

WHITE PAPER
ON
COMPETITIVE ENDURANCE

A PROPOSED THEORY OF SUCCESS FOR THE U.S. SPACE FORCE

Introduction

The United States Space Force was established to protect the Nation's interests in space. The approach we take to this vital mission matters. Irresponsible weapons tests, such as Russia's November 2021 destructive test of a direct ascent anti-satellite missile, provide a worrisome glimpse of what combat in the domain could entail. Unrestrained military force in space would create catastrophic orbital debris that endangers the many space capabilities providing prosperity and security for the United States and the world. Therefore, space forces must protect U.S. interests in a manner that preserves the safety, security, stability, and long-term sustainability of the domain. Doing so will require the Space Force to field combat-ready forces that avoid operational surprise, deny first-mover advantage in space, and undertake responsible counterspace campaigning. This approach, notionally referred to as *Competitive Endurance*, is informed by the first three years of Space Force analysis, experimentation, and wargaming. The rest of this white paper describes the origins of this theory and what it means for the Space Force.

The national interests the Space Force must protect in space are extensive. The United States has used space capabilities as an economic engine and to enhance military capabilities for decades. Most Americans are generally aware that satellite communications and the global positioning system (GPS) play important roles in their everyday life. They may also understand that space technologies and the supporting space industry account for billions of dollars in the U.S. economy. Fewer Americans know that the entire military force structure has been designed and sized around the assumption that it will have access to space capabilities like positioning, navigation, and timing data; space-based intelligence capabilities; and the ability to communicate anywhere on the planet.

The increasingly contested operational environment in space threatens the satellites the Joint Force depends on. Equally alarming, our pacing challenge, China, has invested heavily in developing its own military space capabilities. The resulting space-enabled kill web provides them with a long-range precision strike capability that can hold our land, sea, and air forces at risk before we are close enough to project combat power. To protect our joint force the U.S. must be ready to prevent any strategic rival from effectively employing space or counterspace capabilities in a conflict.

The problem that follows has two components. First, we must be able to protect our space capabilities; second, we must be able to deny an adversary the hostile use of its space capabilities. In military terms, this is called domain control. For the Space Force, the mission to achieve this outcome is called space superiority. This mission is core to our purpose and identity as Guardians. Space superiority is the reason the Space Force exists and an imperative that Guardians are best prepared to deliver. Preparing forces to achieve space superiority without the

insights of historical combat experience in the space domain requires a system of assumptions, guiding principles, and logical conclusions – i.e., a theory of success – that focuses all service activities on a common operational perspective. What follows is an initial examination of *Competitive Endurance* as a proposed Space Force theory of success. Like any theory, it is a point of departure for analysis and critique. It is not new doctrine or new policy guidance.

Emerging Operational Environment

As history has shown us in every other domain, assuring U.S. freedom of action in a contested space domain will likely require credible military force. This simple observation about the emerging operational environment motivated the establishment of the Space Force. Services are organized to contest and control domains. U.S. Army forces prepare to conduct prompt and sustained land control operations, U.S. Navy forces emphasize sea control as the essence of seapower, and U.S. Air Force forces secure control of the air by gaining and maintaining air superiority. In each case, control is a prerequisite to further operations in, from, or through the specific domain. Similarly, the primary purpose of the Space Force is to prepare forces to contest and, when necessary, control the space domain on behalf of the Joint Force.

Contesting and controlling a physical warfighting domain is a complex endeavor. It requires personnel with a deep understanding of the physics, characteristics, and nature of the environment. It requires equipment and capabilities purpose-built for the task. And it requires domain-specific doctrine; operational concepts; and tactics, techniques and procedures honed over time. In short, generating the talent, mindset, experience, and capabilities to contest the space domain takes a military service focused on space in every respect.

Space superiority is the doctrinal concept for domain control in space and is defined here as the ability to conduct all-domain operations at a given time and place without prohibitive interference from adversary space or counterspace forces. The side with space superiority can employ space capabilities in support of military objectives while also preventing adversaries from using their own. The *while also* is important. If both sides can employ space capabilities without prohibitive interference, then neither side has space superiority.

