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Russia's Space-Based, Nuclear-Armed Anti-Satellite Weapon: Implications and Response Options

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Executive Summary

Russia evidently has developed and is preparing to launch a nuclear-armed, anti-satellite (ASAT) weapon system into orbit around the Earth. While the White House downplayed the threat, if deployed on-orbit, the weapon will pose a clear and present danger to U.S. vital national interests. It would also threaten the interests of all other spacefaring nations and those which rely upon the use of space services. Thus, it may come to rival the 1962 Cuban Missile Crisis.

This paper discusses U.S. interests in space, the threat posed by Russia's nuclear ASAT, its implications for U.S. and international security, and response options. The following are a summary of its key findings and recommended course of action for responding to the threat.

- **The Biden-Harris administration reaffirmed long-standing U.S. policy that access and use of space are a vital national interest. Space activities are integral to America's way of life, prosperity, and security.**

- **Development of the ASAT is consistent with Russia's heightened emphasis on nuclear weapons as well as its recognition of the importance of space capabilities for modern warfare.** Russia evidently believes that space is a domain in which the United States can be coerced because of its reliance on vulnerable space systems.

- A deployed nuclear ASAT in space would provide a unique capability for Russian President Putin to rattle the nuclear saber, instill fear, and intimidate adversaries. Russian defense planners are aware that the U.S. is emphasizing proliferated satellite architectures in low Earth orbit. While proliferation may be an effective passive countermeasure against kinetic ASATs (if the cost-exchange ratio favors the defender), it will not be effective against a nuclear detonation in space.

- If a nuclear "Sword of Damocles" is deployed on-orbit or if it effectively becomes a "loose nuke," it would have a deleterious psychological impact with significant attendant socioeconomic effects.

- **The White House's assertion that a nuclear ASAT would not be a threat to humans is incorrect.** According to the *Commission to Assess the Threat to the United States from EMP Attack*, such an attack "has the capability to produce widespread and long lasting disruption and damage to the critical infrastructures that underpin the fabric of U.S. society…. many people may ultimately die for lack of the basic elements necessary to sustain life in dense urban and suburban communities."

- The threat highlights the general lack of knowledge about U.S. interests in space, the stakes of a conflict that begins in or extends to space, and the array of foreign threats to space assets and operations, as well as the need to increase awareness and educate Congress and the public.

- **Russia's nuclear ASAT poses a fundamental challenge to the foundation of the international space legal regime.** If deployed, it would violate the 1967 Outer Space Treaty. If detonated, it would also violate the 1963 Limited Test Ban Treaty. **It provides further evidence that Putin will not comply with agreements to control armaments or restrict military operational behavior, whether on Earth or in outer space and demonstrates the hypocrisy of Moscow's continued agitation for its proposed treaty to prevent the "weaponization of space."**

- Denial or loss of space services would adversely impact the operational security and protection of U.S. diplomats, intelligence officers, and military forces. It would also have a deleterious impact on the functioning of critical infrastructures, emergency services, and economic activities which directly impact

the lives of hundreds of millions of Americans. **A nuclear detonation at LEO would be a catastrophe for the global economy.**

- The U.S. must reconsider its reliance on proliferated low Earth orbit (PLEO) space architectures for mission assurance and resilience along with decisions regarding the nuclear hardening of critical space systems. The United States must also consider deploying active defenses to suppress and destroy such threats.

The U.S. government should integrate the following response options into its course of action for addressing this serious threat:

- **Diplomacy should be used to rally allies, partners, and other members of the international community** in support of U.S.-led efforts to generate private and public pressure to convince Putin to reconsider the nuclear ASAT program and cancel the impending launch. The U.S. also should **conduct a rigorous public diplomacy campaign** to convince foreign governments and populations of the stakes and to stand firm alongside America. **The U.S. should not allow Moscow to use the nuclear ASAT as a bargaining chip for unverifiable arms control and provide an opening to capitalize on a treaty it is prepared to violate or abandon.** Putin is likely to use the proven tactic of denial and intransigence before accepting U.S. inducements not to deploy the weapon, pocketing concessions as rewards for bad behavior, and then move the goalposts to get America to up the ante.

- **Additional diplomatic and economic sanctions beyond what the U.S. has already imposed on Russia should be implemented.** However, if the extent of the U.S. response is to "name and shame," create international opprobrium, impose only modest additional economic sanctions, and seek to further isolate Russia, it likely would be viewed as a sign of weakness by Putin, not achieve the desired result, and may prompt further provocations.

- **The U.S. should develop contingency plans to counter the threat posed by Russia's nuclear ASAT**. This should include passive defenses, such as alternatives to PLEO architectures and nuclear hardening or shielding of mission-critical space assets, as well as measures to improve the resilience of U.S. critical infrastructures and assure the continued viability of national essential functions.

- In addition, **the U.S. should undertake military preparations to counter the Russian ASAT before it could be detonated**. Issuing the threat and acting would **establish a "*Biden Doctrine*" that the U.S. will not allow the deployment of a nuclear weapon in space by acting to enforce the international space legal regime**.

- The U.S. should also **plan, program, and budget for rapid development and fielding of a dynamic, layered, space defense-in-depth as a high national priority**.

- **The President should sign a Memorandum of Notification containing a "Finding" that justifies conducting a covert action program to disrupt and counter Russian efforts to develop, deploy, and operate a nuclear ASAT.**

Russia's Space-Based, Nuclear-Armed Anti-Satellite Weapon: Implications and Response Options

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Introduction

Russia evidently has developed and is preparing to launch a nuclear-armed, anti-satellite (ASAT) weapon system into orbit around the Earth. After Chairman of the House Permanent Select Committee on Intelligence Mike Turner and Ranking Member Jim Himes jointly notified their colleagues of an urgent matter involving a "destabilizing foreign military capability,"[1] White House spokesperson John Kirby confirmed that the U.S. Intelligence Community had informed the Biden-Harris administration about the Russian ASAT weapon.[2]

Some commentators suggested this could be another "Sputnik moment," similar to the impact of the Soviet Union's launch of the first artificial Earth satellite in 1957.[3] Kirby downplayed the threat and its implications for U.S. and international security, however, presumably to reassure the public. While the ASAT weapon is "troubling" and would "violate" the 1967 Outer Space Treaty if deployed, he said it is not yet "operational" and "we're not talking about a weapon that can be used to attack human beings or cause physical destruction here on Earth.''[4] President Joe Biden subsequently asserted that,

> *First of all, there is no nuclear threat to the people of America or anywhere else in the world with what Russia is doing at the moment. Number two, anything that they're doing, or they will do relates to satellites in space and damaging those satellites potentially. Number three, there's no evidence that they have made a decision to go forward with doing anything in space either. So, what we found out was there was a capacity to launch a system into space that could theoretically do something that was damaging. Hadn't happened yet, and my hope is that it will not.*[5]

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[1] Press Release, "House Intelligence Committee Chairman Turner Statement on Serious National Security Threat," House Permanent Select Committee on Intelligence," February 14, 2024, https://intelligence.house.gov/news/documentsingle.aspx?DocumentID=1360

[2] "Press Briefing by Press Secretary Karine Jean-Pierre and White House National Security Communications Advisor John Kirby," The White House, February 15, 2024, https://www.whitehouse.gov/briefing-room/press-briefings/2024/02/15/press-briefing-by-press-secretary-karine-jean-pierre-and-white-house-national-security-communications-advisor-john-kirby-3

[3] Kari A. Bingen and Heather W. Williams, "Is This a Sputnik Moment?" The New York Times, February 17, 2024, https://www.nytimes.com/2024/02/17/opinion/russia-nuclear-space-sputnik.html

[4] "Press Briefing by Press Secretary Karine Jean-Pierre and White House National Security Communications Advisor John Kirby."

