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**The Space Force is Unsustainable:
Current Issues of Space Access and Sustainment**

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THE SPACE FORCE IS UNSUSTAINABLE: CURRENT ISSUES OF SPACE ACCESS AND SUSTAINMENT

AIM

1. This paper aims to go deeper into Space Access and Sustainment. Specifically, how one particular program, Tactically Responsive Space (TacRS), highlights key deficiencies in thought around how US Space Forces are sustained. The space launch industry is undergoing a radical shift from launch vehicles that are expendable and expensive to reusable and inexpensive. While the impacts of this shift have yet to be solidified, the change to space operations will be significant. The United States Space Force (USSF) must acknowledge the historical wartime logistics lessons learned and use that knowledge to formulate the creative application of logistics to the space domain. The recommendations in this service paper seek to improve the focus of sustainment at the strategic, operational, and tactical levels, which could result in improved access to space and the sustainment of effects.

INTRODUCTION

2. The USSF is the newest military branch in the United States. Formed mainly in reaction to adversaries like China and Russia, the new service has roots within the US Air Force. Though this foundation began during the Cold War, it was primarily cemented during the last thirty years in which the United States was the sole provider of space power. Additionally, contrary to the Air Force's beginnings in the throes of WWII, the Space Force has not yet been asked to prove itself in battle. Because of this, the service has been left to determine how to generate effects during a protracted operation independent of experience. Specifically, the Space Force may be unable to continue after the next war's opening salvos. This paper seeks to highlight doctrinal and procurement deficiencies at the tactical, operational, and strategic level using the TacRS program as a critique to formulate the argument.

DISCUSSION

3. The TacRS Program seeks to launch a satellite within 24 hours of notice in response to a combatant commander's needs.¹ What that looks like in practice is unclear. However, it may mean understanding the tactical need in advance, building the satellite and placing and maintaining it in storage, and then having the space launch capability and capacity to take it out of storage and launch it quickly. The USSPACECOM commander has stated that the capability to "replenish" satellites will be critical to deterring China.² Congress members have said the ability to "rapidly reconstitute degraded systems" is crucial.³ TacRS is a relatively small program within the larger USSF budget at \$50-\$100 million in funding. Yet, in a long list of non-negotiables, the program seemingly commands a lions-share of the conversation. However, the

¹ Space News. "Launch On Demand: If satellites are shot down, will Space Force be ready to restock?" accessed 17 Feb 2023. <https://spacenews.com/launch-on-demand-if-satellites-are-shot-down-will-space-force-be-ready-to-restock/>

² Space News. "USSPACECOM Supports Use of Responsive Launch to Deter China and Russia," accessed 17 Feb 2023. <https://spacenews.com/u-s-space-command-supports-use-of-responsive-launch-to-deter-china-and-russia/>

³ Senator Michael Waltz, quoted by Congressional Quarterly 2 March 2022. Reprinted by Scott Sadler, USSF PA.

program's operational concept and the language used to support it show an immaturity within space warfighting.

DOCTRINALLY DIVERGENT

4. TacRS highlights a misunderstanding about how modern armed forces are sustained by misappropriation of terminology, misalignment with the Joint Logistics Enterprise, and an ignorance of history. As previously mentioned, top commanders and thought leaders discussing TacRS have used terms such as “replenish,” “reconstitute,” and “augmentation.” The name of the program contains “responsive.” Typically, these words surround the TacRS program when discussing its capability or advocating for its use or financing. However, these terms have a doctrinal definition that can completely change the nature of the program depending on use.

5. The problem is not that senior leaders are using this terminology; the problem is that the whole service does not understand what it needs from this program. Therefore, the development may be misguided. A responsive program is different from a replenishment program. An augmentation of capability is different from a reconstitution effort. Each of these could be a program in itself. Each of these is not well defined for the space domain specifically.

