



OCTOBER 21, 2020

A Balance of Instability

EFFECTS OF A DIRECT-ASCENT ANTI-SATELLITE WEAPONS BAN ON NUCLEAR STABILITY

By Kaitlyn Johnson

There are few rules that govern international behavior in space, so few that it is occasionally referred to as the “new Wild West.” For the first 50 years of the space age—which formally began in 1957 when the first artificial satellite, *Sputnik 1*, was launched—the lack of agreed-upon rules, regulations, and norms were of little consequence to developing the space domain. This is because the foundation of the first space age was the infamous “Space Race” and, later, space cooperation between the Soviet Union and United States. Satellites and other space infrastructure were mostly geared toward supporting national security and nuclear deterrence on Earth in particular, or for pushing the boundaries of civil space exploration through human spaceflight.

The rise of a new age for space—characterized by a greater number of national actors and commercial space companies—has also created more opportunities for mayhem. This has led to a growing call from the international

space community, governments, and commercial entities to create a sustainable and stable space domain through norms of behavior, best practices, and even international regulation.

Recent tests of direct-ascent anti-satellite (ASAT) weapons from India and Russia, in 2019 and 2020 respectively, give cause to reevaluate the possibility of building an international arms control agreement to limit space weapons or weapons testing. There have long been calls from within the international space community to create a limiting test ban treaty for these weapons due to the inevitability of space debris created by ASATs' kinetic effects. However, the secondary effects of such a ban, such as its impact on greater strategic stability, must be considered. How would new norms for testing space weapons affect nuclear stability and traditional deterrence? Would a direct-ascent ASAT limit or ban create stability or further destabilize the space and nuclear domains?

Historical Context

The nuclear and space domains share DNA and their origins and evolution throughout the Cold War share many points of intersection. By the time the Space Race took off, the nuclear arms race was already well underway, with both superpowers growing their nuclear stockpiles qualitatively and quantitatively. In 1957, the Soviet Union launched the first and second satellites, *Sputnik I* and *II*, into orbit around Earth. Just months later, in early 1958, the United States successfully orbited its first satellite, *Explorer I*. To successfully deliver a nuclear payload to a target across the world, these powers turned to space to increase the range and reliability of its ballistic missile technology. Throughout the Cold War, the combination of both nuclear and space launch technology fueled the nuclear arms race. Intercontinental ballistic missiles (ICBMs) and space-launch vehicles were sister technologies that allowed both for devastating attacks anywhere on Earth in a matter of minutes and for the first satellites to be launched.