[5] "Remarks by President Biden on the Reported Death of Aleksey Navalny," The White House, February 16, 2024, https://www.whitehouse.gov/briefing-room/speeches-remarks/2024/02/16/remarks-by-president-biden-on-the-reported-death-of-aleksey-navalny/

For its part, the government of the Russian Federation denied reports about the ASAT weapon. President Vladimir Putin stated that,

> *Our position is clear and transparent: We have always been categorically against and are now against the deployment of nuclear weapons in space…. We urge not only compliance with all agreements that exist in this area, but also offered to strengthen this joint work many times.*[6]

Russian Defense Minister Sergei Shoigu also said that "there are no such projects – nuclear weapons in space."[7] Additionally, Deputy Foreign Minister Sergei Ryabkov called it a "malicious fabrication" and a White House ploy to persuade Congress to appropriate additional military aid to Ukraine.[8] Similarly, Kremlin spokesperson Dmitri Peskov said, "it's obvious that Washington is trying to force Congress to vote on the [Ukraine] aid bill by hook or by crook," adding "let's see what ruse the White House will use."[9]

Setting aside the veracity of the Kremlin's denial, Russia's development of a space-based, nuclear-armed ASAT system and preparations for its impending launch are more than just "troubling." **If deployed on-orbit, the weapon will pose a clear and present danger to U.S. vital national interests. Thus, it may come to rival the Cuban Missile Crisis prompted by the USSR's deployment of nuclear-armed, intermediate-range ballistic missiles ninety miles off America's east coast in 1962.** Consequently, "hope" is neither an effective policy nor strategy to protect and defend the United States. This paper discusses U.S. interests in space, the threat posed by Russia's nuclear ASAT weapon, its implications for U.S. and international security, and recommended response options.

Context

While the United States seeks to maintain the international rules-based status quo, Russia has revanchist aspirations and seeks to alter the international system in ways favorable to its political ideology, authoritarian governance model, and interests. Putin believes the demise of the Soviet empire was the "biggest political catastrophe" of the 20th century.[10] He wants to reverse the erosion of Russia's power and influence, reestablish a sphere of influence, undermine the North Atlantic Treaty Organization (NATO) and U.S. global leadership, and dominate the foreign, military, and economic policies of neighboring states. Putin apparently aims to restore

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[6] Guy Faulconbridge, "Kremlin Denies U.S. Reports Moscow Plans to Put Nuclear Weapons in Space," Reuters, February 20, 2024, https://www.reuters.com/world/europe/russia-denies-us-claims-that-moscow-plans-deploy-nuclear-weapons-space-2024-02-20/

[7] Ibid.

[8] Guy Faulconbridge, et. al., "Kremlin Dismisses U.S. Warning about Russian Nuclear Space Capability," Reuters, February 15, 2024, https://www.reuters.com/world/kremlin-dismisses-us-warning-about-russian-nuclear-capability-space-2024-02-15/

[9] Ibid.

[10] Claire Bigg, "Was Soviet Collapse Last Century's Worst Geopolitical Catastrophe?" Radio Free Europe / Radio Liberty, April 29, 2005, https://www.rferl.org/a/1058688.html

the former Soviet empire's "near abroad" and perhaps regain control over its "far abroad" in Central and Eastern Europe as well.

Putin's propensity for risk-taking in pursuit of those aims is exemplified by his frequent resort to the threat and use of armed force. He has assassinated political opponents at home and abroad, waged brutal wars in Chechnya, invaded Georgia, turned cities in Syria into rubble, invaded and annexed Crimea, and invaded Ukraine. Russia's strategic objectives, collusion with the People's Republic of China, Islamic Republic of Iran, and Democratic People's Republic of Korea, and efforts to change the international order are intensifying the ongoing geopolitical and attendant astropolitical competition.

U.S. Interests

The Biden-Harris administration reaffirmed long-standing U.S. policy, promulgated by successive administrations of both political parties over many decades, that access and use of space are a vital national interest.[11] National interests are the values, conditions, and geographic factors of importance to a nation's preservation and well-being. For the United States, these include freedom, economic prosperity, and human rights as well as territorial integrity, access to global markets and resources, and international order. Vital interests are those of overriding importance to a nation's safety, integrity, and survival.

Space activities are integral to America's way of life, prosperity, and security. Ubiquitous satellite internet, telecommunications, geospatial, environmental monitoring, and positioning, navigation, and timing services are utilities. Spacecraft collect, generate, and relay information around the world. They are essential parts of global and national information infrastructures which enable the information-age economy. Satellite systems control physical assets in nearly every critical infrastructure sector including energy, finance, transportation, and telecommunications. They help manage power grids, monitor logistics, forecast the weather, manage water supplies, improve crop yields, enable access to internet content and television broadcasts, and facilitate video telecommunications for telemedicine and education. From entertainment to emergency services, space systems are essential to Americans' security and well-being.

The global space economy is projected to more than double from about $469 billion to over $1 trillion by 2030. The United States is the primary engine and beneficiary of this growth as the world's leader in commercial space activities. Space-related commerce, trade, and jobs are important to America's gross domestic product (GDP) and balance of trade. According to the most recent U.S. government data, the U.S. space economy accounted for $211.6 billion of gross output, $129.9 billion (0.6 percent) of GDP, $51.1 billion of private industry compensation, and 360,000 private industry jobs in 2021.[12]

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[11] United States Space Priorities Framework (Washington, D.C.: The White House, December 2021), p.1, https://www.whitehouse.gov/wp-content/uploads/2021/12/united-states-space-priorities-framework-_-december-1-2021.pdf

[12] Department of Commerce, "U.S. Space Economy Statistics 2012-2021," https://apps.bea.gov/scb/issues/2023/06-june/0623-space-economy.htm?_gl=1*m8uxgg*_ga*MTE1NzcyNjYwNy4xNzAxNDU2NDI5*_ga_J4698JNNFT*MTcwMTQ1NjQyOS4xLjEuMTcwMTQ1NjQ5My4wLjAuMA..

Space systems are also integral to America's security and defense. They facilitate diplomacy, gather intelligence on foreign intentions and capabilities, and enable the planning and execution of traditional military as well as special activities across the conflict spectrum. Space assets contribute to nuclear deterrence by enabling development of U.S. nuclear war plans, indications, warning, detection, and assessment of nuclear attack, missile warning, tracking, and defense, targeting of nuclear delivery vehicles and weapons, and nuclear command, control, and communications.

Indeed, **space capabilities are the leading edge and primary instrument of U.S. information-age military power**. They provide a global command, control, communications, computing, intelligence, surveillance, and reconnaissance backbone to increase the operational effectiveness of joint and combined military forces and project power with speed, precision, and lethality anywhere in the world. Indeed, U.S. armed forces are sized and structured based on the assumed availability of space support and are increasingly dependent on space systems to conduct operations around the world.

Earth orbits and the information lines of communication through space thus are as important to America's and its allies' security and well-being as the transportation lines of communication across the continents and oceans. They are extensions of our homelands linked to our nations' centers of gravity. An adversary may threaten or attack space systems to undermine societal cohesion and morale, political resolve, intelligence collection, economic prosperity, and combat effectiveness.

Accordingly, the basic tenets of U.S. space policy (consistent since the Eisenhower administration) include the use of space for peaceful purposes (defined to include non-aggressive defense and intelligence activities); the sovereignty of space vehicles; the right of passage through and operations in space without interference; purposeful interference as an infringement on sovereign rights; and the right of self-defense.[13] U.S. policy and strategy have always sought to deter hostilities on Earth and in space. **National space policy thus continues to declare that "any purposeful interference with or an attack upon the space systems of the United States or its allies that directly affects national rights will be met with a deliberate response at a time, place, manner, and domain of our choosing."**[14]

In sum, space assets are woven into America's socioeconomic fabric, embedded in critical infrastructures, and enable national essential functions. U.S. military forces are reliant and, in some cases, completely dependent upon space services. Disruption or loss of critical space mission capabilities thus would significantly increase the risk of surprise, disrupt society, harm the economy, decrease combat effectiveness, increase the risks and costs of military operations, and complicate the ability to support defense commitments to allies.

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[13] See, for example, Marc J. Berkowitz, "National Space Policy and National Defense," in Peter L. Hays, ed., et. al., Spacepower for a New Millennium (New York: McGraw-Hill, 2000), pp. 37-60.

[14] "National Space Policy of the United States of America," The White House, December 9, 2020, https://trumpwhitehouse.archives.gov/wp-content/uploads/2020/12/National-Space-Policy.pdf

Denial of mission-critical space capabilities could influence the course and outcome of war. Consequently, it is imperative that the U.S. government protect and defend the nation's vital interests in space.

