Don’t Gamble on the Next Space Race: Win the Orbital Gray War Now

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14. ABSTRACT
The first wave of an extraterrestrial gold rush is rushing in as commercial firms rapidly innovate to seek wealth and riches from space. At the same time, America's adversaries are willing to exploit the gaps in space conduct norms to challenge, if not threaten, US national interests through the employment of strategic gradualism, subversion, and cohesive statecraft. Leadership in space is not an American birthright. Primacy in space has always been contested. As the United States adapts to win in a new era of great power competition, policymakers must gain an appreciation of the competitive and increasingly contested nature of space, and an understanding how gray war tactics will extend into space. To win the orbital gray war now, policymakers must overcome two challenges to statecraft and maintain the momentum the current administration has achieved on space security to preserve America's leadership in space.

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What the gold rush did was to give people permission to take risks, to gamble on life, in a way that they hadn't been willing to gamble before.[1]

Despite a widespread belief that the orderly march into the future is part and parcel of America's destiny, leadership in space is not an American birthright. Primacy in space has always been contested, and America's leadership was hard-won. Because of the high cost of entry into the exclusive spacefaring club, just two nations, the United States and the Soviet Union, dominated space operations during the first four decades of the space age. This provided consistent norms of conduct in space and strategic stability. In the last twenty years, however, the cost of entry has plummeted, and now more than 80 nations, international organizations, and the commercial space industry are operating in space. Some new entrants to the space industry are ignoring existing norms of space conduct and safety.[2] Experts are warning that without updated and enforceable rules, space norms and behaviors will mirror the lawlessness of the "wild, wild west"[3] and the chaos of the Yukon Gold Rush.[4]

Today, the country is facing unprecedented, but predicted, challenges to American leadership in very different ways. "America," journalist Jack Hitt wrote in 2001, "has had a free ride in space during the last 40 years when the only country capable of even getting there was Russia. Now there is a satellite rush in the final frontier."[5] The first wave of an extraterrestrial gold rush is rushing in as commercial firms seek wealth and riches from space. At the same time, adversaries are willing to exploit the gaps in space conduct norms to challenge, if not threaten, US national interests through the employment of strategic gradualism and subversion. As the nation adapts to win in a new era of great power competition, policymakers must maintain the momentum the current administration has achieved on space security. Maintaining the momentum requires an appreciation of the competitive and increasingly contested nature of

space, understanding how gray war tactics will extend into space, and consideration of the two challenges of statecraft to preserve America's leadership in space.

Leadership in Space

To understand today's environment, we must first be familiar with the history of the space race, and there are enough books, films, and studies to make cataloging them a lifetime hobby. For the discussion here, it is enough to understand that the United States started the race in second place. The Soviet Union was not just the first spacefaring nation with its stunning launch of Sputnik I in October 1957, but, in 1924, it was also the first to set a goal of space travel.[6] In the post-Sputnik world, American science and technology were no longer superior, and Russia reminded Americans that they had beaten them into space every ninety-six minutes. Many of the people who watched Sputnik pass across the American sky or listened to the "arrogant beep-beep" chirps on shortwave radios, almost instinctually, connected Soviet capability to put a satellite over their home to the horror of Atomic weapons.[7] It was the end, historian Stephen Ambrose concludes, of the nation's post-World War II peace and tranquility.[8]

Already shaken by Sputnik, Americans suffered a crisis in confidence that changed the nation when they, and the world, watched the spectacular failure of the country's first attempt to launch a satellite into orbit exploded on the launch pad in December 1957.[9] The media frenzy turned the failure into an early symbol of the nation's space program and galvanized national will. With the nation's prestige on the line, the next launch, *Explorer 1*, was a success and, fueled by domestic politics in the 1960 presidential campaign, the space race was on in earnest as the centerpiece of Cold War competition.

American leadership during and after the Cold War has made space safe for weather forecasting, communication, sensing and reconnaissance, and a host of civilian uses that are now driving the new space economy. The same is true for military space since the 1991 Gulf War with the success of space-enabled warfare driving the development of counter-space capability into cislunar space.[10] General Howell Estes III, then the commander of US Space Command, argued that the military must be ready because the nation's leadership will turn to them when the inevitable challenge comes.[11] The next war will start in space to eliminate or degrade these advantages. At the height of military space doctrine development in 1999, strategic planners predicted that by 2020 "adversaries will essentially share the high ground of space… [where] those bent on doing us harm will challenge us."[12] Estes predicted that the continued commercial development of space would "provide continued strength for our great country in the decades ahead." [13] As it turns out, both predictions have come true.