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The First Space Age

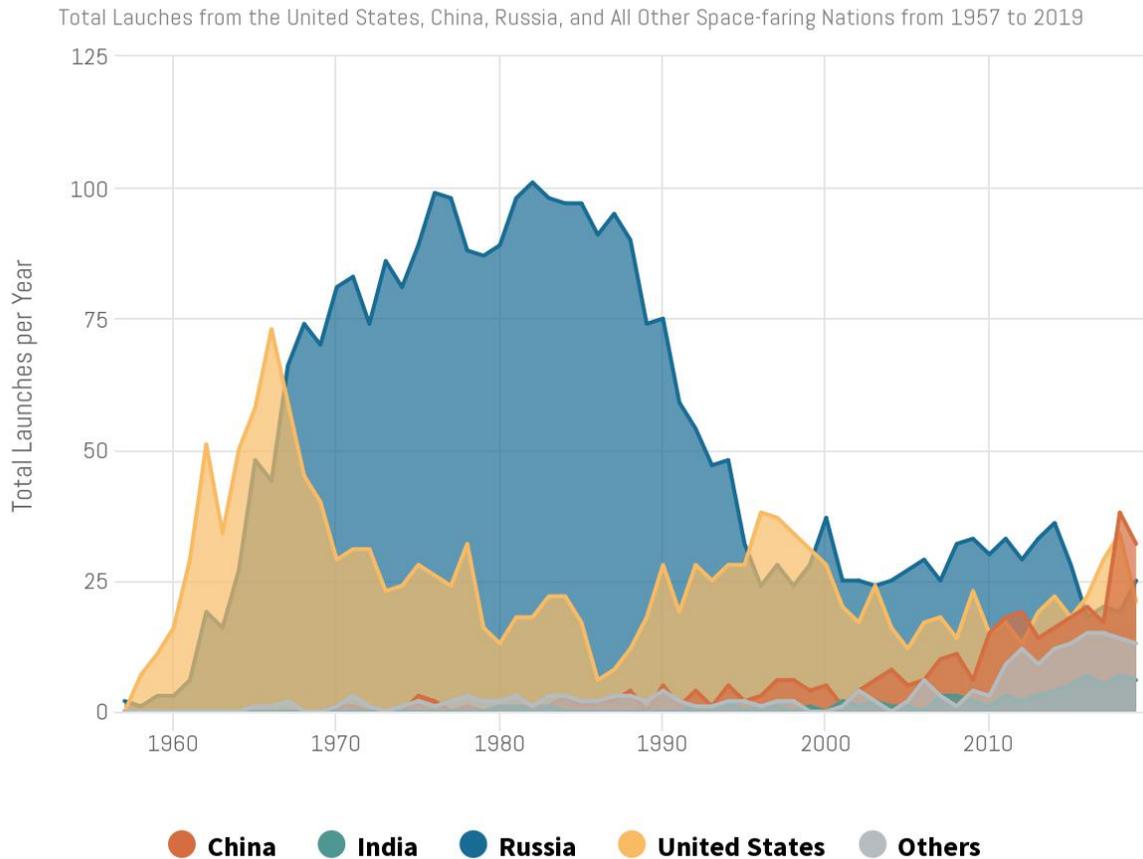
In the space community, the period between 1957 and 1990 defines what is often referred to as the first space age.¹ Although few nation-states possessed nuclear weapons, space capabilities were not similarly limited. Despite this, for almost five decades, 93 percent of all successful launches were by the United States or Soviet Union, and the rest were almost exclusively launched by nation-states. This is not to say that companies did not support government programs or launch their own commercial systems, but the success of the commercial space market as seen today is significantly different from commercial activity in the first space age.

Banner Photo: *The Ground-Based Electro-Optical Deep Space Surveillance System is responsible for tracking thousands of objects in space.*

Source: U.S. Air Force, Tech. Sgt. David Salanitri

¹ This range covers the period between the launch of the first human-made satellite into space (1957) and the end of the Cold War (1991). Todd Harrison, Zack Cooper, Kaitlyn Johnson, and Thomas G. Roberts, *Escalation and Deterrence in the Second Space Age* (Washington, DC: Center for Strategic & International Studies, 2017).

Space Environment: Total Launches by Country



CSIS Aerospace Security | Source: Space-Track.org

As the commercialization of space technologies has grown, so has the diversity of space actors. However, national security space assets—such as missile warning, communications, and intelligence, surveillance, and reconnaissance (ISR) capabilities—remain the continued focus of many space nations, and some have argued that space is becoming “too militarized.” In fact, space has been “militarized”—defined as the use of space assets to support or conduct military operations—since the beginning of the space age. A trend that has reappeared in recent years is the reintroduction of space weapons tests. In 1959, only two years after the launch of *Sputnik I*, the United States conducted the first ASAT weapons test in space. Now, countries such as China and Russia routinely conduct non-destructive weapons tests in space.²

There are many types of ASAT weapons, all with unique capabilities and results. However, the most well-known is probably the kinetic physical direct-ascent ASAT weapon. Kinetic physical attacks strike a target directly or detonate a warhead near a target in order to physically damage or destroy it. Examples of common conventional kinetic physical weapons are missiles and bombs. For space systems, a direct-ascent ASAT is a weapon that attempts to destroy a satellite in orbit using a trajectory that intersects or comes near enough to the target without orbiting the interceptor. In simple terms, this is an Earth-based missile that is launched into space to directly hit or explode near a satellite to permanently destroy the target. Ballistic missiles and missile defense systems can be

² Todd Harrison et al., *Space Threat Assessment 2020* (Washington, DC: Center for Strategic & International Studies, 2020).

modified into direct-ascent ASAT weapons so long as the systems have sufficient capability to reach the high altitudes of space. Impacting the target satellite or detonating nearby it often creates significant amounts of space debris, as pieces of both the warhead and target satellite are dispersed and remain in orbit.

