Centre for International
Governance Innovation

Policy Brief No. 203 — April 2025

Geneva, We Have a Problem: Space Diplomacy Goes Nuclear

Jessica West

Key Points

- Renewed fears of nuclear threats in space are closely tied to escalating military competition and an arms race driven by decades of diplomatic failures.
- Good defence requires good governance: the only long-term path to stability is through a common security regime that includes more robust arms control and conflict prevention measures.
- Concerns about compliance undermine existing arms restrictions and obstruct the creation of new ones. Upcoming governance discussions on both legal prohibitions and norms of responsible behaviour must be coordinated to build confidence in implementing agreements, regardless of whether formal verification methods are in place.
- To build confidence, priorities should include implementing measures for communication and observability; establishing norms of behaviour to enhance space situational awareness (SSA) and support safe rendezvous and proximity operations (RPOs), which are crucial for national technical verification; and developing new institutional mechanisms to implement commitments and address future compliance issues.

Introduction

Prompted by leaked US intelligence suggesting Russia may be developing nuclear weapons for use in orbit, outer space security became a key topic at the UN Security Council for the first time in April and May 2024. This focus marks a turning point in the governance of space peace and security, regardless of whether the fears are justified.

Diplomatic efforts toward prevention of an arms race in space (PAROS) have stalled in the UN General Assembly First Committee on International Disarmament and Security, and its negotiating body, the Conference on Disarmament, for more than 40 years. The deadlock stems from a divide between advocates of a legal ban on space weapons and those favouring a focus on strengthening existing law through transparency measures and agreed norms of behaviour

As diplomacy falters, threats are rising. An assessment from the Secure World Foundation shows that more countries are developing technologies to harm or disrupt space systems (Weeden and Samson 2024). The status quo on PAROS is untenable. Nuclear concerns could escalate the arms race and undermine the framework of the Outer Space Treaty (OST).

The Security Council's recent focus on space security highlights the inadequacies of current governance. The international community must reaffirm the consensus

About the Author

Jessica West is a CIGI senior fellow and a senior researcher at Project Ploughshares, a Canadian peace and security research institute, where she focuses on technology, security and governance in outer space. She has held this position since 2015 and previously worked there on space security and nuclear disarmament issues as a project officer (2006–2009).

As part of her work at Project Ploughshares, Jessica served for seven years as the program manager of the international research consortia responsible for the Space Security Index project, and as managing editor for the 2007–2009 and 2016–2019 publications. She interacts regularly with key UN bodies tasked with space security and sustainability issues, including the UN Committee on the Peaceful Uses of Outer Space, the Conference on Disarmament, the UN First Committee on Disarmament and International Security, and the United Nations Institute for Disarmament Research.

Jessica is also a research fellow at the Kindred Credit Union Centre for Peace Advancement at Conrad Grebel University College at the University of Waterloo, a member of the North American and Arctic Defense Research Network, a member of the Canadian Pugwash Group and an affiliate with the Open Lunar Foundation.

that nuclear weapons have no place in space and address the broader issues of space security. Strengthening confidence in space activities and compliance with agreements is a crucial next step.

Return of the Nuclear Threat in Space

Rumours emerged in February 2024 of "new intelligence" suggesting that Russia is developing a "space-based nuclear weapon" capable of "killing" American and allied satellites (Barnes et al. 2024). Initially, experts speculated this capability referred to nuclear power for non-kinetic counterspace tools such as microwave jammers (Hitchens 2024a). However, US officials later clarified their belief that Russia is developing a weapon to destroy large numbers of satellites with a nuclear blast in orbit (Plumb 2024).

The threat of detonating nuclear weapons in space is not new. All nuclear-armed states have the ability to launch such weapons into orbit, a capability tested by both the United States and the Soviet Union during the early space age (Krepon 2011). These tests showed that nuclear weapons could do more than destroy satellites: they could devastate space itself.

