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VIEWPOINT RESEARCH

Man, State, and War in Space: Neorealism and Russia's Counterbalancing Strategy Against the United States in Outer Space Security Politics

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ABSTRACT

This paper aspires to contribute to the limited field of neorealist scholarship on security affairs in outer space by conducting a case study of the Russian Federation's security policy in the celestial sphere. In recent years, Russia has emerged as one of the key players in the international politics of outer space. However, Russia's strategy of developing its space defense assets, while in parallel launching diplomatic initiatives in international organizations calling for the avoidance of an arms race in outer space, is ambiguous. I argue that the neorealist paradigm elucidates this case by highlighting the intensifying balancing trajectories of contemporary outer space security affairs. In a first step, hypotheses on states' behavior in the field of outer space armament and arms control are derived from the body of neorealist scholarship on terrestrial international politics. This is followed by hypothesis testing against the case of Russia's space security politics. It is contended that Russia is engaging in a predominantly competitive endeavor vis-à-vis the United States by utilizing a hybrid approach of internal and external balancing, as well as a pragmatic instrumentalization of international institutions to leverage its own economically disadvantaged position in outer space.

Introduction

In recent years, debates about the potential weaponization of outer space have been re-invigorated, despite previously believed to be irrevocably averted with the formal termination of the Strategic Defense Initiative (SDI), known as "Star Wars", in 1993. In U.S. political discourse, this development is reflected by the influx of references to the "three Cs" denominating the congested, competitive, and contested nature of contemporary outer space.[1] This trend is manifested in form of a sharp increase in state and non-state actors in space

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[1]Roger G. Harrison, "Unpacking the Three C's: Congested, Competitive, and Contested Space," *Astropolitics* 11, no. 3 (2013): 123–31.

and a heightened number of satellite launches into orbit,[2] as well as an international surge in the establishment of national military space forces.[3]

While the space program of the Russian Federation has so far not resumed to the size comparable to the former Soviet Union, there is a trend of expansion of the Russian space sector, not least due to international cooperation and financial injections from the West.[4] Analogous to the general trajectories of Russian security policy and military expenditure under Putin,[5] space budgets in Russia have increased after 2000, concurring with the general return to a political assessment of outer space as a strategic military region and a theatre for accumulating global prestige.[6] However, at first glance, Russia's approach to outer space security is ambiguous. On one hand, Russia has continuously advanced resolutions on multilateral diplomatic platforms, such as the United Nations General Assembly (UNGA) and the Conference on Disarmament (CD), on the prevention of an arms race in outer space.[7] On the other hand, Russian official discourse has increasingly emphasized the necessity of accumulating and modernizing military space capabilities. In March 2018, Russian Defense Minister Shoigu called for the maintenance and modernization of Russia's satellite reconnaissance assets given their indispensable function to the armed forces[8] Likewise, President Putin in December 2019, during a meeting with the Ministry of Defense, justified the intensified development of Russia's orbital military and dual-use systems against the backdrop of U.S. efforts to militarize outer space.[9]

While the incongruence of these strategies at first glance appears equivocal, this paper argues for the coherence of this hybrid approach through the paradigm of structural realism.[10] The study of outer space constitutes a peculiar case in international relations (IR) as it largely does not form as a distinctive topic in the definitive theoretical works of the discipline. Whereas more recent scholarship has sought to interlink the study of outer space with

[2]Giorgio Petroni and Davide Gianluca Bianchi, "New Patterns of Space Policy in the Post-Cold War World," *Space Policy* 37 (2016): 15.
[3]Pawel Bernat, "The Inevitability of Militarization of Outer Space," *Safety & Defense* 5, no. 1 (2019): 50.
[4]Nicole J. Jackson, "Russia's Space Security Policy," in *Handbook of Space Security: Policies, Applications and Programs*, ed. K-U Schrogl (Cham: Springer International Publishing; Imprint; Springer, 2020), 390; and Victor Mizin, "New Russia in Space: More Than a 'Celestial Travel Agency'?" *Astropolitics* 1, no. 3 (2003): 82.
[5]Mark Galeotti, *The Politics of Security in Modern Russia* (London: Taylor and Francis, 2016), 4.
[6]Jana Robinson, "Space Security Policies and Strategies of States: An Introduction," in *Handbook of Space Security: Policies, Applications and Programs*, ed. K-U Schrogl (Cham: Springer International Publishing; Imprint; Springer, 2020), 361.
[7]See for example United Nations, "Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT)", Conference on Disarmament, February 12, 2008; The Ministry of Foreign Affairs of the People's Republic of China, "Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (Draft)", June 16, 2014.; United Nations General Assembly, Resolution 69/32: No first placement of weapons in outer space (2014). Available at: https://undocs.org/en/A/RES/69/32 (accessed April 3, 2021).
[8]Ivan Petrov, "Šojgu: Podderžka iz kosmosa sdelaet armiju maksimal'no èffektivnoj," *Rossijskaja gazeta* March 6, 2018.
[9]Ajsel Gerejhanova, "Zvezdnye vojny," *Rossijskaja gazeta*, December 4, 2019.
[10]The terms structural realism and neorealism in this article are used interchangeably.

varying theoretical concepts of IR,[11] the small body of literature on Russian space policy is predominantly characterized by eclectic or atheoretical modes of analysis.

This paper adheres to Mearsheimer's and Walt's[12] dictum about the essentiality of theory in the discipline of IR. These authors highlight the value of theoretically sound analyses, especially for cases that are characterized by inherent novelty or limited historical precedent, which resonates with the case of outer space.[13] Therefore, this article attempts to conduct a theoretically grounded structural realist analysis of Russian space security policy. It seeks to answer the questions of which underlying factors incentivize Russia's dual-path security policy in outer space, and how the state's space security policy adapted to the changing power dynamics in the Post-Cold War era. The analysis mainly concerns the period from 2008 to 2021 as before this phase the Russian space program was undergoing reconsolidation. The academic value of this lies in its contribution to the limited field of neorealist research on outer space by providing a potential avenue for its application on the concrete Russian case, while analogously evaluating the theory's explanatory power.

This paper is structured into two sections. In the first section, I critically engage with the challenge of applying structural realist theory in the study of IR in outer space. Based on the chapter's analysis of key focal points of interest for realist research of space, I derive four hypotheses based on structural realist predictions of Russia's space policy in the key debates on armament and arms control in outer space. The first hypothesis, on the ground of the structural distribution of power in outer space, expects Russia to engage in a mixed balancing strategy vis-à-vis the U.S. through both internal and external means. The second hypothesis asserts that Russia, due to internal budget constraints and general military-technological factors concerning outer space security assets, will opt for engaging in a mixed deterrence approach. Subsequently, the third hypothesis expects areas of U.S.-Russian cooperation in outer space affairs to diminish with Russia's space power re-consolidating in the 2000s. Finally, the fourth hypothesis asserts that Russia will cooperate on outer space affairs in international institutions only when relative gains are equitably

[11]See for example Natalie Bormann and Michael J. Sheehan, eds. *Securing Outer Space* (London, New York: Routledge, 2009); Anna Burzykowska, "Smaller States and the New Balance of Power in Space," *Space Policy* 25, no. 3 (2009): 187–92; Mischa Hansel, "The USA and Arms Control in Space: An IR Analysis," *Space Policy* 26, no. 2 (2010): 91–98; and Max M. Mutschler, *Arms Control in Space: Exploring Conditions for Preventive Arms Control* (Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2013); Petroni and Bianchi, "New Patterns of Space Policy in the Post-Cold War World."

[12]John J. Mearsheimer and Stephen M. Walt, "Leaving Theory Behind: Why Simplistic Hypothesis Testing is Bad for International Relations," *European Journal of International Relations* 19, no. 3 (2013): 427–57. Also, see Kenneth Waltz's, *Seminal Monography: Kenneth Waltz, Man, the State and War: A Theoretical Analysis* (New York: Columbia University Press, 2010), 159–86.

[13]See Mearsheimer and Walt, "Leaving Theory Behind," 436–37.

distributed between it and the United States otherwise instrumentalizing institutions to increase its bargain leverage in diplomatic negotiations.

In the second section, I adopt a three-step investigation of Russia's space security policy. First, I provide a historical overview of Russia's space program up to 2008 laying down the ground for understanding the context culminating in the recent developments. For the second step, I examine Russia's respective policy strategies in armament and arms control in outer space, respectively. Following this for the third step, I critically analyze this proposed hypothesis.

