in its core values, and it will not be difficult for space service members to embrace the new service’s value-based ethics. These internal factors, along with others, will help the Space Force define the space profession, but the Space Force has internal challenges to address.



## Internal Weaknesses

The potential for “tribalism” among space professionals may weaken the Space Force’s ability to develop a cohesive space profession. There are two “tribes” within the space cadre; operators and acquirers. A natural and healthy tension exists between system acquirers and system operators, and this is not unique to the space domain. While the SPDP embraced space-experienced acquisition officers, subsequent decisions sent mixed signals. In 2005 AFSPC began awarding the space badge to acquisition officers with space-relevant experience, creating a shared identity among acquirers and operators. However, in 2013 AFSPC decided that the space badge would only be awarded to space operators, which left some space-experienced acquisition officers sensing that they had been un-invited.<sup>57</sup> Ideally, space operators and acquirers work seamlessly to provide an operational mindset and technical understanding of space systems to the space profession. The Rumsfeld Commission recognized that space systems are unique, requiring a close relationship between acquirers and operators.<sup>58</sup> The Space Force should examine this dynamic and consider how to leverage the combined expertise of operators and acquirers to effectively develop, deliver, and employ space capabilities. First, the highly technical nature of space warfighting requires space operators with the technical background to understand the foundational concepts of space systems and the space operating environment. The Rumsfeld Commission recommended the NSS community develop technically-oriented officers that understand the “functions and underlying technologies of their systems that enable them to use the systems more efficiently in combat.”<sup>59</sup> A 2014 RAND study of science, technology, engineering, and mathematics (STEM) degrees in the Air Force found that, while the institutional goal was 60%, less than 30% of space and missile operators held STEM degrees.<sup>60</sup> In 2018, the goal for STEM-degreed space operations officers was set at 80%.<sup>61</sup> This is an

important move in the right direction, but it will likely take time to achieve that goal and reap the benefits. In contested domain operations, space operators will be more effective at dynamically employing space capabilities by leveraging a deep technical understanding of space systems rather than relying on standard operating procedures or checklists.

Second, space acquirers are more effective at developing and delivering space capabilities when they have space operations experience. The Rumsfeld Commission advocated for leveraging space acquirers with operational experience to directly influence satellite design.<sup>62</sup> The National Reconnaissance Office utilized an effective model at its satellite ground stations by certifying new officers, regardless of career field, as space operations crew commanders before transitioning them into program management or engineering positions. Acquisition officers that spend time on a space operations crew gain valuable insight, enhancing their ability to effectively acquire space capabilities. It may be beneficial to consider the “every Marine a rifleman” model to provide new space officers with a strong foundation in operations before transitioning to acquisition duties. It is commonly discussed within the Air Force acquisition community that sending newly-commissioned lieutenants to a product or logistics center for their first assignment is not ideal for leadership development. For comparison purposes, there are no Army acquisition lieutenants. The Army does not accept officers into its Acquisition Corps until they are mid-grade captains, giving them operational leadership experience before managing an acquisition program.<sup>63</sup> The Navy has a similar model. A 2019 GAO report found that the Air Force’s space acquisition hub, the Space and Missile Systems Center, had a significant number of excess lieutenants assigned.<sup>64</sup> If the additional capacity exists, the Space Force would benefit by creating a pipeline of technically-oriented officers that spend the first few years of their careers leading space operations, increasing the number of STEM-degreed officers conducting

space operations and producing more space acquisition officers with operational experience. Indeed, applying technical expertise in space operations and leveraging operational experience in space acquisitions enhances the effectiveness of the space profession. Providing a common experiential baseline in space operations creates a shared identity, common understanding of the space domain, and establishes operational credibility among young space professionals, increasing overall cohesiveness. Space acquirers and operators need to function as a cohesive team to meet the strategic challenges that lie ahead.

### **External Opportunities**

US national strategy, identification of a pacing threat, and presidential emphasis on space all create an enormous opportunity for the Space Force and its associated space profession. The *National Security Strategy* acknowledges the great power competition with China and Russia and warns that adversaries will attempt to limit US access in all domains.<sup>65</sup> The *National Defense Strategy* identifies long-term strategic competition with China and Russia as a principal priority requiring investment.<sup>66</sup> With the pacing threat identified, the Joint Staff and Services are developing visions of how the Joint Force will compete in an anti-access, area-denial (A2/AD) environment through the employment of joint, all-domain, sensor-to-shooter capabilities. Both the Air Force and the Army produced operational concepts that recognize the reliance of air and ground forces on space capabilities in an A2/AD conflict. Moreover, the president is placing extraordinary emphasis on the space domain. Since taking office, President Trump reestablished the National Space Council, called for the reinvigoration of human space exploration, published the “America First” National Space Strategy, stood-up a space-focused combatant command, and established a new space service. The administration’s efforts are clearly aimed at maintaining US

space dominance, and the Space Force has an opportunity to lead government efforts towards achieving the president's goals.