Contested Space

Freedom to act in space is a core US interest, but institutional predispositions and an unsupported belief of American space primacy may lull policymakers into a false sense of security. National leaders recognized that space is growing more competitive, congested, and, as a warfighting domain, increasingly contested. In response, they reestablished a combatant command for space to integrate the military and the intelligence communities for space operations and defense. Most recently, policymakers established the US Space Force as a new military service. Most space experts and strategists agree that these were positive steps in retaining American space superiority. While most of the challenges and potential threats extend beyond the limits of the military's portfolio, competition over resources frequently turns into conflict.

Great power competition in space began with the Soviet Union's stunning launch of Sputnik and Sputnik II in October and November 1957. Many of the people who watched Sputnik pass across the American sky or listened to its short but incessant flat-A chirps on shortwave radios connected, almost instinctually, Soviet capability to put a satellite over their home to the horror of Atomic weapons. The launch was not a surprise to President Dwight D. Eisenhower, and he was bemused by the feeling of panic across the country. It was the end, historian Stephen Ambrose argues, of the nation's post-World War II peace and tranquility.[14] In December, Americans, and the world, watched the spectacular failure of America's *Vanguard TV-3* as it exploded on the launch pad. [15] The media frenzy turned the crash into an early symbol of the nation's space program and galvanized the nation's will.

Already shaken by the Sputnik crisis, Americans suffered a crisis in confidence that changed the nation. Senator Lyndon B. Johnson, then the chairman of the Senate Armed Services Subcommittee on Preparedness, used the crisis to chastise Republicans and the Pentagon equally for mismanagement, interservice rivalry, and a myopic focus on bombers that caused the country to fall behind the Soviets.[16] With the nation's prestige on the line, the next launch, *Explorer 1*, was a success, and the space race, fueled by domestic politics in the 1960 presidential campaign, was on in earnest as the centerpiece of Cold War competition.

Even before the space race had wholly entered the public's consciousness, both sides had started developing operational concepts and technology to contest space as a warfighting domain. These concepts were intended to produce direct combat effects into and from space. In 1959, the Air Force demonstrated the feasibility of anti-satellite missiles. Two years later, the US Navy presented Congress with an advanced anti-satellite weapon system called *Early Spring.* The submarine-launched missile, once reaching the target altitude, could loiter for up to 90-

seconds before detonating a warhead containing thousands of steel pellets into a satellite's path.[17] Just months after President John F. Kennedy's May 1961 moonshot speech to Congress where he committed the United States to put a human—not one man but the spirit of the entire nation—on the moon, Soviet premier Nikita Khrushchev threatened to put 100-megaton bombs in space where they could be directed to any place on Earth.[18] That weapon, the *Fractional Orbital Bombardment System*, like the Navy's *Early Spring* anti-satellite system, was eventually canceled because of technical and funding challenges but the understanding that space is, in fact, a warfighting domain was abundantly clear even if untested.

Military and manned spaceflight-focused space operations evolved throughout the Cold War into a stable environment with both sides accepting constraints on space operations. American leadership has made space safe for weather forecasting, communication, sensing and reconnaissance, and a host of civilian uses that are now driving the new space economy. This set the conditions for the commercial future of space. Space resources are increasingly accessible. Of the 97 successful space launches in 2019, only 21 were by the United States. China had the most with 32 launches. Russia had 35 and other nations, including the European Space Agency and India, accounted for an additional 19 launches.[19] In 2019, three-quarters of space industry revenues, which are conservatively expected to exceed $1 trillion a year in the next twenty years and then grow at an additional $1 trillion a decade, were in the rapidly expanding commercial space market.[20] While this is roughly a third of the current global aviation industry, it is significantly higher than today's $350 billion space industry market and is expected to grow exponentially.

While this seems to predict organized growth from low initial production and low initial return on investment because the commercial industry is constrained by technology, launch

costs, and the dangers of space, history suggests that all of these will be overcome quickly with enough profit potential. The profit potential for space mining could exceed $700 billion billion" in mineral wealth.[21] The massive Klondike Gold Rush began when three miners discovered gold in 1896 in the inhospitable Yukon Territory leading to a stampede of prospectors looking to get rich quick. Like earlier gold rushes in California and Georgia, unconstrained violence and environmental destruction followed significant reductions in startup costs requiring the government to send the US Army in to establish law and order.