International relations theory and the study of outer space

Although the claims of the absence of meaningful IR and security scholarship on outer space[14] are exaggerated, it can be contended that the corpus of theory-based academic literature on outer space in these disciplines is indeed limited. However, among the limited work, Moltz[15] has insightfully distinguished between four different theoretical schools of thought: (1) global institutionalism; (2) social interactionism; (3) space nationalism; and (4) technological determinism. While they do not entirely map onto the major IR schools of realism, liberalism, and constructivism, theoretical links can be found between the four schools and the three major IR schools of thought. Although an exhaustive coverage of the diverging conceptual avenues or IR scholarship is beyond the scope of this article, liberal and constructivist approaches to the study of space are briefly discussed to delineate the distinctive conceptual direction of a realist engagement with international politics in outer space.

Liberal, neoliberal, and Grotian modes of inquiry provide the theoretical foundation for what Moltz[16] denominated as the global institutionalist perspective on outer space. Proponents of this approach draw heavily on interdependence theory[17] and rational institutionalist theory[18] to highlight the utility of mutual gains through cooperative behavior by rational-acting states in outer space.[19] In the sphere of space security politics, neoliberal concepts have been utilized to investigate the institutional design and potential utility of space arms control regimes for averting arms races in outer space and facilitating stable international cooperation in that sphere.[20]

[14]See for example Shounak Set, "The International Relations of Outer Space: Changes, Continuities, and Contextualities," *Jadavpur Journal of International Relations* 19, no. 2 (2015): 184–92.
[15]James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (Stanford, CA: Stanford Security Studies, 2008), 23–41.
[16]*Ibid*., 27–31.
[17]See for example Robert O. Keohane, Joseph Nye, and Fareed Zakaria, *Power and Interdependence* (Boston: Longman, 2012).
[18]See for example Robert Keohane, *After Hegemony: Cooperation and Discord in the World Polit. Economy* (Princeton, NJ: Princeton University Press, 1984).
[19]Moltz, *The Politics of Space* Security, 30–31; and Petroni and Bianchi, "New Patterns of Space Policy in the Post-Cold War World," 13.
[20]Hansel, "The USA and Arms Control in Space,"; and Mutschler, *Arms Control in Space*.

The school of social interactionism corresponds with social constructivist and sociological institutionalist scholarship of IR focusing on learning and collective identity formation through communication and regularized contacts.[21] Concerning the study of Russia's space policy, social constructivist approaches have been employed to explain the concurring cooperative and confrontational elements in Russia's outer space policy vis-à-vis the United States through the lens of ontological insecurity and significant othering.[22]

Relevant here is the school of space nationalism, which builds on realist concepts of "realpolitik" and great power competition.[23] One of the foundational contributions to the school of space nationalism is constituted by the works of McDougall[24] who emphasizes the imperatives of U.S.-Soviet nuclear rivalry as key enablers for the rapid development of space technology in the second half of the 20th century. Realists emphasize outer space as a strategic theater of international politics and as a playing field for states' zero-sum-games.[25] Therefore, realist scholarship conceives the realm of space as a potential force multiplier[26] incentivizing states to seek its subduction under national security policies. Such outer space strategies are ultimately underpinned by the concept of space power, which is derived from classical realist theory, and determined by a state's presence and denial capabilities in space.[27] While classical realism as a philosophical tradition of thought provides a valuable perspective on political issues in outer space, it lacks the parsimonious social-scientific research program of structural realism.

Finally, Moltz's fourth paradigm of technological determinism provides a unique perspective that does not closely correspond with any of the three schools of IR thought and is rather positioned between realist and liberal paradigms. As it centers around the structural conditions generated by rapid advances in technology as an explanatory variable,[28] it partially converges with realist analyses emphasizing the 'fine-grained structure" of international politics.[29] It, however, is located between normative realism and liberal idealism as it either expects optimistically for these changes to pull states closer together due to the inevitable interdependence and complexity arising from these changes or pessimistically for these changes to lead to the instrumentalizing and exploitation of this technology by states and their military-industrial complexes.[30]

[21]Moltz, *The Politics of Space* Security, 37–40.
[22]Johan Eriksson and Roman Privalov, "Russian Space Policy and Identity: Visionary or Reactionary?" *Journal of International Relations and Development* 24, no. 2(2021): 1–27.
[23]*Ibid*., 24.
[24]Walter McDougall, *The Heavens and the Earth: A Political History of the Space Age* (Baltimore: Johns Hopkins University Press, 1997); and Everett Dolman, *Astropolitik. Classical Geopolitics in the Space Age* (Hoboken: Taylor and Francis, 2005).
[25]Petroni and Bianchi, "New Patterns of Space Policy in the Post-Cold War World," 13.
[26]See note 13 above.
[27]M.V. Smith, *Ten Propositions Regarding Spacepower* (Honolulu, Hawaii: University Press of the Pacific, 2004), 44–48.
[28]Moltz, *The Politics of Space* Security, 31.
[29]Stephen Van Evera, *Causes of War: Power and the Roots of Conflict* (Ithaca, NY: Cornell University Press, 2001), 14–15.
[30]Moltz, *The Politics of Space* Security, 32–34.

Structural realism and the study of outer space security politics

Structural realists, such as Kenneth Waltz,[31] highlight that given the absence of a hierarchical sovereign entity above all states, international politics falls into a self-help system. As states are fully self-reliant, the anarchical structure and ever-present contingency of war dictate them to maximize security above all other commodities, or risk being annihilated or subdued.[32] Therefore, states are inclined to favor the status quo and engage in extensive internal and external balancing against rising states and adversaries to prevent the emergence of hegemonic powers, which endanger their security.[33]

The essence of the structural realist reconceptualization of balance-of-power-theory rests on the core predictions of states responding to the imperatives of international anarchy by pursuing relative power gains and by engaging in balancing behavior, either through alliances, armament, or emulation of successful practices.[34] Hence, neorealist balance-of-power theorists assert that the unipolar moment of U.S. global primacy after the Cold War will inevitably provoke enduring counterbalancing attempts, which aim to offset the hegemony.[35] While Waltz[36] emphasized for his theory to only predict the eventual outcome of a balance of power and not explicit balancing strategies in specific cases, this approach follows Wohlforth's[37] contention that this is negligible as Waltz himself expects a U.S. unipolarity to be balanced by other states. These arguments comprise the theoretical foundation for the subsequent generation of hypotheses for Russia's policy regarding two focal points of space security in the form of space weapons and arms control in space.

Structural realism and the weaponization of space

Concerning the weaponization of outer space, the following three hypotheses can be derived on the grounds of the expectations of neorealist theory. One, Russia will engage in both extensive internal and external balancing behavior vis-à-vis the United States in outer space due to the latter's preponderance in power in this sphere. Two, Russia will pursue a hybrid approach to enforce a credible deterrence posture utilizing asymmetric measures to take advantage

[31]Kenneth N. Waltz, *Theory of International Politics* (Reading, MA: Addison-Wesley, 1979), 73; and Waltz, 2010 (note 12), 160 .
[32]*Ibid*., 92.
[33]*Ibid*., 118–28; and Ian Ross B. Bolton, "Neo-Realism and the Galileo and GPS Negotiations," in *Securing Outer Space*, ed. Nathalie Bormann and Michael J. Sheehan (London, New York: Routledge, 2009), 187.
[34]Waltz, *Theory of International Politics*, 118.
[35]Christopher Layne, "The Unipolar Illusion Revisited: The Coming End of the United States' Unipolar Moment," *International Security* 31, no. 2 (2006): 39.
[36]Waltz, *Theory of International* Politics, 124–25.
[37]William C. Wohlforth, "Revisiting Balance of Power Theory in Central Eurasia," in *Balance of Power: Theory and Practice in the 21st Century*, ed. Thaza V. Paul, James J. Wirtz and Michael Fortmann (Stanford: Stanford University Press, 2004), 217.

of the exposure of the United States in outer space. And three, as Russia's relative power position in the sphere of outer space improves, the areas for U.S.-Russian cooperation in this sphere will diminish.