6. Furthermore, the misappropriation of terminology shows the divergence of the USSF from the larger Joint Logistics Enterprise (JLE). The JLE has an operating framework that clearly outlines logistical objectives at the three classic levels of war. Within the 190-page joint doctrine document, reconstitution is not a guiding principle and is rarely mentioned.⁴ Misalignment with joint doctrine can cause difficulty in advocating for the proper requirements at all levels and can cause difficulty when integrating across services. The difference between Joint and Service level is not unheard of. However, the uniqueness of the Space Force should drive some reflection.

7. Initial attempts at Space Force doctrine have either wholesale applied doctrine from the Air Force or combined terms that further muddle the issue. In the initial Space Force doctrine publication, space launch is associated with mobility and logistics.⁵ The newest Space Force doctrine delineates mobility and logistics, but space launch is still associated with both. Traditionally, the Department of Defense acquires weapon systems, not logistics programs. The acquisition of the weapon system includes operating and maintenance costs. Setting requirements for and developing programs for logistics is putting the cart before the horse. If space launch is more of a mobility capability, similar to a C-17, then space launch needs to be operationalized like a weapon system with the requirements and ownership to match.

8. Any corrections in foundational level doctrine should be initiated before the doctrine becomes solidified into USSF culture. When the US Army deemphasized reconstitution as an important aspect of operational logistics, it was after trialing reconstitution through major wars, publishing a Field Manual on the process, and finally focusing on modularity in the 90s to remove reconstitution entirely. Yet reconstitution reportedly still appears when conducting

⁴ United States. Joint Chiefs of Staff. Doctrine for the Armed Forces of the United States. JP 4-0. Vol. 1. Washington, D.C.: Joint Chiefs of Staff, 2020.

⁵ United States Space Force. “Space Capstone Publication, Spacepower,” 37.

training exercises.⁶ As a corollary, air and naval force reconstitution is rarely discussed.⁷ For an analogy, an uncorrected flight path has a much more significant impact at the start of a journey than toward the end.

TACTICALLY AND OPERATIONALLY IMMATURE

9. A lack of understanding of logistics and mobility highlights immaturity at the tactical and operational levels. This immaturity can be seen through a misunderstanding of both friendly and adversary timelines and implies low confidence in the tactician's ability to win. The TacRS program's name, "Tactically Responsive," implies a timing and tempo that would assist with a tactical timeline. Though the logical chain for determining the program's name is missing, the importance of understanding tactical timelines for space is not. In the span of 24 hours, many tactical operations could occur. In low earth orbit, satellites encircle the earth upwards of 15 times. Depending on the orbit, that could mean multiple daily targeting opportunities for the adversary⁸. On the terrestrial side, the responsiveness of 24 hours may be well past a tactical commander's needs depending on the capability provided. Essentially, the timeline provided by the TacRS program may not be tactically responsive. To that end, even industry believes this logic, pushing the Space Force to "strengthen the concept of operations."⁹ Industry experts seem to understand they are being asked for 24-hour launches, yet do not understand how the Space Force intends to use the capability.

10. Understanding tactical timelines is not the only tactical deficiency highlighted by the TacRS program but also the force's deficient tactical capability as a whole. Wrapped up within the desire to reconstitute forces is the implication that the current satellites in orbit are insufficient to survive. As discussed within the background section of this paper, today's Space Force satellites were developed in an era of US hegemonic space power with no adversary. In other words, a defensive capability is likely deficient concerning the growing threat if it exists.

11. Likewise, a focus on reconstitution highlights deficiencies at the operational level. When the Army used reconstitution, it was composed of three elements: reorganization, regeneration, and rehabilitation.¹⁰ While the elements may translate to Space Force satellites, the more similar analogy would be that of a ship or an aircraft that does not use reconstitution but reallocation. As a thought experiment, what happens if a ship or aircraft is destroyed in combat? Simply, the service reallocates forces from either reserve forces or non-presented forces. The forces are present and available due to proper force design and force ratio considerations. Force ratios, allocation, and design are not fully formulated within the space domain. TacRS just happens to be the contract vehicle that highlights this deficiency.