In the seventeenth century, Thomas Hobbes contended that war, in its most basic form, is inextricably linked to gaining control over resources.[22] Examples, from the American Revolution to the current dispute in the South China Sea, support his linkage between trade and war. To Europeans, the American Revolution was part of a war over agricultural resources in the East and West indies. Japan attacked the United States at Pearl Harbor to secure its access to resources in South Asia. Germany's invasion of Ukraine and the Caucasus was intended to seize oil and agriculture fields. Iraq's invasion of Kuwait was largely an attempt to gain control of large oil reserves. China's irredentist claims in the South China Sea seek control over significant fishing and oil resources. Economic models suggest, somewhat unambiguously, that the probability of conflict increases with resource need.[23]

The risk of conflict over space resources increases at the same time as the exponential growth in the number and types of commercial satellites is heralding an increased dependence on orbital utilities for much of daily life and critical parts of national infrastructure. The image of tens of thousands of space prospectors staking claims in orbit may seem unlikely, the challenges to accessing space resources are being overcome and space mining will soon become a reality. The average cost for NASA to launch a Falcon 9 rocket is $152 million.[24] Elon Musk suggests

that price will come down to $2 million for a much larger rocket capable of taking 100 people into space in the near future.[25] Private companies will soon offer affordable space tourism, space-based mining and manufacturing, and on-orbit services that need a safe and stable environment. Secretary of Commerce Wilbur Ross, speaking at the National Space Council meeting, noted that more than eighty nations have now entered the space industry and many of them are unwilling to follow the existing norms of conduct.[26] Without enforceable order in space commons, a wild 'gold rush' for space resources may put life on Earth at risk and require military action to, again, establish law and order.

Space-based capabilities are vulnerable to the environment, accidents, and deliberate action. Nearly everything in space is a dual-use technology where it is difficult to identify differences between commercial space applications and military threats. Space environment complicates identifying and attributing orbital actions. The most fundamental aspects of an orbital combat system are already practiced in earth orbit and limited only by booster power. For example, a sophisticated satellite, like the Russian inspector satellite Kosmos-2542 launched in November 2019, can use rendezvous and proximity operations to clean up orbital debris or repair and refuel satellites on orbit.[27] They could also be used as co-orbital anti-satellite weapons to approach, interfere, or attack US space objects unless equipped with a local sense and avoid system. State and non-state actors can disrupt, degrade, or deceive satellite operations through cyber-attacks. Directed energy weapons can dazzle or damage satellite optical sensors. Kinetic weapons can destroy satellites. China has fielded direct-ascent anti-satellite weapons and co-orbital weapons, in addition to electromagnetic, directed-energy, and cyber capabilities.[28] Russia is developing a range of anti-satellite weapons including a new mobile launcher system and

satellites capable of sophisticated on-orbit counterspace activities.[29] India tested its first direct-ascent anti-satellite weapon in March 2019.[30]

Orbital real estate is free to anyone capable of launching objects into orbit. As with terrestrial real estate, some orbits are more valuable than others. Protecting the on-orbit portions of that infrastructure means minimizing space debris from accidents and intentional, kinetic destruction. In 2008, the collision of a dead Russian communication satellite and a commercial Iridium satellite resulted in two large debris clouds containing more than 2,500 fragments. Debris from China's 2007 anti-satellite test, which destroyed one of its inoperative weather satellites more than 500 miles above the Earth, continues to orbit.[31] Pieces of orbital debris from India's anti-satellite weapon test are expected to linger in orbit endangering low-earth orbit satellites and the International Space Station for up to two years.[32]

The application of military power in space, as it has been in the realm of nuclear weapons, will not be exercised as much as threatened and used as diplomatic bargaining power.[33] Though less dramatic as visions of global thermonuclear war, the cost of war in space would be high. There is no such thing as a harmless kinetic interception of orbiting targets. Using (or even testing) space weapons could destabilize the orbital environment. Any nation firing kinetic kill weapons is acting recklessly. Fragments from the explosions could create significant and indiscriminate repercussions for all space systems. While the United States has the most extensive space presence and would be disproportionately affected, the Kessler syndrome, proposed by NASA scientist Donald J. Kessler in 1978, predicts that orbital debris could create a domino effect that will cost all of humanity access to space.[34]

Assuming rational actors, avoiding the cost of a war in space will be far more valuable to all nations than any potential gains of orbital warfare. A more plausible consideration is that adversaries will use coercive statecraft approaches designed to stay in the gray zone below the threshold of open armed conflict to achieve goals. These tactics are already used terrestrially. It is only a matter of time before these political and economic gray war tactics extend into space operations.