Offensive neorealists, like Mearsheimer,[38] have traditionally categorized space power as latent power, denominating the socioeconomic foundations on which military power is based. I argue, however, that in the context of anti-satellite (ASAT) and orbital-bombardment systems, space presence becomes tied to military power. While Article IV of the Outer Space Treaty (OST) of 1967 negated the legal possibility of a celestial deployment of weapons of mass destruction, ASAT weapons, first successfully tested by the Soviet Union in 1968, nonetheless remained a salient issue. This is derived mainly from the growing dependency of states on satellites, especially in the military sphere. In times of peace, satellites serve as early warning systems for nuclear launches and provide verification information on compliance to arms control treaties.[39] Additionally, in military conflicts, satellites contribute an important share to facilitating the planning and conduct of operations. This became evident ever since the Gulf War in 1990–1991 where U.S. satellites ensured effective communication among their troops and supported the provision of crucial weather data.[40] Later, during the U.S. intervention in Afghanistan in 2001, satellite-based navigation, U.S. Global Positioning System (GPS), was further used to direct precision-guided ammunition.[41] Therefore, the militarization of outer space, defined as the supportive use of space assets for enhancing military effectiveness constitutes a *fait accompli*.[42] The weaponization of space, defined as the large-scale deployment of conventional weapons in outer space, has so far not manifested despite the dissolution of the Anti-Ballistic Missile (ABM) treaty in 2002, which restricted ASATs.[43]

Despite the military utilization of outer space among states being asymmetric and the United States occupying a *de facto* hegemonic position in terms of its presence in outer space, this dominance is associated with substantial risks.[44] This is a result of the strong positive correlation between a state's over-dependence on outer space assets and its vulnerability in this sphere due to the challenges of protecting satellites against determined attacks.[45] Therefore, in outer space, the offensive-defensive balance is shifted towards favoring the attacker, which defensive realist scholars argue to generally increase the risk of

[38] John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York, NY: Norton, 2001), 56.
[39] James P. Finch and Shawn Steve, "Finding Space in Deterrence: Toward a General Framework for 'Space Deterrence'," *Strategic Studies Quarterly* 5, no. 4 (2011): 10.
[40] Mutschler, *Arms Control in Space*, 129.
[41] *Ibid*., 165.
[42] Jinyuan Su, "The 'Peaceful Purposes' Principle in Outer Space and the Russia–China PPWT Proposal," *Space Policy* 26, no. 2 (2010): 83.
[43] *Ibid*.
[44] Finch and Steve, "Finding Space in Deterrence," 16.
[45] Steve Lambakis, "A Guide for Thinking About Space Deterrence and China," *Comparative Strategy* 38, no. 6 (2019): 501.

preemptive strikes on the grounds of perceived first mover-advantages.[46] Hypothetically, if solely considering the theatre of outer space only, this provides an incentive for states that are less dependent on satellite systems to strike other states, which are highly reliant on their assets in outer space as the inflicted net damage to their adversaries would always exceed their own losses[47] Hence, on the grounds of the asymmetry in states' presences in outer space, reciprocal retaliation is difficult to attain.

However, since outer space as a military theater is interlinked with the terrestrial and aeronautical spheres and asymmetrically exposed to offensive strikes from these areas, the generation of deterrence becomes essential for preserving vital space assets.[48] In other words, a hypothetical first strike on a state's space assets is disincentivized by the terrestrial retaliatory actions that provoke a response given the possibility to unambiguously denominate the first attacker. As Waltzian structural realism and deterrence theory largely intersect on the grounds of their shared underlying balance-centered ontology of power,[49] neorealism provides a suitable approach to the study of military affairs in outer space. The structural realist paradigm suggests that states, under the assumption of being security maximizers, invest substantial resources to obtain and preserve credible deterrence to protect their territorial integrities.[50]

Deterrence is conceptualized as the process of dissuading an adversary from striking first by convincing the adversary that the costs would exceed the generated benefits of the attack.[51] This can be enacted either by a punitive imposition of costs or the denial of benefits. Regarding imposing costs, space deterrence scholars argue that this is either achieved through credible threats of retaliation or the structural constraints of existent international norms of behavior.[52] The denial of benefits, however, requires enhancing the resilience of space assets, the diversification of both celestial and terrestrial systems, and the pooling of resources through international partnerships.[53] Nonetheless, as obtaining holistic retaliatory outer space capabilities is financially unattainable and hardening space assets against kinetic forces is technologically infeasible currently, space actors are expected to pursue hybrid approaches between the two deterrence options.[54]

[46]Van Evera, *Causes of War*, 121.
[47]Roger G. Harrison, "The Role of Space in Deterrence," in *Handbook of Space Security: Policies, Applications and Programs*, ed. Kai-Uwe Schrogl, Peter L. Hays, Jana Robinson, Denis Moura, and Christina Giannopapa (New York, NY: Springer, 2015), 116.
[48]Lambakis, "A Guide for Thinking About Space Deterrence and China," 501.
[49]Anne I. Harrington, "Power, Violence, and Nuclear Weapons," *Critical Studies on Security* 4, no. 1 (2016): 92.
[50]Layne, "The Unipolar Illusion Revisited," 28; and Wohlforth, "Revisiting Balance of Power Theory in Central Eurasia," 217.
[51]Harrison, "The Role of Space in Deterrence," 115.
[52]Finch and Steve, "Finding Space in Deterrence," 13–14.
[53]*Ibid*., 15–16; Lambakis, "A Guide for Thinking About Space Deterrence and China," 501; and Damon Coletta, "Space and Deterrence," *Astropolitics* 7, no. 3 (2009): 185–87.
[54]Coletta "Space and Deterrence," 187.

Finally, on the grounds of the assertions of lateral pressure theory, we can derive the third hypothesis that the process of the re-consolidation of Russian space power would be expected to shift U.S.-Russian outer space relations increasingly toward an adversarial trajectory. Put simply, the lateral pressure paradigm expects states to seek to expand their influence beyond their territorial boundaries in positive correlation with their aggregate power and technological development increasing.[55] While traditionally, these concepts have referred to emerging great powers constructing spheres of influence in their respective regions, it is conceivable that due to the significance of the realm of outer space for both economic and security considerations, this expansion of influence is not confined to terrestrial affairs, but further reaches into the celestial domain. As neorealist paradigms underscore states' concerns for relative gains, we can expect that increases in Russia's technological capabilities and influence in outer space contain an inherent capacity to generate an outer space security dilemma between Russia and the United States. Especially due to the ubiquity of dual-use technology in outer space, any Russian advance in this field would trigger dynamics that converge with what Jervis described as interaction in which one state's attempts to increase its security are inherently leading to decreases in the security of other states.[56] Thus, with the growing propensity of both states being locked in a security dilemma in outer space, the areas of cooperation between Russia and the United States are expected to decrease.

Structural realism and international institutions in outer space

The following fourth hypothesis for Russia's space security policy can be derived from its approach to arms control in outer space; Russia's strategy on outer space arms control will pragmatically instrumentalize or circumvent international institutions to maximize its relative gains in balancing vis-à-vis the United States in outer space.

Concerning international regimes, structural realists stress that under international anarchy, states in pursuit of their independence[57] will instrumentalize these institutions to ensure relative gains compared to their adversaries.[58] As a result, international cooperation is expected to fail, if the related relative gains for the complying parties are unequally distributed.[59] Structural realists assess international institutions as "false promises",[60] that is, without

[55]Nazli Choucri and Gaurav Agarwal, "The Theory of Lateral Pressure: Highlights of Quantification and Empirical Analysis," in: *Oxford Research Encyclopedia of Politics, ed. William R. Thompson* (Oxford: Oxford University Press, 2017).
[56]Robert Jervis, "Cooperation Under the Security Dilemma," *World Politics* 30, no. 2 (1978): 167–214, 169.
[57]Waltz, *Theory of International* Politics, 106.
[58]Mearsheimer, *The Tragedy of Great Power Politics*, 364.
[59]Joseph M. Grieco, *Cooperation Among Nations: Europe, America, and Non-Tariff Barriers to Trade* (Ithaca: Cornell University Press, 1993), 10.
[60]John J. Mearsheimer, "The False Promise of International Institutions," *International Security* 19, no. 3 (1994), 5.

substantial inherent influence over states' behavior and to be abandoned if they cease to generate states' desired benefits. As such, through this paradigm, they would have to be perceived as surface-level appearances of the integral underlying bargaining interactions of state and non-state actors.[61] In a similar vein, deterrence scholars argue that the most significant share of international communication occurs through the intentional and unintentional signaling of military programs and material capabilities.[62] Accordingly, Schelling[63] argues that during the Cold War major bilateral and multilateral agreements and resolutions on the weaponization of outer space only formally acknowledged the already-present imperatives of the existing balance of forces.