Since the demise of the Soviet Union, the Joint Force approach to space superiority has focused on assuring effects generated by U.S. space capabilities and discounted the requirement to disrupt hostile uses of space by an adversary. During this period, space systems became deeply integrated into the joint force structure, enabling all-weather precision attack, beyond line-of-site targeting, global command and control, and persistent overhead surveillance and reconnaissance. U.S. strategic competitors observed this asymmetric advantage and reacted by fielding counterspace weapons to neutralize our space capabilities. Many consider the dramatically destructive Chinese anti-satellite test of 2007 the seminal moment in this progression; however, Saddam Hussein's Army prominently deployed jammers to disrupt U.S. precision guided munitions in 2003 during Operation Iraqi Freedom. The development of counterspace weapons continues to accelerate and today the U.S. military must prepare to defeat a robust arsenal of counterspace weapons. Because of these trends, mission assurance and

protecting U.S. space capabilities against these threats has been the central purpose of space superiority activities over the last three decades.

At the same time, U.S. strategic competitors – most prominently, China – have mirrored our approach to space superiority by integrating their own space systems into long-range precision strike capabilities that pose a direct threat to U.S. forces in the other domains. Reporting from the U.S. intelligence community notes that the Chinese military continues “to integrate space services – such as satellite reconnaissance and positioning, navigation, and timing (PNT) – and satellite communications into its weapons and command-and-control systems.” The intelligence community also makes a similar assessment of Russian intentions. Advanced space integration is not confined to U.S. peer competitors. Space capabilities like precision navigation and commercial satellite imagery underpin the growing arsenal of Iranian precision strike missiles. Iran, in turn, continues to share these precision strike weapons with its proxy forces operating throughout the Middle East. Space-enabled attack, in short, has become common in today’s operational environment.

The growing threat of space-enabled long-range strike alters what it means to have space superiority. Space superiority is not just about protecting the Joint Force’s access to space capabilities, though this remains an important mission. Space superiority, if achieved, also protects the Joint Force from space-enabled attack. Without space superiority, air, maritime, and land forces are dangerously exposed to a growing arsenal of precise, long-range, and networked weapons. Our approach to space superiority must adapt accordingly.

Domain Control in Space

Historically, domain control on land, at sea, and in the air has been achieved by the threat or application of overwhelming destructive military force. Applying this same approach to the space domain would create hazardous debris that jeopardizes the ability of the Joint Force to exploit the very space capabilities these drastic measures seek to protect. It would also disrupt the activities of civil, commercial, and scientific space operations worldwide. Consequently, unlike in other domains, our concept for domain control in space cannot rely on overwhelming destructive force.

Following the end of the Cold War, the Joint Force was designed under the assumption that space capabilities would be available to the warfighter. Space capabilities underpin the Joint Force’s ability to perform all-domain command and control, long-range precision fires, global movement and maneuver, persistent targeting, and missile defense. Enabled by these capabilities, the Joint Force maintains a global forward presence that reassures allies and protects U.S. interests around the world. The Joint Force relies on these capabilities to project global power with acceptable levels of risk.

The People’s Liberation Army, on the other hand, intends on leveraging space capabilities to disrupt U.S. intervention in a regional crisis or conflict. China is fielding systems to find, target, and attack U.S. military terrestrial forces before they are in range to project combat power. Underneath the cover of these space-enabled counter-intervention forces, China plans to pursue a

range of activities, undeterred by U.S. military force on the periphery, and achieve regional political goals free from military consequence.

These opposing military strategies complicate the logic of space domain control for the Joint Force. If we avoid a fight in space and both sides can use their space capabilities in a conflict, then the Joint Force has access to space capabilities but is also dangerously exposed to space-enabled long-range precision attack. On the other hand, if we find it necessary to destroy the adversary's space-enabled kill web and the result is a full-scale destructive conflict in space, the loss of satellites and resultant debris would destabilize the space domain in a way that endangers the space capabilities the Joint Force depends on for success. Balancing between these two extremes is the central challenge facing the Space Force and the motivating problem a theory of success must address.

Competitive Endurance in Theory

Competitive Endurance is the organizing premise for this proposed theory of success. Our adversaries must never be desperate enough or emboldened enough to pursue destructive combat operations in space. The goal of this theory of success is to ensure the Joint Force's ability to achieve space superiority when necessary while also maintaining the safety, security, stability, and long-term sustainability of the space domain. This approach has three core tenets.

First, space forces must avoid operational surprise. Operational surprise occurs when a military force miscalculates the capabilities, force posture, or intentions of its adversary. Space forces must be able to detect and preempt any perturbations in the operational environment that could compromise the ability of the Joint Force to achieve space superiority.