Russian Threat

Russia's development and impending deployment of a nuclear-armed ASAT weapon on-orbit is a profound danger to U.S. and international security. It should come as no surprise, however, given Putin's risk-taking propensity, violations or withdrawal from numerous arms control agreements, and decision to increase the role of nuclear weapons in Russia's defense strategy and military doctrine. In February 2022, Russia launched Cosmos-2553 into orbit just weeks before it invaded Ukraine. The spacecraft evidently has been secretly operating as a research and development platform for components of the nuclear ASAT weapon.[15]

Putin likely authorized the nuclear ASAT system's procurement both to offset Russia's loss of conventional military superiority in Eurasia and reinforce its status as a great power. Putin abandoned a "no first use" of nuclear weapons declaratory policy and instead adopted a doctrine of escalation in the early phases of a conflict for deterrence.[16] Accordingly, Russia is altering its nuclear force structure by modernizing all three legs of its nuclear triad with new nuclear intercontinental ballistic missiles (ICBMs), fleet ballistic missile submarines, and long-range bombers.[17]

Despite (or perhaps because of) economic difficulties exacerbated by Western sanctions, Putin also authorized the development of new dual-capable (nuclear and non-nuclear) "exotic" or "super" weapons he claimed would provide Russia with a strategic capability impossible for America to intercept.[18] The Russian armed forces have developed, tested, and fielded the Sarmat new heavy ICBM, Avangard nuclear-armed hypersonic glide vehicle (HGV), Kinzhal nuclear-armed air-launched hypersonic missile, Burevestnik nuclear-powered and nuclear-armed cruise

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[15] Warren Strobel, et. al., "Russia Launched Research Spacecraft for Antisatellite Nuclear Weapon Two Years Ago, U.S. Officials Say, *Wall Street Journal, May 16, 2024, https://www.wsj.com/politics/national-security/russia-space-nuke-launched-ukraine-invasion-c4aad62e*

[16] See, for example, Russia Military Power (Washington, D.C.: Defense Intelligence Agency, 2017, p. 46, https://www.dia.mil/Portals/110/Images/News/Military_Powers_Publications/Russia_Military_Power_Report_2017.pdf; and Mark B. Schneider, "Escalate to Deescalate," U.S. Naval Institute Proceedings, Vol. 143/2/1 (February 2017), https://www.usni.org/magazines/proceedings/2017/february/escalate-de-escalate

[17] Annual Threat Assessment of the U.S. Intelligence Community, Office of the Director of National Intelligence, February 26, 2023, p. 14, https://www.dni.gov/files/ODNI/documents/assessments/ATA-2023-Unclassified-Report.pdf

[18] Tony Wesolowsky, "'Listen To Us Now': Putin Unveils Weapons, Vows To Raise Living Standards In Fiery Annual Address," Radio Free Europe / Radio Liberty, March 1, 2018, https://www.rferl.org/a/putin-set-give-annual-address-amid-presidential-election-campaign/29069948.html

missile, and Poseidon nuclear-powered and nuclear-armed unmanned underwater vehicle.[19] **Development of a space-based, nuclear-armed ASAT system is consistent with Russia's heightened emphasis on nuclear weapons as well as its recognition of the importance of space capabilities for modern warfare.**

According to then Vice Chief of Space Operations General David Thompson, "both China and Russia are regularly attacking U.S. satellites with non-kinetic means, including lasers, radio frequency jammers, and cyber-attacks."[20] In addition, Russia's unlawful full-scale invasion of Ukraine was preceded by a destructive test of a kinetic energy ASAT weapon. The test generated thousands of pieces of orbital debris which endangered American astronauts as well as Russian cosmonauts onboard the International Space Station and harmed the sustainability of the space environment.[21] While it prompted international opprobrium, the ASAT test served as a stark warning of Russia's ability to hold space assets at prompt risk of destruction. An hour before the Ukraine invasion, Russia launched a cyber-attack against Viasat's KA-SAT ground network.[22] It has also employed electronic warfare to jam SpaceX's Starlink satellite internet services as well as satellite positioning, navigation, and timing services.[23]

Putin also repeatedly and successfully engaged in nuclear "saber rattling" to intimidate and deter the U.S.-led NATO Alliance before and during the Ukraine conflict. He placed Russia's nuclear forces on alert, for example, and stated that "Russia is one of the leading

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[19] See, for example, Tony Wesolowsky, "Here's What We Know: Russia's New Generation of Nuclear-Capable Weapons," Radio Free Europe / Radio Liberty, February 19, 2019, https://www.rferl.org/a/here-swhat-we-know-russia-s-new-generation-of-nuclear-capable-weapons/29778663.html; Samuel Bendett, et. al., "Advanced Military Technology in Russia," Chatham House, September 21, 2021, https://www.chathamhouse.org/2021/09/advanced-military-technology-russia/03-putins-super-weapons; and America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States, October 2023, pp. 8-9, https://armedservices.house.gov/sites/republicans.armedservices.house.gov/files/Strategic-Posture-Committee-Report-Final.pdf.

[20] Josh Rogin, "A Shadow War in Space is Heating Up Fast," The Washington Post, November 30, 2021, https://www.washingtonpost.com/opinions/2021/11/30/space-race-china-david-thompson/

[21] See, for example, "Russian Direct-Ascent Anti-Satellite Missile Test Creates Significant, Long-Lasting Space Debris," U.S. Space Command Office of Public Affairs, November 15, 2021, https://www.spacecom.mil/Newsroom/News/Article-Display/Article/2842957/russian-direct-ascent-anti-satellite-missile-test-creates-significant-long-last/

[22] See, for example, United Kingdom National Cyber Security Centre, "Russia Behind Cyber Attack with Europe-Wide Impact an Hour Before Ukraine Invasion," May 10, 2022, https://www.ncsc.gov.uk/news/russia-behind-cyber-attack-with-europe-wide-impact-hour-before-ukraine-invasion;

[23] See, for example, Alex Horton, "Russia Tests Secret Weapon to Target SpaceX's Starlink in Ukraine," The Washington Post, April 18, 2023, https://www.washingtonpost.com/national-security/2023/04/18/discord-leaks-starlink-ukraine/; and Georgi A. Angelov, "Suspected Russian GPS Jamming Risks Fresh Dangers in Black Sea Region, Radio Free Europe / Radio Liberty, October 26, 2023, https://www.rferl.org/a/russia-gps-jamming-black-sea-romania-bulgaria-ukraine/32655397.html

nuclear powers" and "it is best not to mess with us."[24] More recently, he warned of the possibility of a "nuclear confrontation" with the West ahead of Presidential elections.[25] **A deployed nuclear-armed ASAT in Earth orbit, of course, would provide a unique capability (significantly different than an dual-use ICBM/ASAT) for Putin to rattle the nuclear saber, instill fear, and intimidate adversaries.**

Concerns about the risk of nuclear escalation clearly influenced U.S. policy deliberations on Ukraine. President Biden pointedly stated that the United States would not take any military action which risked escalating the conflict. For example, he rejected establishing a "no fly zone" to protect Ukrainian refugees fleeing combat and initially did not support authorizing the provision of lethal military aid such as fighter aircraft and long-range missiles by invoking the risk of starting World War III. President Biden stated,

> *The idea that we're going to send in offensive equipment and have planes and tanks and trains going in with American pilots and American crews, just understand…that's called World War III, okay? Let's get it straight here, guys…. we will not fight the third world war in Ukraine.*[26]

Moreover, Russia understands the strategic and military importance of space activities to the United States, particularly its dependence on satellite systems to support nuclear deterrence and global power projection. It knows that America relies on space systems to offset its geostrategic disadvantages (distance and time) and project power into Eurasia. **Russia evidently believes that space is a domain in which the United States can be coerced because of its reliance on vulnerable space systems.**

Consequently, Russia has pursued an array of ASAT and counterspace weapon systems to contest the freedom of passage through and operations in space. This includes cyber, electronic warfare, kinetic energy, directed energy, and orbital weapons.[27] Russia's defense ministry and industry have significant space warfare-related research and development (R&D), test and evaluation, procurement, and operational experience to draw upon from the Cold War. The Soviet armed forces operated anti-ballistic missile weapons with ASAT applications as well as a kinetic energy co-orbital ASAT.[28] They also pursued ground-based lasers, conducted R&D