Legal scholars have contended that despite their essentially shared extra-sovereign nature, an effective formalized legal framework as in the case of Antarctica, is not present for outer space to a degree that negates the possibility of its subjugation under states' national security policies.[64] Whereas international discourse on the concept of a "Common Heritage of Mankind" (CHM) in the 1960s certainly influenced the formation of the OST in 1967 and the adoption of the Moon Agreement in 1979, the CHM notion is substantially more impactful in the negotiations of an international law of the sea and its extension to Antarctica. While Articles I and IV of the OST provide the international legal foundation for averting the national appropriation and nuclear weaponization of space, the treaty contains inherent grey zones, thereby incentivizing states to use them as loopholes. One of these essential gaps in the sphere of space weapons is the formal legal possibility of deploying conventional weapons in outer space, which further complicates the international issue of ASAT weapons.[65] Additionally, the abrogation of the ABM Treaty in 2002, which was an essential international regime for the regulation of space weapons beyond the OST, further limits the scope of space arms control. Multilateral attempts to expand the institutional arms control framework for outer space, most notably at the CD with proposals for the Prevention of an Arms Race in outer space (PAROS) since 1985, remain ultimately unsuccessful due to the nature of geopolitics among the United States, Russia, and China.[66] Through the paradigm of structural realism, this impasse is perfectly coherent with the theory's dictums as the high level of asymmetry between states in terms of their space capabilities shifts the relative gains of space arms control in favor of weaker states.[67]

[61]Susan Strange, "Cave! Hic Dragones: A Critique of Regime Analysis," *International Organisation* 36, no. 2 (1982): 496.
[62]Thomas C. Schelling, *Arms and Influence* (New Haven: Yale University Press, 2020), 265.
[63]*Ibid*., 266.
[64]Su, "The 'Peaceful Purposes' Principle in Outer Space and the Russia–China PPWT Proposal," 82.
[65]Hansel, "The USA and Arms Control in Space," 91.
[66]Paul Meyer, "Dark Forces Awaken: The Prospects for Cooperative Space Security," *The Nonproliferation Review* 23, no. 3–4 (2016): 496.
[67]Max M. Mutschler, "Security Cooperation in Space and International Relations Theory," in *Handbook of Space Security: Policies, Applications and Programs*, ed. Kai-Uwe Schrogl, Peter L. Hays, Jana Robinson, Denis Moura, and Christina Giannopapa (New York, NY: Springer, 2015), 49.

Consolidation of Russia's space program from 1991 to 2008

Having outlined the theoretical foundations, this section provides a historical overview of Russia's space security policy to establish the basis for further analysis. As indicated earlier, the dissolution of the Soviet Union constituted a fundamental caesura for Russia's space program. During the Cold War, the Soviet Union occupied a dominant position in outer space, only second to the United States in outer space, which was significant both militarily for purposes of strategic reconnaissance[68] and for status concerns, as the Soviet Union continuously derived great power prestige from its pre-eminence in outer space.[69] Conversely, the events of 1991 accelerated the gradual erosion of Soviet space capabilities that already began in the 1980s, which shifted priorities from the Soviet focus on parity and competition with the United States in outer space[70] toward the imperative of averting a large-scale collapse of Russia's space sector.

Scholars have argued that Russia's inheritance of the major share of the Soviet space program proved both beneficial due to the unique space capabilities of the Soviet Union, yet burdensome at the same time.[71] This burden was caused by the significant economic inefficiency of the Soviet military-industrial space complex, which Russia against the backdrop of its general economic malaise was unable to maintain.[72] Consequently, the collapse of former Soviet space power manifested itself in the loss of the ability to cover Russia's entire national territory with its global navigation satellite system, known by the Russian acronym GLONASS, as the number of related satellites had to be reduced from 24 to 14, making Russian fighter jets dependent on the U.S. GPS.[73] Furthermore, Russia's early warning satellite system degraded significantly in the second half of the 1990s as the number of functional warning satellites decreased from eight to three between 1996 and 1999 resulting in detection gaps of up to five hours per day.[74] This situation was further aggravated by the location of integral Russian-inherited space infrastructure outside of Russia's territory, thus being vulnerable in conflict situations.[75] This included the Baikonur Cosmodrome in Kazakhstan as well as five of Russia's eight early warning radar facilities.[76]

[68]Maxim Tarasenko, "Transformation of the Soviet Space Program After the Cold War," *Science & Global Security* 3 (1994): 339.
[69]Mizin, "New Russia in Space," 81.
[70]Andrei Shoumikhin, "Russian Perspectives on the Military Uses of Outer Space," *Astropolitics* 1, no. 3 (2003): 96.
[71]Christophe Venet, "Space Security in Russia," in *Handbook of Space Security: Policies, Applications and* Programs, ed. Kai-Uwe Schrogl, Peter L. Hays, Jana Robinson, Denis Moura, and Christina Giannopapa (New York, NY: Springer, 2015), 356.
[72]*Ibid*.
[73]Alexey Arbatov, "Russian Perspectives on Spacepower," in *Toward a Theory of Spacepower: Selected Essays*, ed. LUTES CD (Washington, DC: Progressive Management, 2011), 441.
[74]Pavel Podvig, "History and the Current Status of the Russian Early-Warning System," *Science & Global Security* 10, no. 1 (2002): 49.
[75]Jackson, "Russia's Space Security Policy," 390.
[76]Arbatov, "Russian Perspectives on Spacepower," 441.

Embedded in the economic expansion in the early 2000s under favorable global energy prices, during Putin's leadership, the strategic importance of outer space was once again reconsidered, evidenced by a significant increase in Russia's space budgets.[77] This reinvigoration of Russia's space program accelerated in the decade of 2010 as Russia acquired the position of the sole supplier of human spaceflights to the International Space Station (ISS) following the United States ceasing all activities in this field first for a period of time following the Space Shuttle Columbia accident, and then after the termination of its Space Shuttle program in 2011.[78] These developments provided the Russian government with sufficient funds to restore significant shares of space capabilities lost in the early 1990s. In 2004, GLONASS regained its full national coverage through the launches of improved M-variant satellites.[79] Furthermore, Russia's ASAT system program was reinstated following the dissolution of the ABM Treaty.[80] Despite Russia's early warning capabilities deteriorating throughout 2001 and 2002, by the end of 2004, the early warning satellite constellation was consolidated with three operational satellites enabling at least the full monitoring of U.S. territory.[81] By 2005, in international comparison, Russia's share of space budget in its national gross domestic product (GDP) was at 0.085%, which is ranked fourth globally, and in absolute terms, its space budget of $650 million U.S. dollars by 2005[82] was the eighth largest in the world. In the early 2000s, the issue of space security re-emerged as a central issue for Russia's political leadership,[83] though the scope of these new Russian outer space aspirations remained mostly confined to its own territory and that of its post-Soviet neighbor states, frequently referred to as Russia's "near abroad".[84] Furthermore, as the former U.S. Defense Attaché to Russia Bruce McClintock has noted, despite the budget expansions of Russia's space program in this decade, structural economic impediments, such as the continuous brain drain and high levels of corruption, were not effectively addressed, and are expected to persist in the medium and long-term.[85]

The year 2008 can be assessed as the start of the period from which onwards the Russian military space program had been re-consolidated regarding its portfolio of space assets and financial funds. This becomes evident in the shifting focus toward the resumption of modernizing and expanding the

[77]Nicole J. Jackson, *Outer Space in Russia's Security Strategy*, SWP 64 (2018), 230.
[78]Mizin, "New Russia in Space," 88.
[79]Venet, "Space Security in Russia," 364.
[80]Jackson, 2018 (note 77):230.
[81]Alexandre Paleologue, "Early Warning Satellites in Russia: What Past, What State Today, What Future?," *International Society for Optics and Photonics* (2005): 157.
[82]OECD, *Space Economy at a Glance 2007* (Paris: OECD Publishing, 2007), 35–37.
[83]Mizin, "New Russia in Space," 85.
[84]Venet, "Space Security in Russia," 363.
[85]Bruce McClintock B, The Russian Space Sector: Adaptation, Retrenchment, and Stagnation. Eisenhower Center for Space and Defense Studies/U.S. Air Force Academy (2017), 5–7.

country's space assets.[86] The war with Georgia in 2008, despite the decisive Russian victory, revealed the country's significant deficiencies in space-based intelligence and reconnaissance capabilities. These areas later have become the key priorities for development in the years following the conflict.[87] Additionally, since 2008–2009, Russian GDP growth rates entered a phase of normalization and stabilization.[88] Focusing on this period fits into Waltz's[89] dictum of assessing a country's relative power by primarily analyzing growth rates on a normal basis, as they are generally smaller and more indicative than their counterparts in recovery phases.