Orbital Gray War

The US National Security Strategy cautions that adversaries and competitors have "became adept at operating below the threshold of open military conflict and at the edges of international law."[35] Several countries, notably the spacefaring nations of China and Russia, have become adept at terrestrial gray zone campaigning by using incremental combinations of influence, intimidation and coercion, and aggressive but challenging to attribute actions intended to remain below the threshold of conventional armed conflict to achieve state goals and weaken the existing rules-based order. China and Russia are aware that the United States recognizes the return to great power competition as a national security challenge. They are, undoubtedly, also aware that the United States does not have a consistent policy or strategy for competing for resources within the gray zone.

It is only a matter of time before these political and economic warfare tactics extend into space operations. Because the bulk of the space ecosystem is on Earth (manufacturing plants, assembly and launch infrastructure, training facilities, and communication and telemetry stations, for example), all political warfare and coercive statecraft tactics are in play and limited only by an adversary's imagination. Applied to the orbital environment, subversive gray war tactics could include the deliberate "accidental" creation of space debris or localized incapacitating

space weather, bumping into or jamming satellites, interference with their orbits. These gray zone actions would be undetectable from Earth using microsatellites that were in production two decades ago.[36]

Spacefaring nations, like those that possess nuclear weapons, confers the prestige of elite membership in an exclusive club of great powers. Some experts maintain that prestige seeking is a strong motivation for revisionist actions.[37] China's obsession with national prestige, which forms the basis for its terrestrial commercial and military interests, "also animates the country's space policy."[38] It is important not to overemphasize this 'prestige' aspect. China's actions suggest that it anticipates competition over resources. China's aggressive pursuit of foreign technology and state-backed "Space Silk Road" financing is disrupting market-driven space launch and services through predatory pricing.[39] At the same time, it is exploiting legal loopholes in US export control law by creating shell corporations in Hong Kong to access restricted space capabilities.[40] The counterargument China uses is that their actions, while seemingly predatory, are conducted peacefully within existing international law.

Gray zone theory remains somewhat undefined, which makes sense when you consider that a "gray area" is defined as an area of uncertainty. They are typically considered to include continual, holistic, and coercive methods where it is difficult to attribute the perpetrators. Some experts believe it to be an emerging theory of power competition changing international politics. Devin Stewart argues the approach is necessary because the distinction between friend and enemy has blurred. Opponents, he describes, are expanding their military capability and posture, using information operations to increase American political polarity and keep the nation "divided, distracted, and weak," and exploiting American culture and values to acquire scientific and technical knowledge while functioning mainly within the existing rules-based order.[41] Other

experts believe the gray zone is just meaningless hype. John Arquilla at the Naval Postgraduate School suggests we should not create "imaginary zones" to describe essential human conflict.[42] Donald Stoker and Craig Whiteside argue in a 2020 *Naval War College Review* article that gray zone discussion distorts necessary distinctions between peace and war and undermines critical thinking.[43] In a *War on the Rocks* article, Adam Elkus was less gracious, saying the hype around the gray war concept was just so much "*ooh-la-lame"* hype.[44]

Gray zone tactics are continual and holistic, but categorization should never be mistaken for in-depth analysis. The argument of a coherent (yet still emerging) gray zone theory is, however, less important than understanding the practical tactics capable of compelling an adversary without causing a war. Egypt's General Nasser understood this practical nature, arguing that the "great advantage of indirect warfare is that our enemies cannot answer back."[45] A state can achieve important goals by staying below the threshold where an adversary must respond with armed conflict. Clausewitz, if he were to review the writings on gray war, might also criticize them as "crammed with jargon, ending at obscure crossroads" and only soothing to their author and, presumably, their echo chamber.[46] War, he suggests, is the continuation of policy with additional means. Essentially, when political warfare is insufficient, the next step is to add indirect military power to political warfare.

Political warfare is steeped in psychological efforts to influence other states. This includes any number of illegitimate (or non-traditional) and indirect tactics: political subversion, denial and deception, election interference, information operations that spread propaganda, rumor and false narrative, harassment through proxies, economic corruption or pressure, sponsored criminal activity, and diplomatic strong-arming.[47] These political warfare methods join coercive economics and lawfare, which seeks to exploit the "sheriff-less wild west" of the

international legal system,[48] under the umbrella of gray zone activities. Today's 24/7 news cycle and the influence of social media has added more tools to influence or attack national will. The degree with which these gray zone efforts are used will determine the distance along the continuum from peaceful statecraft of cooperative bargaining with friendly nations to open hard-ball national competition to covert subversion just shy of where the tension would cause armed conflict. Where revisionist states cannot succeed by working within cooperative bargaining to change the rules-based international order to their liking, and they are not powerful enough to force a change; the only viable option to connect means to ends and achieve state goals or address grievances is to use a strategy of coercive, gray war bargaining through statecraft.