Second, space forces must deny first-mover advantage in space. The visibility, predictability, and reconstitution timelines associated with current military space architectures favor offensive action in space. Furthermore, a successful preemptive strike against U.S. military constellations could jeopardize the ability of the Joint Force to achieve objectives without great risk. Therefore, we must make a first strike in space impractical and self-defeating, thus discouraging an adversary from taking such actions in the first place.

Third, space forces must be prepared to undertake responsible counterspace campaigning. This means confronting malign activity in the domain through protracted, day-to-day competition. The current U.S. strategic advantage in space is fragile. Russia and China are attempting to erode our advantages in space through indirect actions below the threshold of armed conflict. If we wait until a crisis or conflict to confront these challenges, the Joint Force will be incapable of achieving space superiority. Therefore, space forces must preserve U.S. advantages by campaigning through competition without incentivizing rivals to escalate to destructive military activities in space. Should deterrence fail, space forces must be prepared to protect the Nation and the Joint Force from space-enabled attack without generating hazardous debris.

If space forces can avoid operational surprise in the domain, deny first mover advantage, and undertake responsible counterspace campaigning, then we can make the hostile use of

adversary space and counterspace capabilities impractical and self-defeating. This will, in turn, allow the Joint Force to effectively engage strategic rivals in the type of competition in space that favors U.S. national interests and does not compromise the safety, security, stability, and long-term sustainability of the domain.

Competitive Endurance in Practice

Implementing *Competitive Endurance* will require the Space Force to field combat-ready forces that deliver actionable space domain awareness, resilient combat effects, and counter-targeting capabilities that do not generate hazardous debris. Our force design and force development priorities are focused on these priorities and each one plays an important role in the operationalization of *Competitive Endurance*.

Actionable space domain awareness is a timely understanding of the operational environment that is relevant to decision-making. SDA is the combination of intelligence, surveillance, reconnaissance, targeting, cooperative reporting, environmental monitoring, and decision support tools. Throughout competition with Russia or China, the ability to share domain awareness reassures allies, strengthens partnerships, and reinforces norms of responsible behavior in space. Timely and relevant indications and warnings will help us avoid operational surprise in crisis and, when appropriate, take defensive actions. In the event of combat operations, awareness of adversarial space dependencies allows space forces to disrupt space-enabled kills-chains that threaten the Joint Force.

The Space Force's focus on resiliency is also an instrumental component of *Competitive Endurance*. The goal of our resiliency efforts is to make preemptive attacks against U.S. interests in space impractical and self-defeating. The 2022 National Defense Strategy defines resilience as the ability to withstand, fight through, and recover from attacks. For the Space Force, this means our forces must be able to defeat, absorb, and recover from attacks. To that end, we will continue to field defensive capabilities that protect space missions from attack and resilient capabilities that degrade gracefully if attrited. We must also incorporate passive attributes like disaggregation, distribution, diversification, protection, maneuverability, and proliferation. Finally, should an attack succeed and impact overall mission availability, the Space Force must have the ability to reconstitute after an attack by recovering lost capacity.

We must also field capabilities that protect the Joint Force from space-enabled attack. This does not mean every adversary space capability is a hostile threat. Rather, deliberate target analysis must determine which adversary satellites present an unacceptable risk to terrestrial forces. Examples include preventing ISR satellites from finding and tracking U.S. terrestrial forces, disrupting communication satellites from passing targeting data, and denying PNT services that guide long-range precision attack. However, the counter-targeting systems we rely on for this element of space superiority must not create hazardous debris that jeopardizes the Joint Force's access to vital space capabilities. Striking this balance will require a wide range of measures to interrupt adversary targeting when necessary.

Conclusion

The President's National Security Strategy emphasizes that the United States faces a decisive decade ahead. Nowhere are these changes more pronounced than in the space domain. The seriousness of this challenge demands urgent change. But urgency without purpose incites panic, and change without direction wastes energy, resources, and time. *Competitive Endurance* provides the purpose and direction for the urgent change we must enact to meet the challenges we face now, and for the foreseeable future. It does so by outlining a theory of success below the threshold of open conflict, with activities and investments that posture the Space Force to protect U.S. interests without compromising the usability of the space domain.

This theory of success is not policy or doctrine, but rather an operational hypothesis we must continuously evaluate. The ideas in this white paper serve as a point of departure. As our understanding of the operating environment matures, the assumptions and principles that guide our action must evolve as well.