China is challenging US dominance in space by aggressively pursuing a broad spectrum of space capabilities. While this is a potential threat to US national security, it presents an opportunity for the space profession. China demonstrated a direct-ascent anti-satellite capability in 2007 and expressed a willingness to target reconnaissance, communication, navigation, and early warning satellites.<sup>67</sup> China is making significant progress in lunar exploration, as evidenced by landing a probe on the far side of the Moon and deploying a relay satellite in lunar orbit.<sup>68</sup> Additionally, China plans to establish a lunar research station in the next ten years and a lunar base by 2050.<sup>69</sup> The current strategic environment requires the NSS community to develop, deliver, and operate space capabilities that support great power rivalry, deter potential adversaries, and if deterrence fails, seamlessly integrate into the all-domain operational concepts of the air, land, and sea forces. The current strategic context requires the Space Force to expand its role beyond the traditional missile warning, communications, navigation, intelligence, and counter-space mission sets by integrating into all-domain operational concepts.

In the emerging strategic context, there are at least two mission areas that should be considered in the Space Force's strategic mission and vision. First, space-based capabilities must be integrated into an all-domain, sensor-to-shooter, Joint Force kill chain to compete in the A2/AD threat environment. Consider an A2/AD conflict where the Joint Force is denied the ability to establish domain superiority in air, land, or sea. The Joint Force Commander relies on space-based sensors to find, fix, and track the enemy and share data with an all-domain command and control (C2) node. The C2 node fuses space-based sensor data to target the enemy and directs fires from unmanned aircraft and Army and Navy long-range munitions. In parallel,

space assets continually assess the battlespace and defend friendly space assets from terrestrial and on-orbit enemy threats. It is difficult to envision how the Joint Force succeeds in an A2/AD conflict without the integration of space capabilities.

Second, the Space Force must ensure that the United States maintains its global advantage in the space domain. China's anti-satellite capability threatens NSS assets, and its plans to establish a major presence on the Moon expands China's cislunar presence, further threatening NSS systems. In the context of great power rivalry, it is prudent for the United States to seriously consider lunar basing options and focus on getting there faster than China. Although international law prohibits the establishment of military bases on the Moon, the Outer Space Treaty permits military personnel to conduct scientific research and utilize lunar-based equipment and facilities for peaceful purposes.<sup>70</sup> Appointing the Space Force to lead efforts in establishing a lunar base enables military space to support US civil and commercial interests in space and provides an opportunity to project an American military presence across cislunar space. While the civil and commercial space sectors will reap significant benefits from the decision to establish a lunar base, they can rely on military space to build and operate a base in the austere conditions of the lunar surface. One of the primary advantages of a lunar base is the opportunity for in-situ fuel production. Given the Chinese kinetic anti-satellite threat, NSS satellites will need agility, and hence fuel, to maneuver. Fuel is potentially a limiting factor, but a lunar base with fuel production capabilities enables the Space Force to refuel US satellites without launching from the earth's surface. Although ambitious, establishing a multi-purpose lunar base would help enable the United States to protect its assets in a conflict that extends into space. Moreover, a lunar base initiative supports the president's goal to reinvigorate human space exploration to the Moon and beyond. Given the clear mission needs, the Space Force

profession of arms is well-positioned to help the United States achieve its national objectives, but to fully succeed, the new service must articulate to society how it will protect national security.