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[24] Paul Sonne, "As Tensions With West Rise, Russia Increasingly Rattles Nuclear Saber," The Wall Street Journal, April 5, 2015, https://www.wsj.com/articles/as-tensions-with-west-rise-russia-increasingly-rattles-nuclear-saber-1428249620,

[25] Ann M. Simmons, "Putin Rattles Nuclear Saber Ahead of Presidential Elections" The Wall Street Journal, March 13, 2024, https://www.wsj.com/world/russia/putin-rattles-nuclear-saber-ahead-of-presidential-elections-2c99e003

[26] Aaron Blake, "Why Biden and the White House Keep Talking about World War III, The Washington Post, March 17, 2022, https://www.washingtonpost.com/politics/2022/03/17/why-biden-white-house-keep-talking-about-world-war-iii/

[27] Challenges to Security in Space (Washington, D.C.: Defense Intelligence Agency, 2022), pp. 27-29, https://www.dia.mil/Portals/110/Documents/News/Military_Power_Publications/Challenges_Security_Space_2022.pdf

[28] Soviet Military Power, (Washington, D.C.: Defense Intelligence Agency, 1990), pp. 60-61, https://apps.dtic.mil/sti/tr/pdf/ADA229299.pdf

on various exotic technologies with ASAT applications, and were planning to deploy a space-based laser ASAT test bed when the USSR collapsed.[29]

Furthermore, Russian defense planners are aware that the U.S. government is emphasizing proliferated (large numbers of space vehicles in a constellation) and hybrid (national security and commercial) architectures in low Earth orbit (LEO) in response to the renewed threat to space systems. **While proliferation may be an effective passive countermeasure against kinetic energy ASAT weapons (if the cost-exchange ratio favors the defender), it will not be effective against nuclear weapons.**

Secretary of Defense Lloyd Austin recently testified to Congress that Russia's detonation of a nuclear ASAT in space "would have devastating consequences on a lot of our capabilities in space — not only our capabilities but the capabilities of other countries."[30] Similarly, Assistant Secretary of Defense for Space Policy John Plumb told Congress that Russia's nuclear ASAT "could pose a threat to all satellites operated by countries and companies around the globe, as well as to the vital communications, scientific, meteorological, agricultural, commercial, and national security services we all depend upon."[31] Moreover, he acknowledged that detonation of such an "indiscriminate" weapon could render LEO unusable for a long time, "it could be a year."[32]

Russia, of course, has long possessed the capability to launch and detonate a nuclear weapon in space using a ballistic missile, antiballistic missile, or space launch vehicle. While a thermonuclear detonation in space would not produce a mushroom cloud, it would generate prompt and sustained nuclear effects that would "sweep the skies" by degrading or destroying spacecraft.[33] An exoatmospheric nuclear explosion would also create a blackout effect preventing communications with spacecraft by interfering with radio and radar waves.[34] The specific impact of nuclear effects on spacecraft depends upon the number, location, and yield of

[29] Ibid; and Dwayne Day and Robert Kennedy, "Barbarian in Space: the Secret Space-Laser Battle Station of the Cold War," The Space Review, June 5, 2023, https://www.thespacereview.com/article/4598/1

[30] House Armed Services Committee, Hearing on Fiscal Year 2025 Defense Budget Request," April 30, 2024, https://armedservices.house.gov/sites/republicans.armedservices.house.gov/files/SECDEF%20Statement%20.pdf

[31] "Statement of John Plumb, Assistant Secretary of Defense for Space Policy, Before the House Armed Services Subcommittee on Strategic Forces, on Fiscal Year 2025 National Security Space Programs," May 1, 2024, https://armedservices.house.gov/sites/republicans.armedservices.house.gov/files/05.01.24%20Plumb%20Statement.pdf

[32] House Armed Services Subcommittee on Strategic Forces, Hearing on Fiscal Year 2025 National Security Space Programs," May 1, 2024, https://armedservices.house.gov/hearings/str-hearing-fy25-budget-request-national-security-space-programs

[33] See, for example, Nuclear Matters Handbook (Washington, D.C.: Deputy Assistant Secretary of Defense for Nuclear Matters, November 2020), pp .167-183, https://www.acq.osd.mil/ncbdp/nm/NMHB2020rev/docs/NMHB2020rev.pdf and Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack, April 2008, p. vi, https://apps.dtic.mil/sti/pdfs/ADA484672.pdf

[34] Ibid.

the weapon(s), the time since detonation, the spacecraft's distance from the detonation, orbital parameters, and extent of radiation hardening or shielding.

In general, spacecraft in the line of sight of a nuclear detonation would be destroyed while those with radiation hardened components or shielding as well as those not in the line of sight (because they were shielded by being on the opposite side of the Earth from the detonation) would be degraded over the following days, weeks, or months as they accumulated radiation doses while orbiting through the enhanced radiation zone(s). As Major General Michael Traut, Commander of Germany's Space Command, observed, however, the explosion of a nuclear weapon high in the atmosphere or at LEO "would be more or less the end [of the orbit's utility] …. Nobody would survive an action like that – no satellite, either Chinese or Russian and American or European."[35]

The White House's assertion that a nuclear ASAT would not be a threat to humans is incorrect. A nuclear detonation in space could kill or harm humans onboard a space station or touring space. It could also cause fatalities and casualties on Earth or on aircraft flying above it with an electromagnetic pulse (EMP). A nuclear explosion at an altitude of 100 kilometers, for example, would expose 4 million square kilometers (about 1.5 million square miles) of Earth's surface beneath the burst to a variety of EMP effects.[36] In 2008, the Congressionally-directed *Commission to Assess the Threat to the United States from EMP Attack* examined the vulnerability of national critical infrastructures and space systems to EMP attack as well as the impact and consequences of such an attack on America. According to the Commission, **an EMP attack "has the capability to produce widespread and long lasting disruption and damage to the critical infrastructures that underpin the fabric of U.S. society… Should significant parts of the electrical power infrastructure be lost for any substantial period of time… the consequences are likely to be catastrophic, and many people may ultimately die for lack of the basic elements necessary to sustain life in dense urban and suburban communities."**[37]

Given the array of non-nuclear (both kinetic and non-kinetic) options Russia operates to deceive, deny, disrupt, degrade, or destroy space systems, a nuclear attack in space may not be

[35] Danielle Wallace, "German Space Commander Warns Russian Nuclear Weapon Could Destroy 'Global Commons': 'Nobody Would Survive'," Fox News, February 18, 2024, https://www.foxnews.com/world/german-space-commander-warns-russian-nuclear-weapon-could-destroy-global-commons-nobody-would-survive

[36] Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack: Critical National Infrastructures (April 2008), https://apps.dtic.mil/sti/pdfs/ADA484672.pdf. As part of Operation Fishbowl, the United States conducted the Starfish Prime nuclear test, exploding a 1.4 megaton weapon launched by a Thor missile 250 miles above Johnston Island in the South Pacific in 1962. The burst damaged the majority of spacecraft on-orbit including American, Canadian, British, and Soviet satellites as well as Telstar 1, the first commercial communications satellite. Telstar 1 was launched a day after the test and experienced a total dose of radiation 100 times greater than expected orbiting through the enhanced radiation belt causing its failure. Moreover, the exoatmospheric detonation also generated a larger than expected EMP which caused electrical surges on aircraft and power grids, destroyed electronics, and disrupted communications 800 miles away in Hawaii.

[37] Ibid. This includes the inability of "emergency services to protect lives and property, effectively communicate with the public, and among emergency workers, and rapidly restore lost infrastructure capabilities." Additionally, the Commission observed that, "Electrical power is necessary to support other critical infrastructures, including supply and distribution of water, food, fuel, communications, transport, financial transactions, emergency services, government services, and all other infrastructures supporting the national economy and welfare."

its main course of action. An exoatmospheric nuclear blast would, of course, cause fratricide by destroying or degrading American as well as Russian, Chinese, European, Japanese, Indian, and any other nation's satellites in the orbital regime. Nonetheless, Russian decision-makers and military strategists may consider the threat or use of a space-based nuclear ASAT an effective option for pre-war or intra-war deterrence because the United States is more reliant on space systems than Russia. In a conflict on or near the Eurasian landmass, Russia will have internal lines of communication and terrestrial alternatives to space systems for support to military operations.