The 1962 Starfish Prime test by the US military exemplified this. A thermonuclear warhead detonated 400 kilometres above the Pacific Ocean, at the altitude where the International Space Station orbits today, created a blast 100 times more powerful than the first atomic bomb dropped on Hiroshima in 1945. The effects were both visually "breathtaking" and immensely destructive (King 2012). The resulting electromagnetic pulse disabled eight of 24 operational satellites and worsened the Van Allen radiation belts (Moltz 2008, 67, 119). The blast also disrupted radio and telecommunications as far away as Australia (Hoerlin 1976, 20).

Today, with more than 11,000 active satellites in orbit[1] — more than 7,000 in low-Earth orbit — and a growing human presence in space, a similar blast would be catastrophic. Immediate destruction would be compounded by space

1 See https://orbit.ing-now.com/.

debris and radiation, jeopardizing satellite operations and long-term space sustainability (Hadley 2024a). Such an event could cripple essential infrastructure, endanger astronauts, risk nuclear war on Earth and violate the OST.

Given these dangers, why would any state consider using nuclear weapons in space? It remains uncertain whether Russia has such intentions. The United States has pointed to a single satellite in an obscure orbit as evidence, suggesting Russia is researching radiation effects (Stewart, Swope and Hamre 2024); subsequent information released indicates that it carries a "dummy warhead" (Hennigan 2024). Russia has denied these claims as "baseless" (Nebenzia 2024). Despite having fewer satellites than the United States and China, Russia maintains national ambitions in space, as analyst Dmitry Stefanovich (2024) has noted.

This issue cannot be viewed in isolation. Potential nuclear threats in space are closely tied to escalating military competition and an arms race driven by decades of diplomatic failures.

An Escalating Arms Race in Space

The severe impact of nuclear weapons testing in space led to a ban under the 1963 Partial Test Ban Treaty, which was extended to the placement or orbiting of such weapons in space by article IV of the OST. This ban remains the only significant arms restriction in space to date.

Despite these prohibitions, nuclear weapons have persisted as a threat. During the Cold War, Russia operated a fractional orbital bombardment system (FOBS) for surprise nuclear attacks from orbit (Eisel 2005). A 2021 demonstration suggests China is developing a similar capability with hypersonic speed (Gupta 2023). These systems have been interpreted as technically complying with the OST, since the weapons would not be "stationed" or complete a full "orbit" in space (Listner 2022; Siddiqi 2000). This interpretation reflects a broader political unwillingness to impose robust restrictions in space.

This reluctance is fuelling an escalating arms race and increasing global insecurity, with nuclear accusations being the latest issue. Kinetic anti-satellite missile tests have created hazardous debris in orbit (Weeden and Kunasek 2025), while non-kinetic interference using electronic, cyber and directed energy capabilities is becoming more common. Spoofing of civilian Global Positioning System signals, for instance, poses ongoing risks to airlines (Plucinska, Insinna and Pearson 2024).

Despite the long taboo on putting *any* weapons in space, accusations of this activity are becoming more frequent. US Ambassador Robert Wood has described the Russian satellite Cosmos 2576 as "likely a counterspace weapon" (Wood 2024). Russia confirmed a military payload without revealing the satellite's function, denying that it was a weapon (Faulconbridge 2024). Similarly, in 2020, the United States accused Russia of conducting a space-based anti-satellite test, which Russia claimed was merely a small vehicle inspecting another satellite (Burns 2020). The United States has also highlighted China's advanced space capabilities as evidence of potential future space-based weapons (Office of the Director of National Intelligence 2024, 11).

China, in turn, has accused the US military's Mission Extension Vehicle, used to service satellites, of being a weapon (West 2023, 16). Russia has similarly claimed that Western states are developing space weapons (Nebenzia 2024).

These claims are difficult to verify, leading to growing mistrust and encouraging states to develop their own counterspace capabilities.

This activity creates a significant defence challenge in space. Modern militaries rely heavily on vulnerable space systems. Concerns extend beyond major space powers; Canada's Senate is holding its first hearings on space defence.[2]

Defensive measures are fuelling the arms race. The United States aims for "combat readiness" in space by 2027, including the ability to engage in offensive "space fires" (U.S. Space Command 2024; Hadley 2024b). The European Defence Fund plans to deploy stealth satellites with laser capabilities to counter threats (Hitchens 2024b). The suspected nuclear threat aims to overcome the resilience

2 See House of Commons, Standing Committee on National Defence, "Space Defence," *Minutes of Proceedings and Evidence*, 44th Parl, 1st sess (22 November 2021–6 January 2025), online: <www.ourcommons.ca/Committees/en/NDDN/StudyActivity?studyActivityId=12625994>.

of distributed space systems such as SpaceX's Starlink, which has resisted interference during the war in Ukraine (Stewart, Swope and Hamre 2024). However, a nuclear threat would alter this balance.