Economic indicators

Throughout the 2010s, Russia's internal balancing efforts accelerated and the state's space budget in 2014 ranked the third-largest in the world measured in absolute terms, and first in the world in terms of GDP percentage-shares with 0.25%.[90] This is attributable in part to the end of the U.S. Space Shuttle program in 2011 and the subsequent U.S. payments to Russia for crewed flights to the ISS, as well as the reconsolidation of Russia's space program that began in 1991, which were all mentioned earlier. Although Russia's space budget contracted after the annexation of Crimea up to 2017 under western sanctions,[91] Russia was able to regain its position as the second most influential space power after the United States by the late 2010s.[92] However, western economic sanctions and export controls imposed on Russia in response to its invasion of Ukraine in February 2022 threaten to revert this ascendancy. As these sanctions were devised to particularly impair Russia's space and technology sectors, Roscosmos is faced with limited access to components of vital importance for its space program, such as semiconductors.[93] In addition, Russia's retaliatory response to these sanctions of imposing an embargo on rocket-engine exports to the United States[94] and canceling the commercial launch of 36 satellites of the British company OneWeb is likely to further

[86]Jackson, 2018 (note 77):230.
[87]Venet, "Space Security in Russia," 365.
[88]World Bank, *GDP growth (annual %) – Russian Federation | Data* (2021) Available at: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=RU (accessed 29 March 2021).
[89]Waltz, *Theory of International* Politics, 177.
[90]OECD, *The Space Economy at a Glance 2014* (Paris: OECD Publishing, 2014), 43.
[91]OECD, *The Space Economy in Figures: How Space Contributes to the Global Economy* (Paris: OECD Publishing, 2019), 23.
[92]Venet, "Space Security in Russia," 363; and Jackson, "Russia's Space Security Policy," 387.
[93]Andrew Tarantola, "What Economic Sanctions Mean for Russia's Space Program, March 2, 2022, https://www.engadget.com/what-economic-sanctions-mean-for-russias-space-program-170003960.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAHzMMQROkb06QgRcnzzZn8ziwhYo_Sw_cyJh3QZt4-4gL9IzmmJxtpWVOWD7mTF4zy2PjLzRFFuomuas-t0b9OrboQKhU6-FvZOYspgfljqsttw21iJ5obP_eO-RWCbzYPo1w3O0qwkzlEN4M31YEblKVlO3_ryjqelkZ95Uz4Bq.
[94]The Washington Post, "Russia Cuts Off Rocket Engine Supply and Threatens Space Station Partnership, March 3, 2022, https://www.washingtonpost.com/technology/2022/03/03/Russia-nasa-rocket-engines-rogozin-Ukraine/.

deprive Russia of financial inflows that undermine the ability of Roscosmos to maintain its international competitiveness.[95]

The Russian space sector is also subjugated to increased governmental centralization and nationalization to enhance state control over Russia's space program, and to decrease the dependence on space infrastructure located outside Russian territory. In December 2015, Roscosmos was dissolved and merged with the state-owned United Rocket and Space Corporation into the Roscosmos State Corporation.[96] Furthermore, next to the existing Kazakh-leased Cosmodrome in Baikonur, the Russian government authorized the construction of another civilian launch site on Russian territory in the Amur region under the name Vostochny, which has been used for space launches since 2016.[97] The expansion of Russia's military-operated Plesetsk spaceport is also a key priority in the state's federal program on the development of cosmodromes in the period of 2017 to 2025.[98]

However, in comparative terms, Russia's allocated finances to the space sector are still significantly behind that of the United States evidenced by Roscosmos' budget only amounting to 12% of NASA's budget.[99] This capability gap is further widened by the space corporation's reported inefficient budgetary allocations,[100] as well as the Russian space sector's high degree of corruption.[101] Russia's distinct space budget for military capabilities totaled approximately $1.6 billion U.S. dollars.[102] In contrast, a budget of $15.2 billion U.S. dollars was requested by the Department of Defense (DOD) for the U.S. Space Force in 2020;[103] for the fiscal year 2023, the U.S. Space Force's proposed budget is $24.5 billion U.S. dollars.[104] The gap in funding between the United States and Russia mintages any Russian attempt at parity with the United States whether for civil space pursuits or for national security and power

[95] Jeremy Grunert, "Sanctions and Satellites: The Space Industry After the Russo-Ukrainian War," In: War on the Rocks, June 10, 2022, https://warontherocks.com/2022/06/sanctions-and-satellites-the-space-industry-after-the-russo-ukrainian-war/.

[96] Jackson, 2018 (note 77):232.

[97] Venet, Venet, "Space Security in Russia," 361.

[98] Ministry of Economic Development of Russia, Ob utverždenii federal'noj celevoj programmy «Razvitie kosmodromov na period 2017–2025 godov v obespečenie kosmičeskoj dejatel'nosti Rossijskoj Federacii», 2017, http://government.ru/docs/29338/# (accessed March 30, 2021); and Government of the Russian Federation, *Ob utverždenii federal'noj celevoj programmy «Razvitie kosmodromov na period 2017–2025 godov v obespečenie kosmičeskoj dejatel'nosti Rossijskoj Federacii*, September 21, 2017, http://government.ru/docs/29338/ (accessed April 5, 2021).

[99] TASS,*V Roskosmose sravnili svoj bjudžet i NASA*, February 11, 2020.

[100] Ministry of Finance of the Russian Federation, *Neobhodimo povysit' upravljaemost' bjudžetnyh assignovanij na Federal'nuju kosmičeskuju programmu*, August 25, 2020, https://minfin.gov.ru/ru/press-center/?id_4=37158-minfin_nyeobkhodimo_povysit_upravlyaemost_byudzhetnykh_assignovanii_na_federalnuyu_kosmicheskuyu_programmu (accessed March 29, 2021).

[101] Yuri Karash, *Russian Space Program: Financial State, Current Plans, Ambitions and Cooperation with the United States* (2016), 2.

[102] Roger McDermott, *Russia's Military Exploitation of Outer Space* (2020).

[103] The Hill, Pentagon requests $15.4B for Space Forces, February 10, 2020, https://thehill.com/policy/defense/482373-pentagon-requests-154b-for-space-force/.

[104] United States Space Force, Kendall, Brown, Raymond tell Congress $194 billion budget request balances risks, quickens, April 28, 2020, https://www.spaceforce.mil/News/Article/3013259/kendall-brown-raymond-tell-congress-194-billion-budget-request-balances-risks-q/.

projection. Russia's internal economic capacity allows only for a selective emulation of integral U.S. military space strategies. This does not enable an approach relying on self-dependent internal balancing.

It is important to highlight that while the U.S. space budget overshadows the budget allocated to Roscosmos in absolute terms, the Russian space industry has significant comparative cost-advantages vis-à-vis the United States, especially in the sphere of space-launch vehicles. The advantages are evidenced by NASA's reliance in the past (2011 to 2020) on purchasing seats in Russian Soyuz-type spacecraft as opposed to utilizing more expensive domestic alternatives and the nature of Russia's much lower costs for space programs and projects.[105] These factors, however, are not sufficient for closing the gap between Russia's space capabilities and that of the United States. Also, since 2020, the geopolitical dynamics have changed with the increasing importance of commercial actors, such as SpaceX crewed launches for NASA. These dynamics evidence the importance of going beyond traditional economic indicators in the analysis of IR in outer space. Despite the persistence of U.S.-Russian cooperation in space launches against the backdrop of Russia's war in Ukraine, as evident in the return of a U.S. astronaut from the ISS on a Russian Soyuz Rocket in late March 2022,[106] comments by Dmitry Rogozin, the CEO of Roscosmos, on his doubts concerning the effectiveness of ISS, have led to uncertainties regarding the feasibility of future U.S.-Russian cooperation in outer space.[107]

Strategic goals and threat perceptions

References to developments in outer space are included in all major strategic publications on Russia's military and foreign policy since 2010. However, as of 2022, no distinct space policy papers have been published. While the Military Doctrine (MD) of 2010 in its Article 9[108] underscores the general danger of militarization of space for international politics, both its 2014 iteration[109] and the 2015 National Security Strategy[110] emphasize explicitly the presumed global strike ambitions of the United States as one of the most salient international issues in outer space. The main identified threats for Russia in outer

[105]Marco Aliberti and Ksenia Lisitsyna, *Russia's Posture in Space: Prospects for Europe* (Cham: Springer International Publishing, 2019), 63; and Thomas Roberts, "Space Launch to Low Earth Orbit: How Much Does It Cost? – Aerospace Security," 2020, https://aerospace.csis.org/data/space-launch-to-low-earth-orbit-how-much-does-it-cost/ (accessed December 22, 2021).