While the effects of a nuclear detonation in space would be the same regardless of the ASAT system's basing mode (terrestrial or space), the United States would likely have indications and warning of the launch and detonation of a terrestrial-based weapon. In contrast, America would be at greater risk of an unwarned, surprise attack by a space-based, nuclear ASAT. Consequently, the speed and scale of the attack would be a shock. Compared to non-kinetic attacks against space systems, however, it would not be difficult to attribute the origin of the attacker unless the nuclear ASAT was covertly deployed into space.

Implications

Russia's space-based, nuclear-armed ASAT weapon system would pose an existential threat to U.S. vital national interests if deployed. It would also threaten the interests of all other spacefaring nations as well as those which rely upon the use of space services. Indeed, it would threaten the world's human population given the impact on the global economy of a nuclear detonation in space. Assuming Moscow plans to launch and potentially employ such a weapon, what are some of its implications?

This development highlights the general lack of knowledge about U.S. interests in space, the stakes of a conflict that begins in or extends to space, the array of foreign threats to space assets and operations, and the consequent need to increase awareness and educate Congress and the public. While the White House cannot be faulted for wanting to prevent panic when it confirmed the nuclear ASAT, neither the President nor his spokesperson accurately characterized either the threat or its ramifications. Further, if a nuclear "Sword of Damocles" is deployed on-orbit or if it effectively becomes a "loose nuke," it would have a deleterious psychological impact with significant attendant socioeconomic effects. Indeed, Russia's ASAT would be the only nuclear weapon deployed without physical security. If Russia detonates the weapon and breaks the "nuclear taboo" in place since the atomic bombing of Nagasaki – with the attendant severe economic and other consequences – the American people would be rightfully outraged and likely demand a forceful response.

Many of the international political implications of Russia's space-based nuclear ASAT also are apparent. While other nations do not always readily accept U.S. intelligence assessments, especially since the estimate of Iraqi weapons of mass destruction, the issue has generated concern among U.S. allies, international partners, and other foreign governments. This exacerbates existing tensions over Russia's aggressive behavior, creates instability in yet another domain, and influences the dynamics of international relations. The nuclear ASAT also demonstrates a general lack of knowledge about the implications of space warfare and the need to inform foreign decision-makers and opinion leaders about its risks and potential consequences.

While Putin's provocation will further test the resolve of the U.S., its allies, and partners as well as the cohesion of alliance relationships, it could create distractions that other adversaries might seek to exploit. In addition, the fear and insecurity likely caused by deployment of a space-based, nuclear ASAT would have a grave impact on the United States and the world, especially as the secondary and tertiary effects of a possible nuclear detonation become more widely assimilated. The psychological and socioeconomic implications of such an event would be profound. As Ludwig Möller, director of the European Space Policy Institute, observed, there would be an "economic fallout of trillions of dollars just in the banking and energy sectors" if Russia exploded a nuclear weapon in space which damages or destroys commercial satellites.[38] In short, **a nuclear detonation at LEO would be a catastrophe for the global economy.**

Furthermore, **Russia's development of a space-based, nuclear ASAT provides further evidence that Putin will not comply with agreements to control armaments or restrict military operational behavior, whether on Earth or in outer space.** Indeed, the list of arms control agreements Russia has violated or abandoned is long and growing. It includes the New START Treaty, the Comprehensive Nuclear Test Ban Treaty, the Open Skies Treaty, the Intermediate Range Nuclear Forces Treaty, the Conventional Forces in Europe Treaty, and the Biological Weapons Convention.

In fact, **Russia's nuclear ASAT is a brazen challenge to the very foundation of the international space legal regime. If deployed, it would violate Article IV of the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (or Outer Space Treaty) which prohibits "placing in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction."[39] If detonated, it would also violate the 1963 Limited Test Ban Treaty which prohibits nuclear weapons tests "or any other nuclear explosion" in the atmosphere, in outer space, or under water.**[40] It thus illustrates the risks and potential consequences of entering into arms control treaties or agreements which do not have enforcement mechanisms. Additionally, the indiscriminate and widespread nuclear weapons effects would open Russia to liability for compensatory and punitive damages.

Moreover, the nuclear ASAT demonstrates the hypocrisy of Moscow's continued agitation for its proposed Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects (PPWT).[41]

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[38] Wallace, "German Space Commander Warns Russian Nuclear Weapon Could Destroy 'Global Commons': 'Nobody Would Survive'."

[39] "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html

[40] "Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water," https://2009-2017.state.gov/t/avc/trty/199116.htm

[41] See, for example, "Russian Federation Explanatory Note on Updated Draft Treaty on the Prohibition of the Placement of Weapons in Outer Space and the Threat or Use of Force Against Space Objects," https://docs-library.unoda.org/Conference_on_Disarmament_(2014)/1319%2BRussian%2BFederation%2BExplanatory%2Bnote%2Bupdated%2Bdraft%2BPPWT.pdf

Diplomatic efforts in the United Nations (UN) and other bilateral and multilateral fora to limit arms or restrict provocative actions through adoption of norms of responsible behavior in space are viewed as naive by Putin. Neither Moscow nor Beijing have been receptive to U.S. diplomatic efforts to establish space norms. Both rejected the Biden-Harris administration's suggestion that they join the U.S. government in adopting a moratorium on destructive tests of direct-ascent ASAT missiles. Moscow also blocked the UN Open Ended Working Group on Reducing Space Threats from issuing a final report to the UN General Assembly.[42] Instead, it argued the focus of the UN's work should be in the Group of Governmental Experts on Prevention of an Arms Race in Outer Space (led by Russia) to concentrate on Russia's and China's joint PPWT proposal.

Moreover, Russia recently vetoed a UN Security Council resolution proposed by the United States and Japan and co-sponsored by more than sixty countries which called on all nations to ban nuclear weapons in outer space.[43] Russia's UN Ambassador Vassily Nebenzia called it "a dirty spectacle" and a "cynical ploy" that was "cherry picking" weapons of mass destruction from all other weapons that should also be banned.[44] (Thirteen countries supported the resolution, while China abstained.)[45] He rejected the resolution as "absolutely absurd and politicized," arguing that it did not go far enough in banning all types of weapons in space. Russia and China proposed an amendment to the U.S.-Japan resolution that would call on all countries, especially those with major space capabilities, "to prevent for all time the placement of weapons in outer space, and the threat or use of force in outer space, from space against Earth, and from Earth against objects in space."[46] The amendment was not accepted, however, because it failed to get the minimum nine votes required for adoption. (Seven countries voted for the amendment, seven voted against it, and one country abstained.)[47]

Russia's deputy UN ambassador Dmitry Polyansky previously dismissed the joint U.S.-Japan proposal as "yet another propaganda stunt by Washington," "very politicized" and

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[42] See, for example, Theresa Hitchens, "Russia Spikes UN Effort on Norms to Reduce Space Threats," Breaking Defense, September 1, 2023, https://breakingdefense.com/2023/09/russia-spikes-un-effort-on-norms-to-reduce-space-threats/#:~:text=Moscow%2C%20which%20voted%20against%20the,report%20to%20the%20UN%20General

[43] United Nations Security Council, S/2024/302, April 24, 2024, https://documents.un.org/doc/undoc/pro/n24/112/16/pdf/n2411216.pdf?token=Hs99czuzdnsxoqD4XE&fe=true

[44] "Security Council Fails to Adopt First-Ever Resolution on Arms Race in Outer Space, Due to Negative Vote by Russian Federation," UN News, April 24, 2024, https://press.un.org/en/2024/sc15678.doc.htm

[45] Ibid.

[46] United Nations Security Council, S/2024/324, April 24, 2024, https://documents.un.org/doc/undoc/pro/n24/112/16/pdf/n2411216.pdf?token=Hs99czuzdnsxoqD4XE&fe=true

[47] "Security Council Fails to Adopt First-Ever Resolution on Arms Race in Outer Space, Due to Negative Vote by Russian Federation, "Algeria, China, Ecuador, Guyana, Mozambique, Russian Federation and Sierra Leone voted for the amendment; France, Japan, Malta, Republic of Korea, Slovenia, United Kingdom, and United States, voted against it, and Switzerland abstained.