⁶ US Army, Menter, John. "The Fallacy and Myth of Reconstitution," accessed on 28 Feb 2023 https://www.army.mil/article/219390/the_fallacy_and_myth_of_reconstitution

⁷ Author's note: after extensive research, the author could not find language supporting reconstitution in either Air Force or Naval doctrine or programming.

⁸ United States. Defense Intelligence Agency. "2022 Challenges to Security in Space"

⁹ Space News. "Space Force Lays Out Timeline for 2023 Rapid Response Launch Experiment," accessed 17 Feb 2023. <https://spacenews.com/space-force-lays-out-timeline-for-2023-rapid-response-launch-experiment/>

¹⁰ US Army, Menter, John. "The Fallacy and Myth of Reconstitution."

STRATEGIC INDECISION

12. At the strategic level, TacRS shows indecision between styles of warfare, a lack of clarity of combatant commander requirements, and a space-industrial base that cannot support wartime efforts.

13. The USSF shows a defense striving for dominance using an attrition style of war and overwhelming logistics. In attrition warfare, the objective is to outlast your enemy through the sequential destruction of their forces and prevent the same from happening to yours. Maneuver warfare, attrition warfare's opposite, using initiative and rapid movement of forces brings success.¹¹ While there are more styles of war, it would appear that with the TacRS program, the Space Force is attempting to build toward surviving an attrition war through resilience. However, within the first capstone document, maneuver warfare is the focus of discussion.¹² The doctrinal focus on maneuver is unsurprising; most modern and democratic militaries have focused on maneuver warfare for decades. Though reconstitution may be applied to maneuvering forces, the effort of TacRS seems to be outlasting the enemy through overwhelming logistics.

14. Overwhelming logistics helped the US win two world wars, so is it a bad strategy? Unfortunately, as it stands right now, the state of the space industrial base and supply chain may not support a simple wartime effort. Over the past 25 years, the DoD has launched about 75 missions, or about three per year.¹³ The commercial side is not significantly different. In the last five years, that is changing with an exponential increase in satellites in orbit. However, that increase is largely driven by SpaceX and the Starlink constellation, not an assessment of the industry as a whole. A simple analysis could be done to understand the capacity of the space industrial base and compare it to the ability to potential to create ground-based anti-satellite weaponry to understand the shortcomings. However, even more simply, it takes less effort to build a missile than a satellite. In other words, the Space Force may not survive an extended war unless the US figures out how to make satellites cheaper and faster.

15. Unfortunately, this highlights another potential issue facing the newly formed service. TacRS highlights a lack of clarity of combatant commander requirements. In a picture-perfect world, the combatant commander would understand the adversary, the tactical skill of friendly forces, force ratios and allocation, and the state of the space industrial base, and ask for precisely what is needed to win the war effort. Assuming the provided analysis above holds water, then the perfect world has yet to come to pass. The major benefit TacRS provides is flexibility due to its poorly defined mission.

¹¹ Peterson, Brent L. "The Factors That Influence Air Strategy: How Do Leaders Choose Air Strategy?" School of Advanced Air and Space Studies, 2019.

¹² United States Space Force. "Space Capstone Publication, Spacepower,"

¹³ Ars Technica. "With Reusable Rockets on the Rise, Air Force Changes EELV Program Name," accessed on 20 Feb 2023. <https://arstechnica.com/science/2019/03/with-reusable-rockets-on-the-rise-air-force-changes-eelv-program-name/>

BENEFITS OF RESPONSIVENESS

16. Responsiveness, as initially conceived, is still an excellent idea. The Operationally Responsive Space (ORS) program, a different program from TacRS, took the idea of fast-tracking development and design to produce combat effects for the warfighter rapidly.¹⁴ TacRS maintains that heritage today. If conditions rapidly change, the TacRS program is the contract vehicle that would allow the combatant commander to fast-track a response to the new environment. Having that flexibility could be a massive boon to a commander. That capability, however, is unseen in any other domain. In practice, it may be more effective to understand the domain and the requirements and put a satellite into space ahead of need.