### **External Threats**

The inability of society to understand the distinct mission of the Space Force threatens the establishment of a credible space profession. As discussed earlier, a profession earns the trust of society by providing a unique and vital service effectively and ethically, and in exchange, society grants the profession significant autonomy and discretion to conduct its practice. It will be difficult for the space profession to thrive if the service provided is not well understood by society. Following the post-World War II military drawdown, Samuel Huntington discussed the importance of a military service's *strategic concept*. The strategic concept of a military service describes its role in implementing national policy and protecting national security.<sup>71</sup> Without a well-defined strategic concept, society will not understand the role or need for the service, and consequently, the service will not receive the resources needed to conduct its mission.<sup>72</sup> There are indications that society does not understand the strategic concept of the Space Force. On the day the Space Force was established, a reporter mentioned the "Space *Farce*" and Gen Jay Raymond clarified, "This is not a farce. This is nationally critical."<sup>73</sup> Indeed. The health of the space profession relies on the perceived legitimacy of the Space Force mission, both externally and internally. Externally, the space profession needs to overcome the "giggle factor" by clearly articulating to the public how the Space Force contributes to the protection of national security. Internally, the commitment of space professionals to their profession and the service it provides relies on a common and shared understanding of the Space Force's strategic concept. With a well-defined and communicated strategic concept, space professionals are positioned and motivated to advocate for the space mission rather than feeding into the "giggle factor," which

marginalizes the legitimacy of their own profession. The current strategic environment provides a tremendous opportunity for the Space Force profession of arms to articulate a compelling strategic concept that society understands and endorses.

## **Recommendations**

The Space Force should be built on the foundation of a space profession. The legitimacy of the space profession relies on a clearly articulated strategic concept that communicates how the Space Force will protect national security. To implement the strategic concept, the Space Force needs proficient, ethical, and service-oriented space professionals that embody the defining characteristics of the space profession. Because of the unique nature of the military space mission, professionals should develop a common technical and operational understanding of the domain to effectively develop, deliver, and employ space warfighting capabilities. This leads to four recommendations for instituting the Space Force profession of arms.

First, codify the Space Force profession of arms in service policy. This should include the key characteristics of the space profession and its professional ethic. Policy and guidance should emphasize the collective responsibility of space professionals for stewardship of the profession.

The space warfighting profession should include the following characteristics:

- **Competence:** Professions require expertise, specialized knowledge, and unique skills.
- **Character:** Professions are guided by a professional ethic, determined by their values, beliefs, laws, and moral standards.
- **Commitment:** Professions provide a vital and unique service to society.
- **Leadership:** Professions require leadership at each echelon to establish and self-regulate the profession, develop and certify professionals, and cultivate the professional identity.
- **Trust:** Professions rely on external trust to practice their profession with autonomy and discretion, and they rely on internal trust to operate effectively and cohesively.

Second, define the strategic concept for the Space Force to ensure that space professionals and society understand precisely how the service protects national security. A compelling and clear strategic concept strengthens the commitment of space professionals to the

service's unique mission. The Space Force should define its strategic concept along three lines; traditional, emerging, and long-term. Traditional missions include missile warning, satellite communications, space-based navigation, intelligence, and counter-space. The emerging mission focuses on integrating traditional and innovative space capabilities into all-domain operations, delivering joint lethality to achieve dominance in an A2/AD conflict. In the long-term, lunar basing supports civil and commercial space endeavors and enables the United States to protect and defend its on-orbit assets while projecting US space power. Recognition of these three mission areas offers the Space Force a compelling narrative that describes tangible ways the new service will protect national security by cooperating with partners, competing with other space-faring nations, deterring adversaries, and providing critical all-domain capabilities in an armed conflict. A compelling narrative helps mitigate the "giggle factor" which potentially threatens the perceived legitimacy of the space profession. Failure to establish a strategic concept puts the notion of a space warfighting profession at risk.

Third, establish a professional certification program that assesses an individual's competence, character, and commitment. The profession has a collective responsibility to ensure members are proficient in their practice, ethical in their decision-making, and resolute in their service to society. Certifying professional competence is fairly objective and should leverage existing certification programs for assessing expertise in space operations and acquisitions. Certifying an individual's character and commitment is more subjective, although not unprecedented. Air Force annual performance reports rely on supervisors to assess such subjective factors as loyalty, dedication, integrity, and judgment. Similar factors should be applied and emphasized for space professional certification. Individual character is assessed through personal observation and interaction, certifying the member's judgment and ability to



apply the professional ethic in decision-making. Certification of individual commitment requires personal observation to assess whether the member demonstrates honorable and resolute service in the Space Force and to the Nation. Utilizing a whole-person concept for professional certification ensures members are qualified to self-regulate and uphold the key characteristics of the profession.