"divorced from reality."[48] He also criticized the proposal's text saying, the wording neither had been worked out by experts nor discussed at either the UN Conference on Disarmament or the UN Committee on Peaceful Uses of Outer Space. Additionally, Russian deputy foreign minister Sergey Ryabkov stated "this is nothing more than another attempt to find pretexts to smear Moscow's policies. We repeat once again for those who have not yet memorized this, that Russia is fully committed to its obligations under multilateral agreements, including those related to outer space."[49] U.S, National Security Advisor Jake Sullivan responded to the Russian veto by stating that "we have heard President Putin say publicly that Russia has no intention of deploying nuclear weapons in space. If that were the case, Russia would not have vetoed this resolution."[50] In addition, Assistant Secretary of State for Arms Control, Deterrence, and Stability, Mallory Stewart, said that the United States would continue to press the issue at the UN General Assembly, First Committee, and Conference on Disarmament, and other fora.[51]

Russia continues to exploit Western interest in space arms control and norms of behavior as an opportunity to conduct political and legal warfare and constrain U.S. military technology. U.S. Ambassador to the UN Linda Thomas-Greenfield recently indicated that the United States was willing to engage in bilateral arms control discussions with Russia and China "without preconditions."[52] In a sharp response, Russian Foreign Ministry spokesperson Maria Zakharova took the opportunity to restate that such talks must address Russian security concerns about NATO expansion and Western support for Ukraine. She also pointedly noted that, "We are aware of Washington's efforts to attract the private sector to serve its military space ambitions … [such systems] become a legitimate target for retaliatory measures, including military ones."[53]

The discovery of Moscow's nuclear ASAT capability and intent to deploy it is an important achievement for the U.S. Intelligence Community. Whether such information was derived from human, technical, or a combination of intelligence sources, obtaining and reporting such intelligence prior to the ASAT's launch provided valuable time for U.S. policymakers to consider response options, consult with the Congress as well as allies and partners, and plan a

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[48] Edith Lederer, "US and Japan Seek UN Resolution Calling on All Nations to Ban Nuclear Weapons in Outer Space," Associated Press, March 18, 2024, https://apnews.com/article/un-nuclear-weapons-space-us-japan-russia-37daa4642da601e641500299061fd9d8

[49] "Russia, US in Touch on Non-Deployment of Nuclear Weapons in Space — MFA." TASS, April 11, 2024, https://tass.com/science/1773893

[50] "Statement from National Security Advisor Jake Sullivan on Russia's Veto of the UN Security Council Resolution on the Outer Space Treaty," The White House, April 24, 2024, https://www.whitehouse.gov/briefing-room/statements-releases/2024/04/24/statement-from-national-security-advisor-jake-sullivan-on-russias-veto-of-the-un-security-council-resolution-on-the-outer-space-treaty/

[51] Theresa Hitchens, "New Details Emerge of Russia's Potential Nuclear Space Weapon," Breaking Defense, May 3, 2024, https://breakingdefense.com/2024/05/new-details-emerge-of-russias-potential-nuclear-space-weapon/

[52] Guy Faulconbridge and Dmitry Antonov, "Russia responds icily to U.S. hint on arms control talks with Moscow and Beijing, Reuters, March 30, 2024, https://www.reuters.com/world/russia-says-strategic-talks-with-us-possible-only-part-broader-debate-2024-03-20/#:~:text=MOSCOW%2C%20March%2020%20(Reuters),made%20such%20objects%20legitimate%20targets.

[53] Ibid.

course of action to counter the threat. Likewise, timely intelligence assessments of the weapon's technical features as well as the political and military implications of its deployment or use will continue to inform policy deliberations and contingency planning.

Public disclosure of the intelligence information, however, could increase the risk of endangering intelligence sources and methods. Regardless of the actual source(s) of the information, its release could jeopardize fragile or perishable intelligence sources and methods as well as complicate or eliminate future collection opportunities. Consequently, downgrading and sharing intelligence on the threat for diplomacy and strategic communications must carefully consider the risk of intelligence gain/loss.

The military implications of Russia's development and potential launch of a space-based, nuclear-armed ASAT are manifold. The weapon underscores long-standing concerns expressed by U.S. civilian and military leaders about foreign ASAT and counterspace capabilities as well as the need to field timely and effective countermeasures. Russian and Chinese destructive tests of direct-ascent, kinetic energy ASAT weapons as well as Beijing's test of an HGV fractional orbital bombardment system (FOBS) heretofore have garnered the most attention. According to the U.S. government, however, foreign space warfare capabilities also include cyber, electronic warfare, directed energy, and orbital weapons.[54] The threat such weapons pose to American, international, and commercial space systems is fast paced, full spectrum, all altitude, and cross domain. **Denial or loss of the services that space assets provide would adversely impact the operational security and protection of U.S. diplomats, intelligence officers, and military forces. It would also have a deleterious impact on the functioning of critical infrastructures, emergency services, and economic activities which directly impact the lives of hundreds of millions of Americans.**

The U.S. government is taking steps to address growing counterspace threats from Russia, China, Iran, and North Korea. This effort mainly emphasizes developing international norms of responsible space operating behavior and enhancing space mission assurance primarily through passive measures to increase the resilience of satellite constellations and individual spacecraft. Norms may help to draw clear distinctions between proper, non-aggressive behavior and improper, aggressive behavior. They may contribute to reducing mishaps, misperceptions, and misunderstandings arising from provocative or ambiguous behaviors on-orbit.

History demonstrates, however, that nations tend to honor norms when least needed (in peacetime) and disregard them when most necessary (in crisis and conflict). Norms reflect rather than create states' interests in avoiding conflict. When those interests no longer coincide, compliance with norms cannot be assumed. Consequently, relying on an adversary's good faith, appeals to their good behavior, or their concern about being "named and shamed" for U.S. security is insufficient and unwise. This is especially the case when dealing with autocrats such as Putin.

Although disaggregation of large, multi-mission spacecraft at geosynchronous Earth orbit was initially favored by the Department of Defense to improve the resilience of its space posture, deploying proliferated constellations of smaller, single-mission satellites at LEO is currently the focus of new investments. However, as noted, detonation of a nuclear ASAT would either

[54] Challenges to Security in Space., pp., 17-18, 31-32.

destroy or degrade the spacecraft in that orbital regime. In fact, a nuclear ASAT is a predictable countermeasure to proliferated LEO (PLEO) space architectures, along with kinetic ASAT weapons to create exploitable gaps in a satellite constellation and cyber attacks. Defense planners must think ahead to be prepared for the inevitable measure-countermeasure dynamic of space warfare. Consequently, **America's growing reliance on PLEO architectures for mission assurance and resilience must be reconsidered along with decisions regarding the nuclear hardening of critical space systems such as those performing strategic indications and warning, missile warning, tracking, and defense, as well as nuclear command, control, and communications.**

Moreover, the nuclear ASAT demonstrates that there are some space weapon systems that cannot be countered exclusively with passive defense measures. **The United States must also consider active defenses to suppress and destroy such threats. In fact, it would be prudent for America to field a dynamic, layered, defense-in-depth with a mix of passive and active countermeasures (as it has done for every other operating environment that became a warfighting domain) to protect and defend U.S. interests in space.**

Finally, this development raises serious questions about U.S. and allied response options. Given the stakes, how should the United States confront or penalize Moscow? Should the U.S. rely on "naming and shaming" Moscow or impose additional sanctions against Moscow once such a system is launched? Should the U.S. take proactive steps to delay or hinder the launch and/or on-orbit operation of a nuclear ASAT weapon system? Does the U.S. possess capabilities either to prevent the launch of such a system or disable or destroy the weapon once it is deployed on-orbit? Under what legal authorities would such defensive operations be taken? Would such actions have the support of the Congress as well as our friends and allies?