Most space-based systems, such as nuclear command and control, are vulnerable to direct-ascent ASAT weapons. Despite the seeming mobility of satellites, space systems cannot easily maneuver out of the way of an impending attack. Space systems are deployed with an optimized amount of propellant to reduce launch weight and are purposefully placed into specific orbits to conduct their mission. Spending fuel to move a satellite not only shortens the life of the satellite by decreasing the amount of onboard fuel but may also move the satellite into an ineffective orbit for its mission. Additionally, many high-value space systems have cross-communication links and moving one satellite out of sync with its fellows may compromise the entire constellation's effectiveness and mission.

The Space and Nuclear Nexus

The space and nuclear domains have been intertwined since the early 1960s. For example, in 1962, shortly after the first ASAT test, the United States conducted the largest nuclear weapons test in space to further understand the effects of radiation in high altitudes. The test, dubbed Starfish Prime, occurred at about 250 miles (400 kilometers) above sea level—almost the same altitude at which the International Space Station (ISS) currently orbits. Starfish Prime proved the disastrous effects nuclear weapons could have on space systems. The 1.45 megaton weapon was approximately 100 times more powerful than the nuclear weapon used on Hiroshima and produced such a massive electromagnetic pulse and wave of charged particles that almost one-third of all satellites in orbit were damaged or destroyed by radiation effects. The radiation that remained in orbit from both Starfish Prime and a subsequent Soviet nuclear test in space caused irreparable damage to the first commercial communications satellite, *Telstar 1*.³ Such tests were banned the following year by the Partial Test Ban Treaty (PTBT).

While tests of nuclear weapons in space were banned, the relationship between the space and nuclear domains only deepened after 1963. In fact, between 1957 and 1990, almost 70 percent of all satellites launched were used to support military missions, particularly nuclear forces.⁴ Most satellites were highly classified and focused on the seemingly existential strategic conflict in which the U.S. found itself engaged.⁵ For example, constellations of intelligence, surveillance, and reconnaissance (ISR) satellites were put into orbit by both superpowers to gather intelligence on the other's missile forces, including production facilities, known launch sites, and missile defense systems.

As the Cold War progressed, both nations further intertwined their strategic goals with space and created structures to protect these assets, such as the 1972 Anti-Ballistic Missile (ABM) Treaty, which barred both the United States and Soviet Union (and later Russia) from developing and deploying ballistic missile defense capabilities against long-range missiles, like ICBMs, on Earth and in space. The two superpowers also used communications satellites to

³ "'Starfish Prime' on 9 July 1962," CTBTO Preparatory Commission, accessed September 18, 2020, <https://www.ctbto.org/specials/testing-times/9-july-1962starfish-prime-outer-space>.

⁴ Harrison et al., *Escalation and Deterrence in the Second Space Age*, 2.

⁵ Ellen Pawlikowski, Doug Loverro, and Tom Cristler, "Space: Disruptive Challenges, New Opportunities, and New Strategies," *Strategic Studies Quarterly* 6, no. 1 (Spring 2012): 30.

ensure nuclear command and control as a way to direct and receive messages in a crisis. These messages were usually sent through either Navy or Air Force communications satellites.⁶

As time progressed, the United States and Soviet Union reached a sense of *détente*—an easing of hostilities between the two nations. This relative safety allowed both nations to develop highly exquisite and capable satellites in valuable orbits. Along with the mutual vulnerability of unprotected space assets for both nations, this *détente* reinforced the confidence on both sides that nuclear-focused satellites were also relatively safe from destruction.