Good Defence Requires Good Governance

History shows that arming ourselves is not a solution to nuclear threats. Some experts suggest focusing on defence and survivability of space systems (Vincent 2022), but resilience has its limits. Although the United States is exploring ways to clean space of radiation after a nuclear blast, this approach has environmental risks and would not prevent the immediate and near-term destruction of satellites. Future satellites might be hardened against such effects, but many unprotected ones — and people in orbit — would still be at risk. Moreover, there are numerous other ways to interfere with the ability to use outer space and space systems that remain legal. The only path to long-term stability is through a common security regime rooted in good governance.

However, the PAROS mandate has been on the UN agenda since 1981, with little progress. Fundamental disagreements persist over whether to ban weapons in space or focus on anti-satellite weapons, control technology or regulate behaviours, create new legal agreements or enhance existing ones with norms and voluntary commitments (West and Azcárate Ortega 2022). Much of the inertia is political (Meyer 2020).

The issue's escalation to the UN Security Council has intensified this diplomatic deadlock. A draft resolution[3] between the United States and Japan, backed by 65 co-sponsors, reinforced treaty obligations and called on states to reaffirm the ban on weapons of mass destruction in orbit. Russia vetoed it, labelling it a "dirty ploy" (United Nations 2024a). Russia then introduced a counter-resolution to ban all weapons in space, reflecting its long-standing proposal with China on the Prevention of the Placement of Weapons in Outer Space,[4] but it also failed (United Nations 2024b). This standoff continued at the UN General Assembly's First Committee on International Disarmament and Security in the fall of 2024.[5]

Opportunities to break the stalemate in space security governance are on the horizon. A new Open-Ended Working Group (OEWG) on PAROS "in all its aspects" — one that combines the focus on norms of responsible behaviour with legal measures to prohibit weapons and force in space — begins in April 2025. It is crucial that these efforts are not overshadowed by current nuclear concerns. Instead, this moment should be used to prioritize developing robust mechanisms for implementing space governance agreements both old and new.

Moving Forward: "C" Is for Confidence

Renewed fears about nuclear weapons in space stem from concerns about compliance with existing agreements, which also hinder the formation of new ones. A key technical challenge lies in defining and identifying weapons, especially since much space technology is dual-purpose, meaning it can serve both peaceful and harmful uses (Azcárate Ortega 2023). Politically, there is long-standing resistance to allowing prelaunch or orbital inspections (Paine 2018).

3 *Albania, Antigua and Barbuda, Argentina, Australia, Bahamas, Bangladesh, Belgium, Bosnia and Herzegovina, Bulgaria, Cabo Verde, Canada, Colombia, Costa Rica, Croatia, Cyprus, Czechia, Denmark, Djibouti, Estonia, Finland, France, Georgia, Germany, Greece, Honduras, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kenya, Latvia, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Marshall Islands, Micronesia (Federated States of), Montenegro, Netherlands (Kingdom of the), New Zealand, North Macedonia, Norway, Palau, Panama, Paraguay, Poland, Portugal, Republic of Korea, Republic of Moldova, Romania, San Marino, Singapore, Slovakia, Slovenia, Spain, Sweden, Timor-Leste, Türkiye, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland and United States of America: draft resolution*, UNSCOR, UN Doc S/2024/302 (2024), online: <https://digitallibrary.un.org/record/4045253?ln=en&v=pdf#files>.

4 *Belarus, China, Democratic People's Republic of Korea, Nicaragua, Russian Federation and Syrian Arab Republic: draft resolution*, UNSCOR, UN Doc S/2024/383 (2024), online: <ttps://digitallibrary.un.org/record/4048622?ln=en&v=pdf#files>.