Options

Putin and his generals clearly understand how vital space systems are to modern warfare and especially how government and commercial space systems are contributing to Ukraine's self-defense. Hence, they may not be easily dissuaded from deploying a nuclear-armed ASAT weapon on-orbit or deterred from detonating it in a crisis or conflict**. If Russia proceeds with its nuclear ASAT program and preparations to deploy the weapon in space, America, its allies, and partners will face profound decisions on how to respond – decisions that will set important precedents. How they choose to respond will set the tone for the intensifying geostrategic and associated astropolitical competition.** What options exist for countering the threat beyond briefing members of Congress and allies and engaging with Russia government officials?

In fact, **the United States has multiple options available to develop a responsible course of action for addressing this serious threat. The following options are not mutually exclusive and should be pursued in combination.**

Diplomacy (whether private, backchannel, bilateral, multilateral, or public) should be used to rally allies, partners, and other members of the international community in support of U.S.-led efforts to generate private and public pressure from a broad group of nations and non-governmental entities to convince Putin to reconsider the space-based nuclear ASAT program as well as cancel the impending launch. Beyond reminding foreign leaders that Russia is a party to the Outer Space Treaty, which prohibits the stationing of

weapons of mass destruction in space, the U.S. government must explain how the Russian ASAT threatens their nations' political, economic, and national security interests as well.

Thus far, President Biden has emphasized diplomacy to address the challenge. After Director of National Intelligence Avril Haines briefed Members of Congress and National Security Advisor Jake Sullivan consulted them on the response options under consideration, the administration warned U.S. allies that Russia could launch the nuclear ASAT weapon this year.[55] In addition, Secretary of State Antony Blinken engaged China's and India's foreign ministers to request their leaders' help in persuading Putin not to deploy the weapon since Russia has demonstrated its disdain for the United States.[56] While both China and India have close relations with Russia and are major space faring nations with significant investments in space systems that would be at risk from a nuclear ASAT on-orbit, their willingness and ability to persuade Putin to abandon the weapon is uncertain.

In seeking China's assistance, based on the assumption of having common interests regarding space security and environmental sustainability in this instance, the Biden-Harris administration has also opened the door for Beijing to ask for quid pro quos in exchange for their help. China reestablished a bilateral, "no limits" partnership with Russia, continues to expand cooperation on political, technological and military matters, and is strengthening what President Xi Jinping and Putin term their "special relationship."[57] Moreover, Xi and Putin share an interest in altering the global status quo, undermining U.S. relationships and driving wedges among America, its allies, and partners as well as creating internal political divisions to rupture U.S. alliances in Europe and the Indo-Pacific.

Diplomacy typically involves the use of "carrots and sticks" in seeking to obtain a desired change in policy or behavior. Because the administration has demonstrated an affinity for international norms of responsible space operations behavior and expressed interest in additional space arms control measures, it may consider new proposals to restrain or prohibit military space capabilities or operations as an inducement. **U.S. policymakers should be wary of allowing Moscow to use its nuclear ASAT as a bargaining chip for unverifiable space arms control and providing an opening for Russia to capitalize on a treaty it was preparing to violate or abandon.** Indeed, **Putin is likely to use the proven tactic of denial and intransigence before accepting U.S. inducements not to deploy the weapon, pocketing concessions as rewards for bad behavior, and then move the goalposts to get America to up the ante.**

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[55] David E. Sanger "U.S. Warns Allies Russia Could Put a Nuclear Weapon Into Orbit This Year," The New York Times, February 21, 2024, https://www.nytimes.com/2024/02/21/world/europe/us-russia-nuclear-weapon-space.html#:~:text=American%20intelligence%20agencies%20have%20told,West%20guessing%20about%20its%20capabilities

[56] David E. Sanger and Julian Barnes, "U.S. Fears Russia Might Put a Nuclear Weapon in Space," The New York Times, February 17, 2024, https://www.nytimes.com/2024/02/17/us/politics/russia-nuclear-weapon-space.html

[57] "Joint Statement of the Russian Federation and the People's Republic of China on the International Relations Entering a New Era and the Global Sustainable Development," February 4, 2022, transl. https://www.airuniversity.af.edu/Portals/10/CASI/documents/Translations/2022-02-04%20China%20Russia%20joint%20statement%20International%20Relations%20Entering%20a%20New%20Era.Pdf

In this regard, the U.S. Deputy Permanent Representative to the Conference on Disarmament stated on March 28, 2024, that in addition to the U.S.-Japan resolution Russia vetoed at the UN Security Council,

> *The United States is also interested in engaging with States Parties to the Outer Space Treaty to explore ways to increase confidence in compliance with this Article IV obligation. The United States has already begun considering approaches to help ensure that countries cannot deploy nuclear weapons in orbit undetected, and we intend to engage with other States Parties as our ideas evolve.*[58]

Details regarding the U.S.-proposed confidence building measures have not been released. Likewise, the Biden-Harris administration has not publicly described what measures it is "exploring" to ensure Russia does not deploy nuclear weapons on-orbit undetected.

U.S. private or public diplomacy, of course, may fail to persuade Putin to change course. Putin and Shoigu, as noted, denied that Russia has developed or is planning to deploy a nuclear-armed ASAT in space and Russia used its veto at the UN Security Council to block the U.S.-Japan resolution. **Russia's history of violating the terms of various arms control treaties or abandoning such international agreements altogether also yields little hope that Putin can be convinced that the viability of the Outer Space Treaty outweighs what the former KGB operative likely sees as a vital Russian national security interest.**

Nonetheless, **agile U.S. diplomacy will remain essential to help avert, de-escalate, or manage the ensuing crisis should Russia proceed to deploy the nuclear-armed ASAT in space.** Private communications by the President which convey U.S. interests, the seriousness of the situation, the stakes involved, and his political resolve will contribute to deterrence and reassurance and thus may help to deescalate the crisis. In addition, **the U.S. should conduct a rigorous public diplomacy campaign to convince foreign governments and populations of the stakes and to stand firm alongside America as it seeks to pressure Putin to abandon his dangerous plan.** The U.S. government must seize the moral high ground with a strategic communications narrative which helps to justify the legitimacy of its positions and actions, shape domestic and international public opinion, and catalyze international condemnation of Russia's aggressive behavior.

Regarding potential "sticks," **additional sanctions beyond what the U.S. government has already imposed on Russia should be implemented.** Sanctions could be either unilateral or multilateral. Those imposed by multiple international actors, of course, can be more effective than unilateral American penalties. Diplomatic sanctions would entail political measures that convey displeasure with or disapproval of Russia's ASAT program. They involve using diplomatic and political means such as limiting, suspending, or canceling diplomatic interactions and withdrawing or expelling diplomatic personnel or official recognition. Such political sanctions would be less severe measures, however, than economic penalties.

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[58] U.S. Mission to International Organizations in Geneva, "Prevention of an Arms Race in Outer Space, Remarks to the Conference on Disarmament on Agenda Item 3: Prevention of an Arms Race in Outer Space," Delivered by U.S. Deputy Permanent Representative Alison Storsve, March 28, 2024, https://geneva.usmission.gov/2024/03/28/prevention-of-an-arms-race-in-outer-space/

Economic sanctions which involve imposing financial and commercial penalties to further restrict Russia's ability to conduct commerce and trade are another option. Debilitating sanctions could be imposed, for example, on various Russian leaders, individuals, and companies involved in the nuclear ASAT program or the broader Russian defense industrial base. Restrictions on financial transactions, enactment of tariffs or other trade barriers, and embargoes are all forms of economic sanctions. Embargoes are legal barriers to trade that are the most severe form of economic sanction. They would entail constraining or prohibiting imports or exports, imposing special taxes on goods or services, restricting access to specific technologies and products, and freezing or seizing financial or other assets.

Given the scope of the threat posed by a space-based nuclear ASAT, other nations may be willing to enact such economic penalties if Russia deploys the weapon on-orbit. Nonetheless, as evidenced in the cases of Iran, North Korea, China, and Russia, there likely will be other nations willing to help Moscow evade sanctions regardless of its behavior. Moreover, the limited sanctions and other economic measures imposed to date by the United States and other governments on various Russian individuals and entities as a result of its invasion of Ukraine have not succeeded in causing Putin to withdraw Russian forces. Imposition of far more stringent sanctions and other economic warfare measures are clearly warranted, but in the near-term probably are unlikely to alter Putin's behavior and may prompt further provocations.