The risks of instability that have emerged in the last few decades are partially due to the breakdown of this mutual vulnerability. In a conflict, an adversary could disable only a few of these highly valuable, yet vulnerable satellites and have a devastating effect on the United States' ability to operate both its conventional and strategic forces.⁷ A similar attack on an adversary of the United States may not have the same effect, as there is no country as reliant on its space forces as the United States.

The Second Space Age

The breakdown of mutual vulnerability is not the only cause of instability in what is known as the second space age. After the fall of the Soviet Union, the space domain became much more diverse, disruptive, disordered, and dangerous. A variety of new actors are entering the space domain, including state-sponsored agencies and



India successfully launched the Ballistic Missile Defence (BMD) Interceptor missile in its "Mission Shakti" direct-ascent anti-satellite test in March 2019.

Source: India Ministry of Defence

commercial actors. The space domain no longer enjoys stability based on *détente* between two superpowers, and the combination of new actors and the changing behaviors of old actors has led to a more disruptive environment.

This analysis focuses mostly on the last two characteristics of the second space age: disordered and dangerous. There are few international or multilateral treaties or organizations regulating the space domain. The lack of international consensus has led to disorder and discord among space actors on what constitutes acceptable behavior in space.

Satellites in orbit are also facing increased threats from both space debris and counterspace weapons. Recent direct-ascent ASAT tests by Russia and India have reenergized an ongoing debate about how to limit ASAT tests, which stand to create even more harmful debris in the space environment. India's ASAT test in March 2019 demonstrated that even at a low altitude and with a test designed to minimize debris creation, direct-ascent ASAT weapons always have the potential to create some debris

⁶ Robert Critchlow, "Nuclear Command and Control: Current Programs and Issues," Congressional Research Service, May 3, 2006, 7, <https://fas.org/sqp/crs/nuke/RL33408.pdf>.

⁷ For threats to U.S. space systems, see Harrison et al., *Space Threat Assessment 2020*.

that can threaten the safety of both satellites and humans in orbit.⁸ There is a growing international call to action by the space community to address several key issues of space governance, including the mitigation of space debris and the management or limitation of harmful, debris-producing counterspace weapons tests.

Arms Control in the Space Community Today

Today, arms control measures for the space domain are scattered throughout various international treaties. The cornerstone of international space agreements is the 1967 Outer Space Treaty (OST). The OST provides a very basic framework for operating in space, including banning the placement of nuclear weapons in orbit or on celestial bodies such as the Moon. While a necessary starting point, the OST is quickly becoming outdated, and its requirements are open to much interpretation. For example, article nine of the OST states that nations must alert other space-faring nations if an experiment or activity is likely to cause harmful interference in the space domain. One might assume that this includes direct-ascent ASAT tests that create space debris. However, nations have rarely followed this practice thus far.

The ABM treaty also addressed the relationship between space, nuclear, and missile defense. Designed to curb the arms race between the United States and Soviet Union, the treaty limited strategic offensive weapons to better reassure mutual vulnerability. As well as prohibiting robust ground- or air-based missile defense systems, the ABM treaty also prohibited any space-based missile defense systems or components. This included space-to-Earth systems that could be used to protect against strategic strike. The United States withdrew from the ABM treaty in June 2002 for many reasons, including that the outdated limits imposed were affecting theater-level conventional strike.⁹ However, the withdrawal also had unintended consequences for space, as it negated one of the only binding agreements that limited space weapons.

Recent multilateral efforts to mitigate the weaponization of outer space have stalled in the United Nations (UN). In 2008, China and Russia proposed treaty language in the UN to limit weapons in outer space. This treaty, entitled “Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects” and often referred to as the PPWT, provides a specific definition of space weapons as those that launch from one on-orbit system to another or from an on-orbit system to Earth.¹⁰ These definitions of space weapons do not include direct-ascent ASAT weapons such as those launched by China in 2007, the United States in 2008, India in 2019, and Russia in 2020. Due to the limited scope of PPWT and the challenges associated with verifying which on-orbit space systems could be used as weapons, the United States opposes the treaty. Continued disagreements have stalled the PPWT, and “it remains in a form of suspended animation.”¹¹

In 2008, the European Union proposed a voluntary International Code of Conduct for Outer Space Activities to the UN.¹² The effort focused on taking space sustainability measures and establishing norms of behavior in space. Many

⁸ The Indian ASAT test created debris that was dispersed into higher altitudes and continues to threaten the lives of humans working on the International Space Station.