5 On this occasion, a US-led resolution calling on states to reaffirm and comply with the ban on nuclear and other weapons of mass destruction in space — and, in addition, to commit not to develop any such weapons intended for orbit — was adopted with 167 votes; see *Weapons of mass destruction in outer space*, UNGAOR, 79th Sess, Agenda Item 96, UN Doc A/C.1/79/L.7/Rev.1 (2024), online: <https://documents.un.org/doc/undoc/ltd/n24/322/24/pdf/n2432224.pdf>. However, this resolution was protested by Russia, China and seven other states, which called for all weapons and all armed confrontation to be barred from space (Arab Republic of Egypt et al. 2024).

States have traditionally relied on their own national technical means to verify the nature of objects in space. Historical analysis suggests a belief that hiding a nuclear bomb in orbit would be difficult and that such a bomb would not disrupt strategic balance (ibid.). However, the escalation of nuclear concerns to the UN Security Council highlights the limitations of this approach. And the increasing number of national satellites performing "inspection" functions has become part of the escalating arms race in space, risking confrontations as states try to avoid or prevent close approaches (Roblin 2023).

The emphasis on technical verification reflects a desire for certainty, but certainty is elusive. For capabilities that can cause widespread harm, verification after the fact is too late. This is why the US-Japan Security Council resolution added an extra commitment not to develop nuclear weapons for space use. However, this promise is also difficult to verify. Instead of seeking certainty, the focus should be on building confidence.

The building of confidence involves using a broader diplomatic tool kit, including processes, tools and institutions that support the implementation and compliance of agreements (Moodie and Sands 2001). While technical verification is part of this, confidence requires multiple layers of cooperative measures, including active demonstrations of compliance (Lentzos 2019). See Table 1 for approaches to compliance that have been identified in arms control agreements and described by the author and Gilles Doucet (2022).

Confidence can, in part, be bolstered by the growing availability of SSA data, which tracks objects in orbit. Basic data is publicly accessible through the US government's portal for space data, space-track.org, while commercial providers offer more precise information. Although detailed inspection and characterization of orbital objects are mostly handled by advanced military programs,

Table 1: Approaches to Compliance Identified in Arms Control Agreements

Approach	Measures
Transparency and confidence-building measures	Communications measures (diplomatic channels, hotlines), notifications, reporting, information sharing and exchange, joint research, joint operations, declarations, disclosure (capabilities, activities, location, and so forth)
Cooperative measures for verification	Non-concealment (of hardware or purposes), allowing inspections, non-interference, observable design differences, notifications
External verification measures	Scheduled inspections, general observation, international monitoring systems, surveillance, national technical means, detection, monitoring
Addressing of compliance concerns	Consultations, clarifications, challenge inspections (little or no prior notice), resolve ambiguities or different interpretations, complaint procedures, meeting of states parties
Dispute resolution	Dispute settlement mechanism, consultations, International Court of Justice
Addressing of violations	Investigations, fact-finding missions
Enforcement	UN Security Council, sanctions, liability

Source: Adapted from West and Doucet (2022, Figure 12).

emerging commercial capabilities are expanding in-orbit services. Standardizing and improving access to SSA information was a key focus of the 2022–2023 OEWG on reducing space threats through norms, rules and principles of responsible behaviours.

But data points alone are insufficient for confidence. Also needed are measures to nurture mutual trust in the integrity of orbital activities and capabilities and to demonstrate commitment and adherence to governance agreements.

Recommendations

As new security governance processes begin in 2025, the following recommendations aim to build confidence in both existing frameworks and new agreements. It is essential that efforts to develop legal arms restrictions and norms of behaviour be coordinated and mutually reinforcing.

Emphasize Communication and Observability

Transparency measures are crucial for nurturing confidence in compliance because they involve "concrete actions that express a political commitment" that can be observed and assessed.[6] At its core, transparency combines communication with observability to provide reassurance about activities, capabilities and their usage.

Effective communication can include prior notifications, points of contact, robust registration, information exchanges and national reporting, as outlined in the 2013 Group of Governmental Experts' report on transparency and confidence-building measures in outer space activities.[7] Implementing these practices should be a priority.