If the extent of the U.S. response is to "name and shame," create international opprobrium, impose only modest additional economic sanctions, and seek to further isolate Russia, it likely would be viewed as a sign of weakness by Putin and not achieve the desired result. Consequently, additional response options warrant serious consideration by the President and his senior advisors.

The first involves the **development of contingency plans and preparations to counter the threat posed by Russia's nuclear ASAT**. This should include Presidential direction to the Secretary of Defense and the Director of National Intelligence to **implement passive defenses, including alternatives to PLEO architectures (such as distribution and diversification of assets and alternative orbits) and nuclear hardening or shielding of mission-critical (government and commercial) space assets which support U.S. national security.** It should also involve Presidential direction to the Secretary of Homeland Security to implement measures which **improve the resilience of U.S. critical infrastructures and assure the continued viability of national essential functions.**

Additionally, contingency planning should include **preparations to disable or destroy the Russian ASAT, thereby preventing it from detonating its nuclear payload.** In this regard, the President should direct the Secretary of Defense to develop plans for the employment of armed force to eliminate the threat to U.S. and international security posed by the Russian nuclear ASAT weapon. Such guidance should include direction to develop options for employing military capabilities to counter the threat as well as direction to make every effort to minimize the creation of long-lived space debris. **This option would in effect establish a *"Biden Doctrine"* that the United States will not allow the deployment of a nuclear weapon in outer space by acting to enforce a fundamental principle of the Outer Space Treaty and the international space legal regime.**

The President should also direct the Secretary of Defense to **plan, program, and budget for rapid development and fielding of a dynamic, layered, defense-in-depth to suppress and destroy any space-based threat to U.S. interests as a high national priority.** The guidance should include direction to evaluate the military utility, technical feasibility, and cost effectiveness of boost-phase defenses that would have the added benefit of being able to suppress and destroy nuclear or nonnuclear ballistic missiles, HGVs, and FOBS as well as prevent future attempts to deploy nuclear ASAT weapons on-orbit. The President thus could seize the opportunity presented by Russia's nuclear ASAT program to significantly enhance the U.S. strategic posture taking into account the rapid growth in the number and sophistication of Russian and Chinese strategic forces, undercut Russia's emphasis on nuclear weapons and dangerous approach to escalation control, strengthen the credibility of U.S. deterrence-by-denial, improve defense of the homeland and deployed forces, and reassure allies about America's commitment to their defense.

Furthermore, **the President should issue guidance to the Director of National Intelligence to work with the Director of the Central Intelligence Agency (CIA) to conduct a covert action program to disrupt and counter Russian efforts to develop, deploy, and operate a nuclear ASAT system.** Covert action involves activities to influence conditions abroad where the role of the U.S. government will not be apparent or publicly acknowledged. Presidents from both parties have used covert action to achieve critical U.S. national security objectives.[59] Such actions should not be taken lightly, however, and consideration must be given to important issues such as possible or likely Russian and other international reactions if the program is discovered, technical challenges, and more.

Pursuit of this option would require the President to sign a Memorandum of Notification containing a "Finding" that justifies establishment of a covert action program. A formal Presidential "Finding" is legally required for the CIA to begin detailed planning of a possible covert action to disrupt, degrade, or destroy the Russian nuclear ASAT weapon system.[60]

It may not be practicable for such a program to provide a credible option for the President's consideration within the short time frame associated with the potential launch or on-orbit operation of the Russian nuclear ASAT system. Indeed, the challenges associated with developing and implementing such a covert action program are significant. Nonetheless, covert action is a valuable tool for addressing this serious threat in that it does not require the United States to acknowledge its role in disrupting or degrading adversary space systems. **Were such an operation to prove successful, it could enhance deterrence, cause Putin to question the security and trustworthiness of the Russian military-industrial complex, and force Putin and other adversaries to reconsider their aggressive plans for deploying additional counterspace systems.**

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[59] See, for example, Gus Weiss, "Duping the Soviets: The Farewell Dossier," Center for the Study of Intelligence, 1996-2 https://www.cia.gov/resources/csi/studies-in-intelligence/1996-2/the-farewell-dossier/

[60] See Section 503, "Presidential Approval and Reporting of Covert Actions," and Section 504, "Funding of Intelligence Activities," of the of the National Security Act of 1947, as amended, regarding the requirement for such a "Finding," https://www.dni.gov/index.php/ic-legal-reference-book/national-security-act-of-1947

Approval of and funding for such a covert action program requires support from the Congress, which cannot be assumed. That being said, the support among Republican and Democratic members of the House Permanent Select Committee on Intelligence for encouraging all House members to be briefed on the intelligence regarding the Russian space-based nuclear ASAT system might suggest that bipartisan support for a U.S. covert action program to address the threat is feasible. Indeed, some in the policy community may prefer a covert U.S. campaign to delay, disrupt, or defeat the Russian nuclear ASAT as compared to overt U.S. military action because of concerns about the risk of escalation.

Conclusion

Time is of the essence in determining how the United States will respond to this grave provocation by Putin. As noted, public statements by administration officials indicate the Russian nuclear ASAT system will be launched this year.[61] As a practical matter, there may not be sufficient time for development of new capabilities to counter the Russian nuclear ASAT. Existing tools may not be capable of exploiting vulnerabilities in the design or operation of the Russian nuclear ASAT system. And technical details of the Russian system may not be available to enable the rapid acquisition and fielding of U.S. capabilities to defeat the weapon. Moreover, attempts to negate the nuclear ASAT could cause the weapon to detonate if it is salvage-fused.

In considering various options, the administration must factor in potential Russian responses to the courses of action available to the United States, its allies, and friends. Putin could view overt U.S. military action against an on-orbit Russian satellite as an act of war and use such an act as a pretext to take aggressive and direct action against American interests. Given this possibility, the United States must plan to enhance the readiness of U.S. military forces without provoking an overreaction by Russian military forces. Can U.S. actions be conducted in such a way as to deter or prevent Russian escalation? Does the U.S. government know enough about what deters Putin to pursue the various courses of action?

It is important to note that Russia and its friends have many capabilities at their disposal to inflict serious harm on the U.S. interests and the American homeland. These range from debilitating cyber-attacks on U.S. critical infrastructures to sabotage of key facilities — many of which can be conducted using "cutouts" and proxies to make attribution difficult — to direct attacks using military systems such as long-range cruise missiles. **Russia, its partners, and proxies could strike U.S. military personnel and facilities overseas. They also could launch near-simultaneous attacks on U.S. allies and friends in various regions thereby opening up a multi-front war at a time when U.S. munition stocks are significantly depleted and domestic politics are about to go into overdrive with a presidential election just months away.**

Is the United States ready to deter or defeat such attacks? Perhaps Putin, Xi, Khamenei, and Kim are probing for further evidence of the United States' willingness and ability to respond. The President must weigh the risks of both action and inaction. He must decide whether Russia's impending launch of a space-based nuclear-armed ASAT is a clear and present danger that warrants a major U.S. response, including the use of military force or covert action. If he does, then the question will be how much time and political capital is he willing to devote to this

[61] Sanger and Barnes, "U.S. Warns Allies Russia Could Put a Nuclear Weapon Into Orbit This Year."

effort in the midst of a highly contested political campaign? Conversely, if the President decides to rely solely on diplomacy, then he must determine how to protect and defend such U.S. interests (as well as his legacy) from the threat posed by a nuclear weapon orbiting Earth which could be detonated at any time without warning and explain his perspective to the American people, Congress, allies, and partners.

Regardless of the response option(s) selected, America's leaders must do more to inform Congress and the American people about U.S. vital national interests in space. Moreover, they must ensure the nation is prepared to deter or defeat the threat or use of armed force in space. Simply put, an adversary's detonation of an orbital nuclear ASAT or a campaign with non-nuclear counterspace weapons would be catastrophic for U.S. and international security as well as for the global economy. Leaders must seize the moment, devote the time and resources to educate legislators and citizens alike about America's growing reliance on space, and take all necessary measures to ensure that national essential functions will continue even in the aftermath of attacks on critical space systems.

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