⁹ “The Anti-Ballistic Missile (ABM) Treaty at a Glance,” Arms Control Association, last reviewed July 2017, accessed October 2, 2020, <https://www.armscontrol.org/factsheets/abmtreaty>.

¹⁰ “Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects” (draft), 1-2, <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/cd/2008/documents/Draft%20PPWT.pdf>.

¹¹ Meyer, “Space Dossier File 6,” 21.

¹² “Draft Code of Conduct for Outer Space Activities,” Council of the European Union, December 17, 2008, 9, <https://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2017175%202008%20INIT>.

of these norms are aimed at limiting debris-creating events such as direct-ascent ASAT tests. Although the code has been revised several times, it has yet to be adopted by the United Nations. In 2012, the United States announced that it would use the European Union's code of conduct as a base to work with its partners and allies to draft a new document. Japan and Australia have voiced similar intentions.¹³

While UN dialogues on the weaponization of space—focusing on several types of offensive space weapons—and potential measures for arms control are still ongoing, there has been little concrete movement. There are likely several reasons for this, including some states' lack of willingness to “give up” counterspace systems and obstacles to overcome regarding verification. Verification is challenging with direct-ascent ASAT weapons because many ICBMs or missile defense systems could be modified to kinetically attack a target in orbit. Furthermore, continued tests of such systems appear to be normalizing the behavior. After the 2007 Chinese ASAT test, there was strong international backlash at the reckless behavior and incredible amount of debris the one test created. In 2008, there was less backlash against the United States for testing a similar capability, possibly because it was conducted at a much lower altitude, which allowed for most of the debris to burn up in Earth's atmosphere. Only a handful of countries decried the Indian direct-ascent ASAT test in 2019, which resulted in ten pieces of debris that remain in orbit today.¹⁴ In the United States, only National Aeronautics and Space Administration (NASA) Administrator Jim Bridenstine spoke out against the destructive test.¹⁵ Russia's ASAT test in early 2020 created no debris, and also garnered a muted response from the international community.

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Perspectives in the Space Community

A recent survey of public perceptions, especially in the space community, illuminates current thinking on ASAT capabilities and testing. “Demonstration of anti-satellite (ASAT) capabilities is increasing,” one question began, asking, “Would you say that there is evidence of an emerging norm related to this activity?” Over 50 percent of the surveyed space experts answered “Yes.”¹⁶ Not all norms of behavior are good, and in the case of kinetic physical direct-ascent ASAT tests, the current norms of behavior are reinforcing the idea that direct-ascent ASAT tests are acceptable so long as they create minimal debris.

To best preserve the space environment and protect against the creation of debris, the international space community needs to shift international perception. This is because, despite the small amount of debris created in the most recent tests, if such a weapon was used during conflict it is unlikely that the targeted satellite would be orbiting at a low enough altitude as to not create any long-lasting space debris. Space debris indiscriminately affects satellites of all nations in similar orbits. An attack in geosynchronous Earth orbit (GEO), for example, would

¹³ Chris Johnson, “Draft International Code of Conduct for Outer Space Activities Fact Sheet, Secure World Foundation, February 2014, https://swfound.org/media/166384/swf_draft_international_code_of_conduct_for_outer_space_activities_fact_sheet_february_2014.pdf.

¹⁴ Jonathan C. McDowell, Satellite Catalog, 2020 <https://planet4589.org/space/log/satcat.txt>.

¹⁵ Jeff Foust, “NASA warns Indian anti-satellite test increased debris risk to ISS,” SpaceNews, April 2, 2019, <https://spacenews.com/nasa-warns-indian-anti-satellite-test-increased-debris-risk-to-iss/>.