Observability is essential for confidence, as it allows others to verify communicated information and monitor adherence to commitments. To enhance observability, especially for dual-purpose technology, the following measures are recommended (West and Doucet 2022):

- Differentiate technical capabilities by separating technology applications, distinguishing military from civilian uses and pursuing observable design differences for specific applications.
- Establish practices for permitted activities, such as declaring permitted activities, issuing pre-activity notifications, disclosing activities and capabilities, and consulting with other space nations.

Integrate Norms into Arms Control Confidence

Norms of behaviour are vital to both current and future arms control agreements. Norms help distinguish helpful from harmful and threatening from non-threatening activities. Observable behaviours can clarify security concerns and contribute to establishing predictable patterns of behaviour among space actors (Borghard and Lonergan 2018). This predictability provides context for interpreting technical verification methods and SSA data.

There should be a specific focus on developing norms for RPOs, which are crucial for on-orbit surveillance and inspections. While renewed nuclear fears in space highlight the underlying need for formal inspections of space objects — both prelaunch and on-orbit — in the short term, creating rules for safer and more predictable RPOs can help build confidence about the nature of orbital objects and reduce the risks associated with uncoordinated close approaches.

Develop New Institutional Mechanisms

The recent escalation of nuclear diplomacy in space highlights the need for stronger institutional mechanisms to support space governance agreements.

Currently, there is a lack of dedicated diplomatic infrastructure for cooperative governance and arms control in space, which requires continuous dialogue, information exchange, data sharing, consultations and communication across political and operational levels. Additionally, there are no formal mechanisms

6 *Study on the application of confidence-building measures in outer space: Report by the Secretary-General,* UNGAOR, 48th Sess, UN Doc A/48/305 (1993) at para 95, online: <https://digitallibrary.un.org/record/175346>.

7 *Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities,* UNGAOR, 68th Sess, UN Doc A/68/189 (2013), online: <https://digitallibrary.un.org/record/755155>.

to address compliance concerns and disputes outside of the UN Security Council.

Without these institutional tools, commitments risk becoming unfulfilled promises. Strengthening institutional capacity is essential to ensure effective implementation and enforcement of space governance agreements.

Conclusion: Closing the Nuclear-Space Arms Control Gap

The UN Security Council has warned that the risk of nuclear weapons use is at an all-time high (United Nations 2023), and the unchecked arms race in outer space amplifies this danger.

The most urgent security threats in space come from the potential introduction of weapons and military conflict, worsened by inadequate governance. The elevation of PAROS diplomacy to the UN Security Council highlights the shortcomings of the current framework, which lacks mechanisms to ensure compliance and has failed to advance the decades-old goal of preventing an arms race in space.

These issues go beyond the fear of nuclear weapons in space. The growing conventional arms race in space also threatens future security and sustainability. Additionally, the increasing reliance on nuclear weapons for national security on Earth raises concerns that the long-standing nuclear taboo is weakening (Dill and Valentino 2022; Tannenwald 2018).

However, there is an opportunity for improvement. The OEWG on PAROS in all its aspects offers a chance to address governance flaws — if the combined approaches can work in concert. To succeed, we must not let current nuclear fears overshadow these efforts, but rather must use them as lessons.

Banning activities alone is not enough; effective governance requires tools that foster implementation and confidence in compliance. Practices that emphasize communication and observability can distinguish peaceful activities from potential threats, laying a foundation of trust. Norms can help standardize space activities, making outliers more visible. Strong institutional mechanisms are essential to turn these promises into reality.

Works Cited

Arab Republic of Egypt, Democratic People's Republic of Korea, People's Republic of China, Republic of Belarus, Republic of Cuba, Republic of Nicaragua, Republic of Zimbabwe, Russian Federation and Syrian Arab Republic. 2024. "Joint Statement on Space Security issues in the First Committee of the 79th session of the UN General Assembly." October 30. New York, NY: Reaching Critical Will. https://reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1com24/statements/30Oct_Group_Russia.pdf.