[106]Reuters, "Ride-Share Return From Space Station on Russian Soyuz still on Track – NASA," March 15, 2022, https://www.reuters.com/lifestyle/science/ride-share-return-space-station-russian-soyuz-still-track-nasa-2022-03-15/ (accessed April 22, 2022).

[107]TASS, "ISS Not Effective Enough in Current Situation – Roscosmos CEO," March 10, 2022, https://tass.com/science/1419969 (accessed April 22, 2022).

[108]Military Doctrine of the Russian Federation, 2010, https://carnegieendowment.org/files/2010russia_military_doctrine.pdf (accessed April 4, 2021).

[109]Military Doctrine of the Russian Federation, "art. 14d," 2014, https://rusemb.org.uk/press/2029 (accessed April 3, 2021).

[110]Russian National Security Strategy, "art. 5," 2015, https://russiamatters.org/node/21421 (accessed April 3, 2021).

space are the destruction or disruption of its surveillance and warning systems,[111] and the closely tied issue of the deployment of strike systems and ballistic missile defense systems in outer space.[112] This emphasis is mainly deriving from the deficiencies of Russia's early warning satellite constellation and its insufficient means to emulate hypothetical large-scale missile defense formations in outer space. As discussed in the theoretical section of the article, the signaling of credible retaliatory nuclear deterrence postures is one of the two central strategies promulgated in the documents to level out this vulnerability.[113] Therefore, adversarial ASAT weapons, such as directed-energy-lasers, dual-usable missile-defense systems, and early warning systems, are directly cited as factors influencing the implementation of Russia's deterrence strategy.[114] Analogously, Russia's adherence to all international arms control institutions forms the second posited avenue for averting an arms race in outer space.[115]

These points can be further identified in publications in key Russian military periodicals, which in recent years have frequently put forward narratives of a U.S.-provoked new version of the "Star Wars" confrontation in the 1980s,[116] and a potential war in space.[117] These publications highlight the U.S. Trump Administration's decision of forming the U.S. Space Force as an independent branch under the U.S. Air Force, as well as the United States' putative non-adherence to space arms control regimes as the principal catalysts of a renewed militarization and arms race in outer space.[118] As argued by Vladimir Kozin from the Russian Academy of Military Sciences, U.S. diplomacy forms an important impediment to the creation of international legal barriers for averting the proliferation of weapons in outer space and the transformation of the cosmic sphere into an area of potential military conflict.[119] Generally, these articles assert the narrative of belligerent first-

[111] *Military Doctrine of the Russian Federation* (2010), art. 14.; *Military Doctrine of the Russian Federation* (2014), art. 14.
[112] *Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence* (2020), 3. Available at: https://www.mid.ru/en/web/guest/foreign_policy/international_safety/disarmament/-/asset_publisher/rp0fiUBmANaH/content/id/4152094 (accessed April 3, 2021).
[113] *Military Doctrine of the Russian Federation* (2014), 21c, https://rusemb.org.uk/press/2029 (accessed April 3, 2021); *Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence* (2020), 5, https://www.mid.ru/en/web/guest/foreign_policy/international_safety/disarmament/-/asset_publisher/rp0fiUBmANaH/content/id/4152094 (accessed April 3, 2021).
[114] *Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence* (2020), 4. https://www.mid.ru/en/web/guest/foreign_policy/international_safety/disarmament/-/asset_publisher/rp0fiUBmANaH/content/id/4152094 (accessed April 3, 2021).
[115] *Foreign Policy Concept of the Russian Federation 2016* (2016), 9. Available at: https://www.mid.ru/en/foreign_policy/official_documents/-/asset_publisher/CptICkB6BZ29/content/id/2542248 (accessed April 3, 2021); *Russian National Security Strategy* (2015), §21. Available at: https://russiamatters.org/node/21421 (accessed April 3, 2021).
[116] Vjačeslav Evdokimov, "Novye zvezdnye vojny", *Zashchita i bezopasnost* 2020:2, 28–29; Nezavisimoe voennoe obozrenie, *Zvezdnye vojny i SNV*, July 31,2020, 2; Pavel Denisov P, *Na puti k zvëzdnym vojnam*. Na strazhe Rodiny, February 14, 2020, 7.
[117] Aleksandr Širokorad, *Pekin osvoit kosmos russkimi klonami*. Nezavisimoe voennoe obozrenie, September 25, 2020, 7.
[118] Vladimir Ivanov, *Kosmos stanet polem boja k 2020 godu*. Nezavisimoe voennoe obozrenie, September 28, 2018.; Širokorad, *Pekin osvoit kosmos russkimi* klonami, 7; and Vladimir Molchanov, *Obespečit' gospodstvo v kosmose*, Krasnaia zvezda (119), October 23, 2019:9.
[119] Vladimir Kozin, "'Zvëzdnye vojny' vozvrašajutsja?" *Krasnaia zvezda*, February 14, 2020, 9.

mover ambitions of the United States to weaponize outer space forcing a hemmed-in, peace-seeking Russia to commit to the emulation of U.S. military efforts in space,[120] or to seek closer ties to China.[121] Hence, Russia's dual approach to outer space security, consisting of diplomacy and armament, becomes increasingly evident in major Russian strategic papers and discourses in key military journals. The following sections investigate the three components of this approach, namely, internal and external balancing, and international arms control diplomacy.

Internal balancing

Russia's central strategic development document for outer space, the Federal Space Program for the period from 2016–2025, reveals Russia's ambitions to expand the number of constitutive parts of its orbital constellation to ensure national security.[122] Until 2025, the document sets out a targeted increase of its orbital satellite constellations from eight to 23 to surmount dependence on foreign provisions of information.

In this context, the expansion of GLONASS represents a major emphasis of Russia's ambitions since 2008 to develop its space capabilities. By 2011, the system reached full operational capacity through launches of second-generation MA-variant satellites. The GLONASS constellation reached a quantity of 27 individual and 24 active systems in total by 2019.[123] This growth illustrates Russia's balancing aspirations against the U.S. GPS, which is comprised of 24 active satellites, though with a larger spatial coverage than that of Russia.[124] The ambitions concerning GLONASS derive from the importance of its indispensable navigation capacities for Russia's prestige armament project of *Avangard*-type hypersonic boost-glide missiles.[125] The short flight times of these missiles ensure credible nuclear deterrence through fast retaliatory strikes. As these missile types, based on their flight trajectories and navigational requirements, blur the distinction between the military domains of air and outer space. Further, the 2015 merger of Russia's Air Forces (VVS) and Aerospace Defense Forces (VVKO) into the Aerospace Defense Forces (VKS) is an indication of the growing importance of hypersonic boost-glide missiles in Russia's nuclear deterrence strategy.[126] Russia's assertion of the primacy of defending its surveillance and navigation assets in outer space is explained through their significance for Russia's deterrence

[120]*Ibid*.
[121]Denisov, *Na puti k zvëzdnym* vojnam, 7.
[122]Roscosmos, "Osnovnye položenija Federal'noj kosmičeskoj programmy 2016-2025," 2021, https://www.roscosmos.ru/22347/ (accessed April 1, 2021).
[123]Jackson, 2018 (note 77): 230; and McDermott, *Russia's Military Exploitation of Outer Space*.
[124]Bolton, "Neo-Realism and the Galileo and GPS Negotiations," 191.
[125]Alexey Arbatov, "Arms Control in Outer Space: The Russian Angle, and a Possible Way Forward", *Bulletin of the Atomic Scientists* 75, no. 4 (2019): 151–61.
[126]Jackson, 2022 (note 4):394.

balancing strategy through hypersonic weapons against U.S. developments in the sphere of ballistic missile defense.