¹⁶ Jessica West and Gilles Doucet, From Safety to Security: Reducing the Threat Environment Through the Responsible Use of Outer Space, Project Ploughshares, July 2020, 15, <https://ploughshares.ca/wp-content/uploads/2020/07/SpaceNormsSurveyReport2020.pdf>.

create debris that could further destroy or damage early-warning satellites, which provide key capabilities to support the nuclear mission.

For the international and U.S. space community, the crux of concerns regarding direct-ascent ASAT weapons is often focused on space sustainability and the future of the space environment. In 2015, Frank Rose, then Assistant Secretary for the U.S. State Department's Bureau of Arms Control, Verification, and Compliance, asserted on behalf of the U.S. government that the "most pressing and existing threat to outer space systems is actually terrestrially-based anti-satellite weapons, which exist, have been tested, and have already damaged the space environment."¹⁷ The aforementioned survey indicated that the participants—who were a mix of experts from government, industry, academia, and space-focused non-profits—indicated that they "strongly support the application of norms that restrict the contamination of the space environment." In fact, most of the survey participants asserted that this standard "should always be applied, except in the most extreme of circumstances."¹⁸

In a recent publication by the United Nations Institute for Disarmament Research, Paul Meyer also argued for leveraging concerns about space environment sustainability to pursue further limits on ASAT weapons and tests in space. He contends that because there have been no destructive tests in higher orbits (such as GEO), introducing a direct-ascent ASAT ban or test limit would help protect precious national security space systems such as early-warning satellites.¹⁹ It is worth noting that non-destructive tests of ASAT systems have occurred in GEO.²⁰ Other U.S. space experts have published similar calls for limiting or banning such testing in space in order to preserve the fragile space environment from further debris-creating events.²¹

Effects of an ASAT Ban

If stability or instability in the nuclear domain affects space, it may be fair to assume that the relationship may work in reverse. So, what might a direct-ascent ASAT ban or test limit mean for broader nuclear stability?

For decades, relative nuclear stability has been assured largely because Russia and the United States have possessed secure second-strike capabilities, the basis of mutually assured destruction. Nuclear arms control in the Cold War also worked because both superpowers—the United States and Soviet Union—were somewhat symmetrical in their nuclear capabilities and vulnerabilities.

Analysis indicates that both China and Russia are moving ahead with offensive and defensive counterspace weapons programs.²² This means diversifying counterspace arsenals beyond direct-ascent ASAT weapons. However, there are clear advantages to direct-ascent ASATs that make these weapons high-value. First, for countries that possess advanced long-range missile technology, turning it into a space weapon requires relatively little effort.

¹⁷ Frank Rose, "Challenges to Arms Control in Space and Pragmatic Way Ahead" (speech, Beijing, China, November 30, 2015), U.S. Department of State, <https://2009-2017.state.gov/t/avc/rls/2015/250231.htm>.

¹⁸ West and Doucet, *From Safety to Security*, 18.

¹⁹ Meyer, "Space Dossier File 6," 26.

²⁰ Harrison et al., *Space Threat Assessment 2020*.

²¹ Aaron Bateman, "America Needs a Coalition to Win a Space War," *War on the Rocks*, April 29, 2020, <https://warontherocks.com/2020/04/america-needs-a-coalition-to-win-a-space-war/>; Charles Powell, "Saving Space from 'Star Wars'-Style Misperceptions," *War on the Rocks*, July 14, 2020, <https://warontherocks.com/2020/07/saving-space-from-star-wars-style-misperceptions/>; Daniel Porras, "Anti-satellite warfare and the case for an alternative draft treaty for space security," *Bulletin of the Atomic Scientists*, June 27, 2019, <https://thebulletin.org/2019/06/anti-satellite-warfare-and-the-case-for-an-alternative-draft-treaty-for-space-security/>.

²² For a full assessment of Chinese, Russian, and other nations' counterspace capabilities, see Harrison et al., *Space Threat Assessment 2020*.