Azcárate Ortega, Almudena. 2023. "Not a Rose by Any Other Name: Dual-Use and Dual-Purpose Space Systems." *Lawfare*, June 5. www.lawfaremedia.org/article/not-a-rose-by-any-other-name-dual-use-and-dual-purpose-space-systems.

Barnes, Julian E., Karoun Demirjian, Eric Schmitt and David E. Sanger. 2024. "Russia's Advances on Space-Based Nuclear Weapon Draw U.S. Concerns." *The New York Times*, February 14. www.nytimes.com/2024/02/14/us/politics/intelligence-russia-nuclear.html.

Borghard, Erica D. and Shawn W. Lonergan. 2018. "Confidence Building Measures for the Cyber Domain." *Strategic Studies Quarterly* 12 (3): 10–49. www.jstor.org/stable/26481908.

Burns, Robert. 2020. "US accuses Russia of testing anti-satellite weapon in space." AP News, July 23. https://apnews.com/article/technology-moscow-politics-russia-united-states-091b05982eaffb5e7b876834025be811.

Dill, Janina and Benjamin A. Valentino. 2022. "Russia's invasion of Ukraine has eroded the nuclear taboo." Online ed. *The Economist*, June 14. www.economist.com/briefing/2022/06/14/russias-invasion-of-ukraine-has-eroded-the-nuclear-taboo.

Eisel, Braxton Brick. 2005. "The FOBS of War." *Air & Space Forces Magazine*, June 1. www.airandspaceforces.com/article/0605fobs/.

Faulconbridge, Guy. 2024. "Russia denies U.S. charge that it put anti-satellite weapon in space." Reuters, May 22. www.reuters.com/world/russia-dismisses-us-claim-that-moscow-put-an-anti-satellite-weapon-space-2024-05-22/.

Gupta, Ritwik. 2023. "Orbital hypersonic delivery systems threaten strategic stability." *Bulletin of the Atomic Scientists*, June 13. https://thebulletin.org/2023/06/orbital-hypersonic-delivery-systems-threaten-strategic-stability/.

Hadley, Greg. 2024a. "SDA Director: Launching a Nuclear Weapon in Space Would Be 'Attack on the World.'" *Air & Space Forces Magazine*, February 27. www.airandspaceforces.com/sda-director-satellites-russian-nuclear-weapon/.

———. 2024b. "Whiting Calls for 'Space Fires' in Rare Hint About Offensive Weapons." *Air & Space Forces Magazine*, August 8. www.airandspaceforces.com/spacecom-boss-space-fires/.

Hennigan, W. J. 2024. "The Warning." *The New York Times*, December 5. www.nytimes.com/interactive/2024/12/05/opinion/nuclear-weapons-space.html.

Hitchens, Theresa. 2024a. "From Russia with nukes? Sifting facts from speculation about space weapon threat." Breaking Defense, February 15. https://breakingdefense.com/2024/02/russia-nuclear-weapon-space-mike-turner-threat-white-house/.

———. 2024b. "European Defense Fund invests in 'Bodyguard' satellite development to 'counteract' orbital threats." Breaking Defense, May 30. https://breakingdefense.com/2024/05/european-defense-fund-invests-in-bodyguard-satellite-development-to-counteract-orbital-threats/.

Hoerlin, Herman. 1976. "United States High-Altitude Test Experiences: A Review Emphasizing the Impact on the Environment." Los Alamos, NM: Los Alamos Scientific Laboratory of the University of California. https://sgp.fas.org/othergov/doe/lanl/docs1/00322994.pdf.

King, Gilbert. 2012. "Going Nuclear Over the Pacific." *Smithsonian Magazine*, August 15. www.smithsonianmag.com/history/going-nuclear-over-the-pacific-24428997/.

Krepon, Michael. 2011. "How Not To Test in Space." *SpaceNews*, November 16. https://spacenews.com/how-not-test-space/.

Lentzos, Filippa. 2019. "Compliance and Enforcement in the Biological Weapons Regime." WMD Compliance & Enforcement Series Paper Four. Geneva, Switzerland: United Nations Institute for Disarmament Research. https://doi.org/10.37559/WMD/19/WMDCE4.

Listner, Michael. 2022. "FOBS, MOBS, and the reality of the Article IV nuclear weapons prohibition." *The Space Review*, October 17. www.thespacereview.com/article/4466/1.