As discussed earlier, with Russia's increasing financial expenditure and reliance on GLONASS and early warning satellite constellations for its nuclear retaliatory capability, there is an increasing concern for the vulnerability to ASAT systems in space. Therefore, the hypothesis that states emulate other state ASAT armaments to close vulnerability gaps in outer space by extending their retaliatory deterrence posture to this domain is viable. Strikingly, after the Chinese ASAT test in 2007, Russia did not engage in immediate costly signaling behavior by emulating tests of their own kinetic-kill ASAT systems in outer space, unlike the United States which tested their equivalent ASAT system on a rogue satellite in 2008.

Nonetheless, Russia emulated U.S. advances in ASAT systems and has accumulated significant kinetic-kill and non-kinetic ASAT capabilities, such as the PL-2019 direct-ascent ASAT system, which according to scholars, has become a priority for Russia's armament program.[127] Finally, in November 2021, Russia like previously China in 2007 and the U.S. in 2008, signaled its direct-ascent ASAT capabilities by striking a live target in form of a Soviet-era satellite with one of its PL19 interceptor missiles.[128] Additionally, Russia allegedly conducted successful tests of ASAT-capable direct-energy lasers and maneuverable satellites[129] and is suspected to invest in developing a mobile anti-satellite complex under the codename *Rudolph*.[130] In July 2020, U.S. Space Command accused Russia of launching a presumed ASAT weapon under the designation object 45,915 from its sub-satellite system Cosmos 2543,[131] which experts have linked it to a putative Russian effort of constructing a co-orbital ASAT system under the codename *Burevestnik*.[132] While these allegations have not been confirmed by the Russian government, the already-verified ASAT armament efforts provide significant evidence for substantial Russian internal balancing behavior vis-à-vis the United States; these systems are often conceptualized for countering U.S. reconnaissance satellites.[133]

This supports the assessment that contemporary Russia is seeking global strategic parity with the United States in outer space. Russia perceives this domain as a key conflict domain[134] that posits substantial threats if left un-

[127]Ankit Panda, "Russia Conducts New Test of 'Nudol' Anti-Satellite System," 2018, https://thediplomat.com/2018/04/russia-conducts-new-test-of-nudol-anti-satellite-system/ (accessed April 1, 2021); and Arbatov, 2019 (note 125):152.
[128]Ankit Panda, "The Dangerous Fallout of Russia's Anti-Satellite Missile Test," 2021, https://carnegieendowment.org/2021/11/17/dangerous-fallout-of-Russia-s-anti-satellite-missile-test-pub-85804 (accessed December 22, 2021).
[129]Jackson, 2020 (note 4):394.
[130]Daniel Porras, *Towards ASAT Test Guidelines* (2018), 7. https://unidir.org/publication/towards-asat-test-guidelines (accessed April 1, 2021).
[131]Timothy Wright, "Russia Tests Space-Based Anti-Satellite Weapon," 2020, https://www.iiss.org/blogs/analysis/2020/09/mdi-Russia-tests-space-based-anti-satellite-weapon (accessed April 1, 2021).
[132]Kaila Pfrang and Brian Weeden, *Russian Co-Orbital Anti-Satellite Testing* (2020), 2.
[133]Arbatov, 2019 (note 125):152.
[134]*Military Doctrine of the Russian Federation* (2014), art. 15c. Available at: https://rusemb.org.uk/press/2029 (accessed April 3, 2021).

securitized.[135] Coherent with the dictum of structural realism, the latent risk of war, and the presumed decisive importance of outer space, Russia engages in the emulation of U.S. military practices in space, such as satellite guidance for hypersonic missiles and deterrence postures through ASAT systems. Furthermore, the trajectories in the sphere of ASAT tests on live satellite targets provide emblematic examples supporting the assertions of structural realist theory. The Chinese and Russian ASAT tests have reportedly produced over 3000 and 1500 trackable pieces of orbital debris in 2007 and 2021 respectively.[136] In principle, space debris generates detriment for all states due to the so-called "Kessler Effect", which highlights the risk of chain reactions in which consecutive collisions of debris generate further debris in outer space. Applying the structural realist paradigm of relative gains elucidates, however, why states despite this risk have actively tested ASAT systems in outer space. While the costs of such tests are absolute and equally affect all states in outer space, they are partially offset for the state conducting the test on the grounds of the relative gains generated by the specific ASAT test itself. Relative gains in this context do not only include the particular military-scientific data produced by such a test for research and development but also pertain to status gains and the signaling of military-technological capabilities to other states for deterrence purposes. Therefore, despite the long-term externalities created by ASAT tests in outer space, structural realism would correctly predict that the relative gains in the short term would incentivize states to conduct these tests. Hence, the emulation of debris-producing ASAT tests by India, the United States, and Russia after the Chinese test in 2007, reveal dynamics akin to a security dilemma, in which the advances of one state in the sphere of space security capabilities are assessed by other states as a detriment to their own security, thereby incentivizing them to reciprocate by expanding their own capabilities in outer space. In this process of emulation, however, Russia is constrained by its limited economic resources.[137] Therefore, the option of external balancing constitutes a more viable alternative.

External balancing

Regarding Russia's external efforts to balance against the United States leading position, its relationship with China is of importance. While Russia since the early 1990s had played a crucial role in supporting the development of China's space program, it was reluctant to share pivotal technological components

[135]Jackson, 2018 (note 77):228.
[136]Idrees Ali and Steve Gorman, "Russian Anti-Satellite Missile Test Endangers Space Station Crew – NASA," *Reuters Media*, November 16, 2021; and Ashley Tellis, "India's ASAT Test: An Incomplete Success," 2019, https://carnegieendowment.org/2019/04/15/India-s-asat-test-incomplete-success-pub-78884 (accessed December 22, 2021).
[137]Shoumikhin, "Russian Perspectives on the Military Uses of Outer Space," 99.

with China.[138] Russia's repudiatory stance was justified by Perminov, then-head of the federal space agency, who warned of the potentiality of China's emergence as a competitor in space.[139] This position signaled Russia's concerns for relative gains vis-à-vis China. Nevertheless, with the increasing alignment of Russia and China over security issues since 2010 and the simultaneous deterioration of both in their strategic relations with the United States, Russia's stance on space security cooperation with China has seen a shift to increasing cooperation. The cornerstone of this collaborative trend is the partnership in satellite navigation, most notably the efforts since 2014 of linking GLONASS with its Chinese equivalence *BeiDou* for civilian and national security usages.[140] Thus, the pooling of Chinese and Russian satellite navigation resources enables the approximation toward parity with the dominant U.S. GPS constellation.

During his speech at the Valdai Conference in 2019, Putin revealed plans for assisting China to acquire early missile warning capacities, which, albeit not yet being fully transpired, could extend into outer space. The Sino-Russian cooperation in outer space security affairs entails significant implications. Both states constitute the two most influential space powers after the United States and are converging on their opposition to U.S. space security policy and posture.[141] As China is blocked from accession to the ISS and given sanctions on technology imposed by the Missile Technology Control Regime (MTCR), the partnership with Russia provides an avenue for China to explore collaborative space projects with a space power. For Russia, it benefits from Chinese financial resources to alleviate the pressure from Western-targeted sanctions against GLONASS.[142] The cooperation also facilitates non-military issue-linkage for both states in outer space, as evidenced by the joint plans, announced in March 2021 concerning the construction of a Sino-Russian Lunar research station.[143] Therefore, given both the considerable financial means of China and its substantial retaliatory ASAT capabilities, the partnership could enable Russia to surmount its internal limitations in emulating U.S. space security expenditure, while also enhancing its denial-related deterrence posture through interlinked reconnaissance and navigation assets.