Second, direct-ascent ASATs allow nearly instantaneous battle damage assessment, meaning they allow the attacker to confirm a hit and ensure that the target was successfully destroyed. If used against many U.S. military space systems, these irreversible attacks may only have to target one or two satellites to significantly degrade a constellation and undermine the military advantage it provided. Lastly, direct-ascent ASAT systems have a longer shelf life than on-orbit systems because they can be stored, tested, and upgraded until a country has a need for them.

Through its response to the PPWT, the United States appears to be supportive of a direct-ascent ASAT ban. However, this may be because the United States feels assured that it can rely on other defensive or offensive counterspace systems to achieve its space goals. For China and Russia, the apparent lack of interest in cementing a direct-ascent ASAT ban or test limits through the PPWT may be a sign that the two nations are not comfortable enough with the breadth of their own counterspace arsenals to be willing to let go of these ASAT weapon systems.



A meeting of the United Nations Conference on Disarmament, where Russia and China jointly introduced the PPWT.

Source: United States Mission Geneva

Space's Impact on Strategic Stability

The stability or instability in one area of strategic competition, such as nuclear weapons, may have repercussions on another. Simultaneously, the tangled relationship between offensive nuclear missiles, ballistic missile defense, and space weaponization makes achieving progress in only one area extremely difficult and renders further destabilization possible.²³ Russian and Chinese policymakers both view U.S. space doctrine—and the potential for space-based defense systems—as reinforcing U.S. missile defense capabilities. Even if the United States treats nuclear, space, and ballistic missile defense (BMD) as separate pathways to achieving strategic security, China and Russia view them as a cohesive effort by the United States.²⁴

For China, the ability to weaken U.S. space-based infrastructure—possibly to include early-warning satellites—is seen as necessary for the survival and credibility of its own nuclear forces.²⁵ Lieutenant General Ge Dongsheng asserted: “We [China] therefore must accelerate the development of space capability to create a new type of integrated space-nuclear strategic force. . . . Through anti-satellite weapons, we can clear a pathway for nuclear missiles so that our nuclear force can survive, effectively penetrate, and accurately hit targets.”²⁶ Direct-ascent ASAT

²³ Meyer, “Space Dossier File 6,” 25.

²⁴ Jeffrey Edmonds, “Russia and China Playing Musical Chairs in Zero Gravity,” War on the Rocks, August 14, 2020, <https://warontherocks.com/2020/08/russia-and-china-playing-musical-chairs-in-zero-gravity/>.

²⁵ Baohui Zhang, “The Security Dilemma in the U.S.-China Military Space Relationship,” *Asian Survey* 51, no. 2 (2011): 311-332, <https://doi.org/10.1525/as.2011.51.2.311>.

²⁶ Ge Dongsheng, “Yi Fazhan Hangtian Liliang Wei Tupokou, Tuijin Wo Jun Xinxi Hua Jianshe, Wei Weihe Guojia Fazhan Zhongjiao Jiyu Qi Tigong Anquan Baozhang” [Developing a space capability to promote military digitization and to provide security protection for national development], in Ba Zhongyan, ed., *Zhanlue Jiyu Qi Di Bawuo He Liyong* [Seizing the strategic opportunity] (Beijing: Shishi chubanshe, 2006), 22. As cited in

weapons are clearly part of China's nuclear strategy, and it is clear that China has made building and testing these weapons a priority. In fact, in almost every year since 2007, China has conducted non-debris creating direct-ascent ASAT tests.²⁷

Russia has similar concerns about the survivability of its nuclear forces due to U.S. advancements in space and missile defense. While the United States' national security community tends to silo nuclear, missile defense, space, cyber, or the classic military domains—as seen in U.S. military structures—Russia and China do not. Since the George W. Bush administration's decision to withdraw from the ABM treaty, Russian policymakers have viewed the United States as “undermining strategic stability by gradually undermining the Russian nuclear deterrent via advances in long-range strike and missile defense.”²⁸ The referenced missile defense forces are made possible due to U.S. space infrastructure, including missile warning and communications satellites.