Meyer, Paul. 2020. "Arms Control in Outer Space: Mission Impossible or Unrealized Potential?" Policy Perspective. October. Calgary, AB: Canadian Global Affairs Institute. www.cgai.ca/arms_control_in_outer_space_mission_impossible_or_unrealized_potential.

Moltz, James Clay. 2008. *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests*. Stanford, CA: Stanford Security Studies.

Moodie, Michael and Amy Sands. 2001. "Introduction." *The Nonproliferation Review* 8 (1): 1–9. https://doi.org/10.1080/10736700108436834.

Nebenzia, Vassily. 2024. "Remarks to the press by Permanent Representative Vassily Nebenzia with regard to the US-proposed draft resolution on nuclear weapons in outer space." April 11. New York, NY: Permanent Mission of the Russian Federation to the United Nations. https://russiaun.ru/en/news/stakeout_110424.

Office of the Director of National Intelligence. 2024. *Annual Threat Assessment of the U.S. Intelligence Community*. February 5. Washington, DC: Office of the Director of National Intelligence. www.dni.gov/files/ODNI/documents/assessments/ATA-2024-Unclassified-Report.pdf.

Paine, Taunton. 2018. "Bombs in orbit? Verification and violation under the Outer Space Treaty." *The Space Review*, March 19. www.thespacereview.com/article/3454/1.

Plucinska, Joanna, Valerie Insinna and James Pearson. 2024. "Aviation sector seeks urgent solutions for GPS interference." Reuters, January 24. www.reuters.com/business/aerospace-defense/aviation-sector-seeks-urgent-solutions-gps-interference-2024-01-24/.

Plumb, John F. 2024. "Statement of Dr. John F. Plumb, Assistant Secretary of Defense for Space Policy Before the House Armed Services Committee Subcommittee on Strategic Forces on Fiscal Year 2025 National Security Space Programs." May 1. Washington, DC: United States House of Representatives. https://docs.house.gov/meetings/AS/AS29/20240501/117236/HHRG-118-AS29-Wstate-PlumbJ-20240501.pdf.

Roblin, Sébastien. 2023. "With the Silent Barker Satellites, America Is Entering a New Space Arms Race." *Popular Mechanics*, September 5. www.popularmechanics.com/space/satellites/a44970695/silent-barker-satellite-new-space-race/.

Siddiqi, Asif A. 2000. "The Soviet *Fractional Orbiting Bombardment Systems (FOBS)*: A Short Technical History." *Quest: The History of Spaceflight Quarterly* 7 (4): 22–32. https://web.archive.org/web/20130401170310/https://faculty.fordham.edu/siddiqi/writings/p15_siddiqi_quest_2000-04_fobs.pdf.

Stefanovich, Dmitry (@KomissarWhipla). 2024. "First Deputy PM Manturov views of Russia's strategic goals in space." X, June 11, 1:41 a.m. https://x.com/KomissarWhipla/status/1800403058100486330.

Stewart, Mallory, Clayton Swope and John J. Hamre. 2024. "The Nuclear Option: Deciphering Russia's New Space Threat." May 3. Video, 43:18. Washington, DC: Center for Strategic & International Studies. www.csis.org/events/nuclear-option-deciphering-russias-new-space-threat.

Tannenwald, Nina. 2018. "The Great Unraveling: The Future of the Nuclear Normative Order." In *Meeting the Challenges of the New Nuclear Age: Emerging Risks and Declining Norms in the Age of Technological Innovation and Changing Nuclear Doctrines*, edited by Nina Tannenwald and James M. Acton, 6–31. Cambridge, MA: American Academy of Arts & Sciences. www.amacad.org/sites/default/files/publication/downloads/New-Nuclear-Age_Emerging-Risks.pdf#page=14.

United Nations. 2023. "Risk of Nuclear Weapons Use Higher Than at Any Time Since Cold War, Disarmament Affairs Chief Warns Security Council." United Nations Meetings Coverage and Press Releases. March 31. https://press.un.org/en/2023/sc15250.doc.htm.