Fourth, create a common experiential baseline to ensure new space professionals have a shared understanding of the space warfighting domain. Newly accessed military members should gain operational experience and professional certification in satellite command and control, space launch, space control, or space surveillance in their first assignment. Following their first assignment, members should then be tracked to either space operations or space acquisitions, depending on their background, job performance, and personal preferences. This helps establish a common identity, a shared sense of purpose, and operational credibility among space professionals. Learning the operational side of space as lieutenants enables young officers to gain valuable experience and build a network of colleagues that will benefit them in the future, whether they ultimately serve as operators or acquirers in the Space Force.

## **Conclusion**

The Air Force made significant progress in developing a cadre of space professionals since the release of the Space Commission report in 2001. Creation of the Space Force provides a further, unprecedented, opportunity to revisit the concept of space professionalism by determining the characteristics of a space profession and taking a holistic approach to develop and certify space professionals. There currently exists a large body-of-work on the characteristics and attributes of professions. Military professions have their own unique characteristics and challenges, and they are strengthened by focusing on the appropriate attributes at the institutional

and individual levels. Multiple government assessments over the last two decades reiterated the imperative to develop a competent space workforce. Up to this point, Air Force efforts primarily focused on providing space-focused education and training to space operators and acquirers. Though this approach enhanced the expertise of space professionals, it did not formally establish or define the space profession and it did not commit to creating a separate space acquisition career field. If the strategic importance of the space domain necessitates a separate military space service, then it should also warrant the establishment of a distinct military space profession.

A SWOT analysis of the current space profession reveals internal strengths and weaknesses, along with external opportunities and threats that should be considered in the establishment of a space profession. Service independence permits the formulation of a focused definition for the space profession as a foundation for the Space Force. The effectiveness of the space profession relies on a cohesive team of operators and acquirers that apply technical expertise in conducting space operations and leverage operational experience in managing space acquisitions. The current strategic environment and presidential support for the space warfighting domain create an enormous opportunity to bring military space to a new level and help the United States achieve its national objectives. To thrive as a military profession, the Space Force should focus on developing a strategic concept that clearly articulates to society how the new service will protect national security. Moving forward, the Space Force should codify the space profession of arms, identify the characteristics of the space profession and its professional ethic, define the Space Force's strategic concept, establish a comprehensive professional certification process, and ensure new members of the space profession obtain a common baseline of operational experience early in their careers. The Space Force has a tremendous opportunity to

build its service upon the indelible foundation of a military space profession, ensuring the United States remains the predominant global space power.

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- <sup>1</sup> Dempsey, “General Dempsey’s Letter to the Joint Force.”
  - <sup>2</sup> Watkins and Snider, “Project Conclusions,” 545-546.
  - <sup>3</sup> Snider, “American Military Professions and Their Ethics,” 18.
  - <sup>4</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, viii.
  - <sup>5</sup> *National Defense Authorization Act for Fiscal Year 2002*, 186.
  - <sup>6</sup> Air Force Space Command, “Space Professional Development,” 12.
  - <sup>7</sup> Snider, “American Military Professions and Their Ethics,” 17.
  - <sup>8</sup> Snider, “American Military Professions and Their Ethics,” 16.
  - <sup>9</sup> Swain and Pierce, *The Armed Forces Officer*, 19-20.
  - <sup>10</sup> Snider, “American Military Professions and Their Ethics,” 17.
  - <sup>11</sup> Swain and Pierce, *The Armed Forces Officer*, 24-26.
  - <sup>12</sup> Snider, “American Military Professions and Their Ethics,” 16.
  - <sup>13</sup> Snider, “American Military Professions and Their Ethics,” 18.
  - <sup>14</sup> Snider, “American Military Professions and Their Ethics,” 15.
  - <sup>15</sup> Snider, “The US Army as profession,” 18.
  - <sup>16</sup> Dempsey, “America’s Military – A Profession of Arms,” 4.
  - <sup>17</sup> Snider, “American Military Professions and Their Ethics,” 18.
  - <sup>18</sup> Snider, “American Military Professions and Their Ethics,” 19.
  - <sup>19</sup> Houghton, *The Decision Point*, 35.
  - <sup>20</sup> Snider, “American Military Professions and Their Ethics,” 19.
  - <sup>21</sup> Snider, *Once Again, the Challenge to the U.S. Army During a Defense Reduction*, 19-20.
  - <sup>22</sup> ADRP 1, *The Army Profession*, v.
  - <sup>23</sup> *National Defense Authorization Act for FY 2000*, 303.
  - <sup>24</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, vii-viii.
  - <sup>25</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, x.
  - <sup>26</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, 42, 90.
  - <sup>27</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, 42-46.
  - <sup>28</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, 44-45.
  - <sup>29</sup> Air Force Space Command, “Space Professional Development,” 12.
  - <sup>30</sup> Lord, “Welcome to High Frontier!,” 4.
  - <sup>31</sup> AFPD 36-37, *Space Professional Development*, 1-5.
  - <sup>32</sup> Mehuron, “Building the Space Cadre.”
  - <sup>33</sup> US Air Force, *Strategic Roadmap: United States Air Force Profession of Arms*, 4.
  - <sup>34</sup> Li et al., *Enhancing Professionalism in the U.S. Air Force*, 9-10.
  - <sup>35</sup> AFPD 36-37, *Space Professional Development*, 1-5.
  - <sup>36</sup> GAO, *DOD Should Collect and Maintain Data on Its Space Acquisition Workforce*, 9.
  - <sup>37</sup> GAO, *Stronger Development Practices and Investment Planning Needed*, 6.
  - <sup>38</sup> The White House, *2006 U.S. National Space Policy*, 3.
  - <sup>39</sup> GAO, *Actions Needed to Expand and Sustain Use of Best Practices*, 16-17.
  - <sup>40</sup> *National Defense Authorization Act for Fiscal Year 2007*, 279.