It appears that both China and Russia may believe direct-ascent ASAT systems are the best insurance against U.S. space-enhanced missile defense systems. Using direct-ascent ASAT weapons as a “penetration aid” to remove such systems, particularly sensors, would secure the success of Chinese or Russian ballistic missile—or nuclear—attacks.

Space operations are another extension of national power, politics, and conflict. A direct-ascent ASAT weapon could be used against almost any space object at any stage of a conflict. It is not solely a weapon used for strategic impact but could also be employed against conventional systems that support ongoing operations on Earth. While simple logic may suggest that a ban on weapons systems that threaten to escalate strategic conflict—such as through a direct-ascent ASAT attack on nuclear command and control or early-warning satellites—will increase stability among world powers, this may be untrue. At the heart of this discussion is the simple fact that nations do not act in space in a vacuum.²⁹

This begs the question: If both China and Russia view space forces—especially those that support missile defense and sometimes nuclear security, such as early-warning satellites—as destabilizing, would a direct-ascent ASAT ban further destabilize the strategic environment?

If China and Russia view such U.S. space systems as inherently destabilizing, then a secure offensive counterspace capability, such as a direct-ascent ASAT system, may give them reassurance and create a balance of instability. This mutual vulnerability (ASATs versus missile defense) may lead to a state of strategic stability. While the United States may see the missile defense space structure as defensive and non-threatening, a threat level is not determined by one's own perception of force but by your adversary's perception of your forces. By ensuring that China and Russia have the capability to thwart the United States' missile defense system through direct-ascent ASAT attacks, China and Russia may feel more assured of global strategic stability.

As explored earlier, the broader space community believes the threat that direct-ascent ASATs pose is great and two-fold: they could hinder vital strategic missions performed from space, and they inevitably create space debris that damages the space environment. For space sustainability, a ban would stabilize and protect the domain by preventing serious debris-causing events. Yet if the space community continues to pursue a direct-ascent ASAT ban,

Baohui Zhang, “The Security Dilemma in the U.S.-China Military Space Relationship,” *Asian Survey* 51, no. 2 (2011): 321, <https://doi.org/10.1525/as.2011.51.2.311>.

²⁷ Harrison et al., *Space Threat Assessment 2020*, 11.

²⁸ Edmonds, “Russia and China Playing Musical Chairs in Zero Gravity.”

²⁹ This is obviously the author's attempt at a bad pun, as space is a nearly perfect vacuum.

it must be aware of the effects such a moratorium may have on the precariously balanced stability of the nuclear domain.

Starting with a test ban of direct-ascent ASAT weapons may reassure space sustainability advocates and help move toward normalizing the non-use of debris-creating weapons. This could be modeled after the PTBT and thereby limit the possibility of debris creation in peacetime. Over time, China's and Russia's views on U.S. missile defense may shift, allowing for a total ban on direct-ascent ASAT weapons. However, this may only occur when China and Russia are sufficiently assured of their ability to employ non-kinetic forms of counterspace attacks or if U.S. defenses of space systems have evolved to the point that a direct-ascent ASAT attack has no utility.

While a direct-ascent ASAT ban may reinforce stability in the space domain—and potentially other domains such as air, land, and sea—it may destabilize the nuclear domain.

So how would new norms for space weapons testing affect nuclear stability and traditional deterrence? And would a direct-ascent ASAT limit or ban create stability or further destabilize the space and nuclear domains? As of today, the direct-ascent ASAT weapons norms, which permit tests if minimal debris is created, reinforce a precarious balance of strategic instability. These norms sanction the continued evolution and testing of national counterspace weapons arsenals. While a direct-ascent ASAT ban may reinforce stability in the space domain—and potentially other domains such as air, land, and sea—it may destabilize the nuclear domain because China and Russia view direct-ascent ASAT weapons as assurance of their nuclear arsenals' success against U.S. missile defense systems. However, because space has been a relatively peaceful domain thus far, it is difficult to fully assess the impact and escalatory implications of direct-ascent ASATs, as none have ever been used in conflict.

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