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# From "Space Law" to "Space Governance": A Policy-Oriented Perspective on International Law and Outer Space Activities

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## ABSTRACT

*Developing activities in outer space, many driven by private actors, coincide with the resurgence of competing systems of world public order. An authoritarian bloc, led by China and Russia, promotes a competing world order based on values, including authoritarian capitalism, that differ greatly from the liberal rules-based public order led by the United States. In the space arena, interactions are complicated by two changing circumstances: the divergence between two frameworks, the U.S.-led Artemis program and the Chinese-Russian program; and the obsolescing of applicable norms due to technological innovation, changing participants, and increasing disputes. These developments require reevaluating paths toward securing minimum and optimum orders in space.*

*Predominant legal scholarship for space, however, has approached emerging claims and negative externalities in space from the perspective of "law," as a body of rules, rather than as a field of "governance." Such an approach fails to appreciate the international lawmaking process and overestimates the authority, control, and endurance of applicable norms. This article proposes that under modern circumstances, it is preferable to detach from "space law" for a "space governance" mode of thinking based on policy-oriented jurisprudence. The article outlines six analytical components of the proposed space governance framework which is geared toward a contextual appreciation of interactions between various participants. It then utilizes the approach to confront two urgent aspects of space governance. First, it proposes a regime of coordination between the two systems of world public order which may alleviate conflicts in lunar operations. Second, it demonstrates that the correlating interests of the competing blocs generate incentives for installing a cooperation regime of non-proliferation and testing prohibition for anti-satellite weapons.*


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## Introduction

Developing public and private activities in outer space coincide with the resurgence of competing systems of world public order.[1] We are witnessing the development of space-to-Earth and even the space-to-space economies,[2] alongside the increase and possible institutionalization of international arbitration for space disputes.[3] The accelerating private space activity since the 1990s has flourished under the U.S.-led democratic global order. This is rapidly changing. An authoritarian bloc, led by China and Russia, has been detaching itself from the democratic world and creating a competing system of world public order, based on a critically different set of values including authoritarian capitalism.[4] A global order marked by competing systems of

1. On minimum order and optimum order, see *infra* text to notes 15–17. On competing systems of public order, see generally Myres S. McDougal, Am. Soc. of Int'l Law, *Perspectives for an International Law of Human Dignity*, 53 Am. Soc'y Int'l L. Proc. 107, 108 (1959); Christopher J. Borgen, *Whose Public, Whose Order? Imperium, Region, and Normative Friction*, 32 Yale J. Int'l L. 331 (2007).

2. Matthew Weinzierl, *Space, the Final Economic Frontier*, 32 J. Econ. Persp. 173 (2018).

3. *See generally* Press Release, Dubai Future Foundation, Courts of Space Launches into Orbit in Support of Global Space Economy (Feb. 1, 2021), https://www.difc.ae/application/files/3116/1406/2366/Courts_of_Space_launches_into_orbit_in_support_of_global_space_economy_ENG__FINAL.pdf [https://perma.cc/XG62-P2VU]; Space Arbitration Association, https://space-arbitration.com [https://perma.cc/N9VT-RWDZ] (last visited Mar. 23, 2023). Recent investor-state disputes include Deutsche Telekom v. India, PCA Case No. 2014-10 (2020).

4. Azar Gat, *The Return of Authoritarian Great Powers*, 86 Foreign Affs. 59, 63 (2007); *see also* John Owen, *Two Emerging International Orders? China and the United States*, 97 Int'l Aff. 1415, 1426 (2021); Hal Brands, *America's War for Global Order Is a Marathon*, Foreign Pol'y (Jan. 25, 2022), https://foreignpolicy.com/2022/01/25/americas-war-for-global-order-is-a-marathon/ [https://perma.cc/T7SM-7TAN]. After Russia, with the tacit support of China, invaded Ukraine, members of the democratic world public order have moved to detach from the Russian economy. *See* Steven Lee Myers & Chris Buckley, *China Takes a Back Seat in International Diplomacy Over Ukraine*, N.Y. Times (Mar. 22, 2022), https://www.nytimes.com/2022/03/22/world/asia/china-ukraine-russia-diplomacy.html [https://perma.cc/HB89-D6WD]; Jarrett Renshaw & Trevor Hunnicutt, *U.S. Sets Red Lines for China Helping Russia Dodge Sanctions*, Reuters (Mar. 23, 2022), https://www.reuters.com/world/us-sets-some-red-lines-

world public order is nothing new; it underlaid global governance during the Cold War era.[5] The resurgence of a competing public order, however, signals the need to reevaluate the path toward minimum and optimum orders for the development of outer space.[6] The complexity of the space arena is underscored by the fact that international rules intended to directly govern interactions in outer space are vague and date back to an entirely different system of competing public orders—the Cold War.[7] These "rules", moreover, are rapidly obsolescing in light of technological innovation, changing alliances, privatization, and increased conflicts.[8] Their ability to control the decisions of participants engaged in space activities will accordingly weaken.[9]