International arms control diplomacy

The emphasis on arms control in outer space informs the second strategic direction of Russia's space security policy and comprises analogously a field in

[138]Nikita Perfilyev, "The Sino-Russian Space Entente," *Astropolitics* 8, no. 1 (2015): 25.
[139]CBC News, *Space pact with China has limits, Russia says*, 27 December 17, 2006.
[140]Richard Weitz, "Sino-Russian Cooperation in Outer Space: Taking Off?" 2020, https://jamestown.org/program/sino-russian-cooperation-in-outer-space-taking-off/ (accessed April 1, 2021).
[141]*Ibid*.
[142]*Ibid*.
[143]TASS, *Rossija i Kitaj podpisali memorandum o sozdanii stancii na Lune*, March 9, 2021.

which the convergence of Russian and Chinese space politics becomes more evident. Since the late Soviet Union era in the second half of the 1980s, Russia consistently employed narratives highlighting the necessity to prevent the weaponization of space through the expansion of extant bilateral arms control regimes.[144] Furthermore, China and Russia have repeatedly underlined the insufficiency of the OST to avert an arms race in outer space, and have published a series of drafts for potential complementary control regimes.[145]

Among the most notable Sino-Russian space arms control efforts are the drafts for a 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), proposed at the CD in 2008, and in 2014 in a modified form. At their core, these treaties through their first and second articles would legally prohibit state parties from placing weapons in outer space. The 2014 iteration of the proposal in Article VII adds regulations for verifying compliance and sanctioning defective behavior. Scholars have asserted that these proposals comprise paradigmatic manifestations of neorealist assertions on states' instrumental utilization of international institutions for beneficial distributions of relative gains.[146] These contentions derive from the employed definition of space weapons in these proposals, explicitly delineating them as weapons placed in outer space, thus excluding any ground-launched system with ASAT capability from being classified as a space weapon.[147] As both Russia and China compared to the United States are at a relative disadvantage concerning the technological and economic base of their space security programs,[148] they would accrue relative gains vis-à-vis the United States in case of the latter's inclusion into the treaty. These asymmetric gains derive from Russia and China's limited means at the time of the treaty proposal to compete with the United States by closely emulating its actions in a hypothetical arms race in the sphere of non-ground-based ASAT systems. According to Cordesman and Kendall, Chinese tests of complex co-orbital ASAT weapons only commenced in 2008 with sophisticated tests occurring between 2010 and 2013.[149] Hence, it becomes evident that in the time frame between the two PPWT proposals in 2008 and 2014, China's non-ground-launched ASAT capabilities were limited to a degree, which would facilitate relative gains vis-à-vis states with more advanced ASAT programs if this weapon class would be eliminated by all major space powers. Following the U.S. objection to the drafted 2008 and 2014 treaties based on the

[144]Shoumikhin, "Russian Perspectives on the Military Uses of Outer Space," 95.
[145]Perfilyev, "The Sino-Russian Space Entente," 28.
[146]Hansel, "The USA and Arms Control in Space," 96; and Mutschler, "Security Cooperation in Space and International Relations Theory," 49.
[147]The Ministry of Foreign Affairs of the People's Republic of China, "Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (Draft)", June 16, 2014, Art. 1b.
[148]Mutschler, *Arms Control in Space*, 141.
[149]Anthony Cordesman and Joseph Kendall, "Chinese Space Strategy and Developments," 2016, http://www.jstor.org/stable/resrep23359 (accessed December 22, 2021).

aforementioned grounds, China and Russia have not further concerted joint efforts to modify the governance system of outer space. This illustrates that the primary Sino-Russian interest is to curtail U.S. advances in the sphere of orbital weapons.

Subsequently, Russia changed its approach to advocate for a resolution calling for a "no first placement of weapons in outer space" at the 69th session of the UNGA, which was later adopted in December 2014.[150] The resolution again provides evidence of Russian concerns for relative gains as its wording indicates that the condemnation of deploying weapons in outer space would mostly apply to the first-moving actor. Hence, efforts of developing space weapons could be incentivized by the signaled lifting of the deployment ban for actors who engage in reactive reciprocal deployments.

Given the economic and military technological preconditions, it could be expected that the United States would first acquire the capacity of conducting large-scale deployments in outer space, whereas Russia and China based on the regulation could emulate this behavior with reduced international norm-related constraints. In this context, Russia's alleged tests of direct-ascent ASAT systems[151] is perceived as a catch-up strategy under the aegis of a -beneficial second mover advantage through the UNGA regulation. With both Russia and China repeatedly signaling their inclination to emulate U.S. space security efforts,[152] structural realism assesses their arms control proposals as means to provide beneficial conditions for Sino-Russian reactive asymmetric responses to U.S. space policy.

Conclusions

This paper illustrated that the Russian Federation re-emerged as a key actor in security affairs in outer space. The research presented evidence that supports the three derived structural realist hypotheses. These hypotheses predict Russian internal and external balancing behavior, hybrid symmetric and asymmetric deterrence strategies, and the diminishment of possible platforms for U.S.-Russian cooperation in space with the increase of Russia's space capabilities, as well as the instrumentalization of international institutions, to accumulate relative gains.

Under Putin's leadership, substantial efforts have been invested to increase Russia's space budgets and resume tests of outer space weapons. From a structural realist understanding, this is coherent against the backdrop of Russia's significant economic growth rates in the early 2000s, which contrasts

[150]Meyer, "Dark Forces Awaken," 498.
[151]United States Space Command, "Russia Tests Direct-Ascent Anti-Satellite Missile," April 15, 2020, https://www.spacecom.mil/MEDIA/NEWS-ARTICLES/Article/2151611/Russia-tests-direct-ascent-anti-satellite-missile/ (accessed April 3, 2021).
[152]Paul B. Larsen, "Outer Space Arms Control: Can the USA, Russia and China Make this Happen," *Journal of Conflict & Security Law* 23, no. 1 (2018): 157.

against the space sector's economic malaise in the 1990s. In the sphere of internal balancing, Russia attempted to emulate U.S. advances in outer space by expanding its early warning and GLONASS satellite constellations and seeking asymmetric responses through ground-based ASAT systems that would level the U.S. lead in space systems.

Additionally, as posited by the third hypothesis with Russia reconsolidating its space program in the early 2000s and expanding its capabilities in the sphere of ASAT systems, security dilemmas arose that deteriorated U.S.-Russian relations in outer space. This limited avenue for bilateral cooperation to research and space launches of U.S. astronauts using Russian rockets. While the U.S.-Russian Agreement on Cooperation in Space was extended from 2021 to 2030, there exist geopolitical constraints to joint action in outer space. Russia's invasion of Ukraine in March 2022 has impeded cooperation significantly.[153]

Furthermore, Sino-Russian cooperation in space security demonstrates substantial external balancing efforts, which are coherent with the general trajectories of the countries' terrestrial security partnership. Consistent with Waltz's[154] dictum of the higher reliability of internal over external balancing, Russia's resumption of ASAT tests and augmentation of its space assets preceded the Sino-Russian convergence, which until 2014 was mostly characterized by competitive concerns.[155]

In the field of international space arms controls institutions, it was expounded that Russia's initiative of the PPWT and No-First-Placement proposals are characterized as supportive means for its asymmetric balancing strategy given its economic constraints against congruently emulating U.S. advances in outer space systems. This would further support assertions of deterrence theory as Russia employs denial-of-benefit strategies through pooling resources with China, which enhances its capacity to impose retaliatory costs through outer space systems and champions international norms against the weaponization of space.

The examination of outer space through the lens of structural realist theory sheds light on the salient structural imperatives for Russia and China to balance the U.S. leading position in outer space due to the latent contingency that an imbalance in space would equate to significant detriments. This supports the conclusion on the persistent importance of balancing in post-Cold War outer space affairs. Of note, is that the structural realist analysis is insensitive to the explanatory significance of Russia's domestic factors in analyzing the trajectories of Russia's space security policy. As suggested by scholars, ontological security and constitutive othering of the United States are

[153]RFE/RL, Russia Extends Space Cooperation with U.S. Until 2030. Russia Extends Space Cooperation with U.S. Until 2030 (03 April 2021).
[154]Waltz, *Theory of International* Politics, 168.
[155]Weitz, "Sino-Russian Cooperation in Outer Space."

also potentially explanatory factors of Russia's pursuit of space security.[156] Moreover, liberal *Innenpolitik* approaches, which research the importance of domestic military-industrial interest groups for the trajectories of Russia's space security program modernization are of further explanatory significance. In this regard, the theoretical framework of neoclassical realism[157] represents an avenue for future research as it interlinks both structural imperatives and the unit-level intervening variables through which the former are filtered in the process of foreign policy-making. Given the small body of theory-grounded literature on Russia's space security strategy, conceptually diverse approaches are needed.

Disclosure statement

No potential conflict of interest was reported by the author(s).

[156]See note 22 above.
[157]Norrin M. Ripsman, Jeffrey W. Taliaferro, and Steven Lobell, *Neoclassical Realist Theory of International Politics* (New York: Oxford University Press, 2016).