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- <sup>41</sup> Allard Commission, *Leadership, Management, Organization for National Security Space*, 24.
- <sup>42</sup> GAO, *Government and Industry Partners Face Substantial Challenges*, 8.
- <sup>43</sup> GAO, *Government and Industry Partners Face Substantial Challenges*, 16.
- <sup>44</sup> The White House, *2010 U.S. National Space Policy*, 6.
- <sup>45</sup> GAO, *DOD Delivering New Generations of Satellites*, 6-8.
- <sup>46</sup> The White House, *2011 National Security Space Strategy*, 8.
- <sup>47</sup> GAO, *DOD Faces Challenges in Fully Realizing Benefits*, 4.
- <sup>48</sup> GAO, *DOD is Overcoming Long-Standing Problems*, 10.
- <sup>49</sup> GAO, *Some Programs Have Overcome Past Problems*, 7.
- <sup>50</sup> GAO, *Some Programs Have Overcome Past Problems*, 11-12.
- <sup>51</sup> GAO, *DOD Continues to Face Challenges of Delayed Delivery of Critical Space*, 3, 5.
- <sup>52</sup> GAO, *DOD Continues to Face Challenges of Delayed Delivery of Critical Space*, 9.
- <sup>53</sup> GAO, *DOD Faces Significant Challenges*, 15.
- <sup>54</sup> Space News, “U.S. Space Force has lifted off, now the journey begins,” 5.
- <sup>55</sup> US Space Force, “How Will the Space Force Impact Me.”
- <sup>56</sup> US Air Force, *Strategic Roadmap: United States Air Force Profession of Arms*, 4.
- <sup>57</sup> Williams, “Space badge renamed, new guidance issued.”
- <sup>58</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, 68.
- <sup>59</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, 45.
- <sup>60</sup> Harrington et al., *Air Force—Wide Needs for STEM Academic Degrees*, 20.
- <sup>61</sup> US Air Force, *Air Force Officer Classification Directory*, 246.
- <sup>62</sup> Rumsfeld Commission, *Commission to Assess United States National Security Space*, 68.
- <sup>63</sup> Army Acquisition Support Center, “AC Officer Career Timeline.”
- <sup>64</sup> GAO, *DOD Should Collect and Maintain Data on Its Space Acquisition Workforce*, 23.
- <sup>65</sup> The White House, *National Security Strategy*, 27, 29.
- <sup>66</sup> DOD, *Summary of the National Defense Strategy*, 4.
- <sup>67</sup> DOD, *Military and Security Developments Involving China 2019*, 51.
- <sup>68</sup> DOD, *Military and Security Developments Involving China 2019*, 50.
- <sup>69</sup> DOD, *Military and Security Developments Involving China 2019*, 50.
- <sup>70</sup> United Nations, *Treaties and Principles on Outer Space*, 4.
- <sup>71</sup> Huntington, “National Policy and the Transoceanic Navy,” 1.
- <sup>72</sup> Huntington, “National Policy and the Transoceanic Navy,” 1.
- <sup>73</sup> Raymond, “Space Force Briefing.”

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