Two Challenges of Statecraft

The challenge of depending on traditional statecraft to solve gray zone issues and ensure the continuation of American leadership in space is two-fold. First, responding to external challenges using the standard tools of international engagement (diplomacy, development, and defense) will require a steady, long-term focus. These tools are not easily merged into a unified tool to formulate and rapidly execute US national security policy. In the second century, Greek historian and statesman Polybius wrote that success in great power competition depended on "strategic empathy and respectful diplomacy" to build a more inclusive and less coercive international order.[49] However, our adversaries use the rules-based order only where it suits their goals. Empathy and respectful diplomacy are weaknesses exploited in gray war. Unless the United States creates a centralized agency dedicated to identifying and responding to coercive gray zone challenges, both terrestrial and in space, responses will, by necessity, be diffused across government. This means that the country must find a way to unify its ability to sense and respond to activities that run counter to US national interests and then apply the appropriate

statecraft tool. The treaties, agreements, and processes at the heart of winning the Cold War took decades of painstaking technical work with allies and partners, strategic thought and debate, and consistent policy.

The second challenge to depending on traditional statecraft is the nation's lack of a unified internal focus for space. Who is in charge of space? The answer is that it depends. The US space ecosystem is made up of three major blocks: civil and commercial space, military space, and national intelligence space. More than twenty US government agencies plus Congress have responsibility. The American political system tends to focus on issues that have the attention of the public. The government essentially lurches "from one point of apparent equilibrium to another, as policymakers establish new institutions to support the policies they favor or alter existing ones to give themselves greater political advantage."[50] This punctuated equilibrium is clearly evident in the inconsistent record of supporting space dating back to the Eisenhower Administration and Sputnik. Once the race to the moon was won, the American public lost interest. Network television even dropped coverage of the last two Apollo missions believing the novelty was over. [51]

In 1992, the most critical recommendation by three major commissions, as well as a Government Accounting Office report, called for a stronger White House focus on streamlining organizational structure for space activities to create more synergy and less duplication.[52] Instead, the National Space Council was disbanded in 1993 and original US Space Command, which President Ronald Reagan established in 1985, succumbed to bureaucratic infighting and budget priorities under President George W. Bush in 2002.[53] At the time, Lambakis criticized policymakers for taking American space superiority for granted. "Americans do not spin in orbit alone."[54] For the previous forty years, politicians have "with astonishing irregularity

[constrained] military activities [in space] without clear public justification."[55] He concluded this disfunction would eventually diminish America's international political leverage and threaten national security.[56] In the final analysis, however, no one is in charge of space, and, traditionally, government support of space programs has depended on domestic considerations.

Conclusion

Space is unique in all human domains, but humanity has a long and brutal history of fighting over resources. Policymakers cannot fall into the trap of thinking that its uniqueness makes it any different where the rules of strategy are concerned. Competition for the vast resources of space may make conflict inevitable without steady leadership and internationally observed rules and norms. The United States maintains several significant advantages and, with the largest number of objects in space, has the most to lose. However, given the on-again, off-again place space occupies in American culture, national security space concerns are easily overlooked, providing our adversaries the freedom to end American leadership in space. If the United States waits for the shock of another Sputnik moment, it will have lost the race. If history is a guide, the "gold rush" of space mining will result in unconstrained violence and an unrecoverable space debris hazard from orbital environmental destruction. China will establish a manned base to exploit the resource-rich south pole of the moon. Mineral riches will upend financial markets and imperil the rules-based international order.

As is often said in government, we have been here before. None of the solutions are new—even in an era of great power competition, gray zone conflict, and the potential of war in space. We have known how to win today's great power competition in space for more than two decades but chose to subordinate space to other policy priorities. Many in the arms control community have argued for controlling dangerous space technologies. They can point to the

challenges that were overcome in dual-use nuclear technology and verification that led to more than seventy years of nuclear deterrence and strategic stability. The treaties, agreements, and processes at the heart of that stability took decades of painstaking technical work, strategic thought and debate, and substantive statecraft.

Pragmatic solutions will require political will and a dedication to sustaining the effort for the long term. The Trump Administration's actions to reestablish the National Space Council as a senior policy focal point and coordinating body and integrating military space operations by establishing the joint warfighting US Space Command and creating the US Space Force provide significant momentum to maintain American leadership in space. The days of space as an elite, national prestige endeavor, which, once achieved, could be ignored, are over. Space is now critical to daily life, and policymakers must insist on an integrated national strategy for space that will sustain American leadership in space with the same commitment it used in winning the Cold War. Policymakers must maintain this momentum now while exploring new methods to leverage statecraft to evolve space commons under a rules-based, American led international order.

Notes

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