17. Though the responsiveness of a commander is critical, typically, responsiveness has not been the domain of military procurement. Responsiveness has been built historically through tactical and operational readiness.¹⁵ Responsiveness is created by ensuring the combat capability can achieve the desired effect and is ready to execute operations immediately. Speed may be a component: a fixed-wing close air support aircraft may be able to support faster than a rotary-wing aircraft covering the same distance. However, to an earlier made point, a force already in the area typically provides the fastest response.¹⁶ If the commander's requirement is purely responsiveness, then having a satellite already on-orbit is likely the best option.

RECOMMENDATIONS

18. The first recommendation may seem out of place but may solve the strategic confusion. First, change the USSF mission to focus on winning. The current mission of the US Space Force has three main parts, 1) organizing, training, and equipping the Guardians, 2) conducting space operations that enhance the way we fight, and 3) and to provide decision-makers military options to achieve national objectives. The US Navy, Air Force, and Army consider winning the nation's wars a component of their mission statements. Change the mission of the space force to focus on winning, fighting, and dominating in space. Gen Chance Saltzman's first note to Guardians after assuming the role as Chief of Space Operations had a line that could replace the mission: "the Space Force must field combat-ready forces prepared to outcompete rivals, deter aggressors, and defeat enemies."¹⁷ As envisioned by the TacRS program, a responsive sustainment capability does none of the things envisioned by the head of the Service.

19. From a strategic perspective, the Space Force needs to focus its efforts on war-winning effects first, then the supply chain as support. The idea of rapidly launching replenishment satellites is deciding that the logistics arm of the Space Force should be developed before the development of the fighter and bomber equivalent. Instead, the US Space Command should

¹⁴ Cebrowski, Arthur K. and John W. Raymond. "Operationally Responsive Space: A New Defense Business Model." *Parameters (Carlisle, Pa.)* 35, no. 2 (2005): 67-77.

¹⁵ Pettyjohn, Stacie L., *The Demand for Responsiveness in Past U.S. Military Operations*. Santa Monica, CA: RAND Corporation, 2021. https://www.rand.org/pubs/research_reports/RR4280.html.

¹⁶ Ibid.

¹⁷ United States Space Force. Saltzman, Chance B. General. C-Note Line of Effort #1, 2. <https://www.spaceforce.mil/Portals/1/Documents/CSO%20LOEs/LOE-1-Fielding%20Combat-Ready%20Forces.pdf?ver=1u-092jJAK9KaeSp2yKb5A%3d%3d×tamp=1673552774412>

advocate for requirements that drive toward initial victory conditions for the space area of operations. In practice, demand a product at a required rate, and the supply chain will follow.

20. Tighten the loop between capability development and operations. Develop requirements that win all levels of war: tactically, satellites should be able to defend themselves through any known defensive options. Operationally, force ratios need to be understood, put into requirements, and driven toward capability development. Changing the thinking to focus on operations and requirements could enhance the space industrial base at a level that could support a 24-hour launch. In other words, the space force should seek to buy satellites first, not the launches that get them to orbit.

21. To that end, the Space Force should radically change its space access and sustainment approach. The recognition and study of the vast literature on mobility and logistics is a great place to start. Additionally, taking that knowledge and not just holistically transitioning it to the space domain but leveraging it to create novel applications of the knowledge within the domain. And while the Space Force has pursued the publishing of doctrine, committing to the wrong doctrine is worse than committing to no doctrine at all.

CONCLUSION

22. All logistical challenges discussed in this paper must be solved if push comes to shove in the space domain. While logistics may win wars, logistics still support the tactical and operational units executing the fight. War-winning logistics are a byproduct of the need to support and sustain the warfighter. In order for the USSF to win the first war in space, it needs the capabilities to do so first. Should the goal be to win or to be “responsive” to failure?

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