———. 2024a. "Security Council Fails to Adopt First-Ever Resolution on Arms Race in Outer Space, Due to Negative Vote by Russian Federation." United Nations Meetings Coverage and Press Releases. April 24. https://press.un.org/en/2024/sc15678.doc.htm.

———. 2024b. "For Second Time Since Late April Security Council Fails to Adopt First-Ever Resolution on Preventing Arms Race in Outer Space." United Nations Meetings Coverage and Press Releases. May 20. https://press.un.org/en/2024/sc15700.doc.htm.

U.S. Space Command. 2024. "USSPACECOM releases updated Strategic Vision." News, February 21. www.spacecom.mil/Newsroom/News/Article-Display/Article/3683192/usspacecom-releases-updated-strategic-vision/.

Vincent, Robert "Tony." 2022. "Getting Serious About the Threat of High Altitude Nuclear Detonatons." War on the Rocks, September 23. https://warontherocks.com/2022/09/getting-serious-about-the-threat-of-high-altitude-nuclear-detonations/.

Weeden, Brian and Emily Kunasek. 2025. "History of Anti-Satellite Tests in Space." February 5. Secure World Foundation. https://docs.google.com/spreadsheets/d/1e5GtZEzdo6xk41i2_ei3c8jRZDjvP4Xwz3BVsUHwi48/edit?usp=embed_facebook.

Weeden, Brian and Victoria Samson, eds. 2024. *Global Counterspace Capabilities: An Open Source Assessment*. April. Broomfield, CO: Secure World Foundation. https://swfound.org/counterspace.

West, Jessica. 2023. *The Open-Ended Working Group on Reducing Space Threats: Recap of the Third Session January 30 to February 3, 2023*. June. Waterloo, ON: Project Ploughshares. www.ploughshares.ca/reports/the-open-ended-working-group-on-reducing-space-threats-recap-of-the-third-session.

West, Jessica and Almudena Azcárate Ortega. 2022. "Norms for Outer Space: A Small Step or a Giant Leap for Policymaking?" Space Dossier 7. Geneva, Switzerland: United Nations Institute for Disarmament Research. www.unidir.org/publication/space_dossier_7_norms_outer_space.

West, Jessica and Gilles Doucet. 2022. *A Security Regime for Outer Space: Lessons from Arms Control*. October. Waterloo, ON: Project Ploughshares. www.ploughshares.ca/reports/a-security-regime-for-outer-space-lessons-from-arms-control.

Wood, Robert. 2024. "Remarks Before the Vote on a Russia-Drafted UN Security Council Resolution on Outer Space Security." May 20. New York, NY: United States Mission to the United Nations. https://usun.usmission.gov/remarks-before-the-vote-on-a-russia-drafted-un-security-council-resolution-on-outer-space-security/.

About CIGI

The Centre for International Governance Innovation (CIGI) is an independent, non-partisan think tank whose peer-reviewed research and trusted analysis influence policy makers to innovate. Our global network of multidisciplinary researchers and strategic partnerships provide policy solutions for the digital era with one goal: to improve people's lives everywhere. Headquartered in Waterloo, Canada, CIGI has received support from the Government of Canada, the Government of Ontario and founder Jim Balsillie.

À propos du CIGI

Le Centre pour l'innovation dans la gouvernance internationale (CIGI) est un groupe de réflexion indépendant et non partisan dont les recherches évaluées par des pairs et les analyses fiables incitent les décideurs à innover. Grâce à son réseau mondial de chercheurs pluridisciplinaires et de partenariats stratégiques, le CIGI offre des solutions politiques adaptées à l'ère numérique dans le seul but d'améliorer la vie des gens du monde entier. Le CIGI, dont le siège se trouve à Waterloo, au Canada, bénéficie du soutien du gouvernement du Canada, du gouvernement de l'Ontario et de son fondateur, Jim Balsillie.

Credits

Managing Director and General Counsel Aaron Shull
Director, Program Management Dianna English
Program Manager Jenny Thiel
Publications Editor Lynn Schellenberg
Graphic Designer Sepideh Shomali

67 Erb Street West
Waterloo, ON, Canada N2L 6C2
www.cigionline.org

CIGI