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china-over-support-russia-2022-03-23/ [https://perma.cc/DZ94-G39K]. *See also* Damien Cave, *The War in Ukraine Holds a Warning for the World Order*, N.Y. Times (Mar. 4, 2022), https://www.nytimes.com/2022/03/04/world/ukraine-russia-war-authoritarianism.html [https://perma.cc/AZJ2-HF3J]; Andrea Shalal & Mark Strzelecki, *Russia's G20 Membership Under Fire from Western Allies*, Reuters (Mar. 22, 2022), https://www.reuters.com/world/europe/poland-pushes-call-russia-be-excluded-g20-2022-03-22/ [https://perma.cc/2KSU-3C6E].

5. *See generally* McDougal, *supra* note 1, at 108; Borgen, *supra* note 1 (discussing a possible multiplicity of different world public orders).

6. The words of Myres McDougal in 1959 resonate with current affairs: "The overriding struggle for most comprehensive completion is, of course, between the totalitarian orders, which explicitly demand the employment of force as an instrument of expansion and postulate the monopolization rather than wide sharing of many important values, and the non-totalitarian orders, with a dominant democratic core, which authorize the use of force only for conservation of values and postulate the wide sharing of all values: in freedom, safety, and abundance." McDougal, *supra* note 1, at 108.

7. *See* Myres McDougal, Harold Lasswell & Ivan Vlasic, Law and Public Order in Space 17–20 (1963); International Co-operation in the Peaceful Uses of Outer Space, A/RES/1721 (XVI 1961), https://www.unoosa.org/pdf/gares/ARES_16_1721E.pdf, [https://perma.cc/H5WR-BSQQ].

8. *See, e.g.*, Melissa J. Durkee, *Space Law as Twenty-First Century International Law*, 6 J.L. & Innovation (forthcoming, 2023); Saadia Pekkanen, *Challenges to building responsible behaviour in space*, ORF (Oct. 18, 2021), https://www.orfonline.org/expert-speak/challenges-to-building-responsible-behaviour-in-space/ [https://perma.cc/Y9UC-VG65]; Henry Ridgwell, *China-Russia Collaboration in Space Poses Challenge for West*, VOA (Dec. 17, 2021), https://www.voanews.com/a/china-russia-collaboration-in-space-poses-challenge-for-west/6358568.html [https://perma.cc/4R3Q-9WFG]; Shirley Kan, Cong. Rcsh. Serv., RS22652, China's Destruction of its Satellite in Space 1–2 (2007); Helen Regan, *India Anti-Satellite Missile Test a "Terrible Thing," NASA Chief Says*, CNN (Apr. 2, 2019), https://www.cnn.com/2019/04/02/india/nasa-india-anti-missile-test-intl/index.html [https://perma.cc/FT2Y-NMEP]; Deganit Paikowsky, *Why Russia Tested Its Anti-Satellite Weapon*, Foreign Pol'y (Dec. 26, 2021), https://foreignpolicy.com/2021/12/26/putin-russia-tested-space-asat-satellite-weapon/ [https://perma.cc/V7SK-ARG2]; Kristin Fisher, *Russia's Space Agency Warns US Sanctions Could 'Destroy' Cooperation on the International Space Station*, CNN (Feb. 24, 2022), https://www.cnn.com/2022/02/24/politics/russian-space-agency-us-sanctions-international-space-station/index.html [https://perma.cc/Q4GP-43HK]; AFP, *NASA Exploring ISS 'Flexibility' After Russia Threatens Space Station Collaboration*, The Times of Israel (Feb. 28, 2022), https://www.timesofisrael.com/nasa-exploring-iss-flexibility-after-russia-threatens-space-station-collaboration/ [https://perma.cc/6B9W-PADY]; Bryan Bender, *Moon Battle: New Space Force Plans Raise Fears over Militarizing the Lunar Surface*, Politico (Mar. 12, 2022), https://www.politico.com/news/2022/03/12/space-force-moon-pentagon-00016818 [https://perma.cc/VTH3-6ZK4]; Henry Olsen, *The U.S. Space Force Is Preparing to Militarize Space. Good.,* Wash. Post (Mar. 17, 2022), https://www.washingtonpost.com/opinions/2022/03/17/space-force-militarizing-good-thing/ [https://perma.cc/P3CE-AVTF]; *Australia Announces New 'Space Command' Defence Agency*, BBC (Mar. 22, 2022), https://www.bbc.com/news/world-australia-60835136 [https://perma.cc/9WGY-D3HK].

9. The term "control" refers to the ability of international rules or norms to shape the policy choices of participants.

Outer space has been marked lately by increasingly militarized interactions that threaten the preservation of minimum order.[10] Recently, the Russian Federation threatened to de-orbit the International Space Station in retaliation for western sanctions over its war in Ukraine,[11] and it later ended its cooperation on the project altogether.[12] The U.S. Space Force has also implemented initiatives for lunar reconnaissance missions and the development of anti-satellite weapons,[13] and Russia has accused the United States of blurring the distinction between military and civilian space assets in relation to the war in Ukraine.[14] In 1963, Myres McDougal, Harold Lasswell, and Ivan Vlasic underlined the urgency of preserving minimum order in outer space activities:

> Undoubtedly the most urgent and fundamental problem facing mankind today is securing of minimum public order in the earth-space arena. It is in the interest of all to develop policies which will decrease, if not completely and immediately remove, the rapidly growing threat of comprehensive violence and — at the same time — create conditions conducive to the fulfilment of the aspirations of [people] everywhere for security and abundance in freedom.[15]

10. The minimum order refers to the prevention of violent conflicts between nations. It includes rules or norms laying at the foundation of the international system of governance. The scope of the minimum order has recently been argued should extend to preventing the deprivation of the most basic social and economic rights. *See* Naama Omri, *International Social Economic Rights: from Standards of Achievement to Minimum Standard* (Dissertation, Yale University) (unpublished manuscript) (on file with author).

11. *See* Fisher, *supra* note 8.

12. Kenneth Chang & Ivan Nechepurenko, *Russia Says It Will Quit the International Space Station After 2024*, N.Y. Times (July 26, 2022), https://www.nytimes.com/2022/07/26/science/russia-space-station.html [https://perma.cc/FX2R-2P29].

13. *See generally* Brian Weeden & Victoria Samson, *It's Time for a Global Ban on Destructive Antisatellite Testing*, Sci. Am. (Jan. 14, 2022), https://www.scientificamerican.com/article/its-time-for-a-global-ban-on-destructive-antisatellite-testing/ [https://perma.cc/Z2ZA-6V8P]; Nivedita Raju, *Russia's Anti-Satellite Test Should Lead to a Multilateral Ban*, Stockholm Int'l Peace Res. Inst. (Dec. 7, 2021), https://www.sipri.org/commentary/essay/2021/russias-anti-satellite-test-should-lead-multilateral-ban [https://perma.cc/KBA4-B6SW]; Theodore Bunker, *US to Monitor Space Between Earth, Moon, and Beyond*, Newsmax (Mar. 7, 2022), https://www.newsmax.com/newsfront/space-air-force-research-laboratory-moon/2022/03/07/id/1060037/ [https://perma.cc/FA2M-BGEN]; Leonard David, *Is Earth-Moon Space the US Military's New High Ground?*, Space (Sep. 17, 2020), https://www.space.com/earth-moon-space-us-military-high-ground.html [https://perma.cc/4WP6-9Y2Y].

14. *See* Mariel Borowitz, *War in Ukraine Highlights the Growing Strategic Importance of Private Satellite Companies, Especially in Times of Conflict*, The Space Rev. (Aug. 22, 2022), https://www.thespacereview.com/article/4438/1 [https://perma.cc/QBA5-C96H]; Brett Tingley, *Russia Says Private Satellites Could Become 'Legitimate Target' During Wartime*, Space (Sept. 16, 2022), https://www.space.com/russia-private-satellites-legitimate-target-wartime-united-nations [https://perma.cc/8R29-P6ZX]; *see also* David Koplow, *Reverse Distinction: A U.S. Violation of the Law of Armed Conflict in Space*, 13 Harv. Nat'l Sec. J. 25, 65 (2022).

15. McDougal et al., *supra* note 7 at 157.

Though the arrangements adopted after this insightful statement provided for certain such policies,[16] today's rapidly changing circumstances require concluding new arrangements to preserve minimum order on Earth, in orbit, and during lunar missions. In addition, we must ensure that in our quest for minimum order, policies are also adopted to ensure optimum order:

> By Optimum order we mean a public order which, beyond authoritative orientation towards the minimum of coercion and the maximum of persuasion in the interactions of participants, is further designed to promote the greatest production and the widest possible sharing of human dignity values amongst all peoples.[17]

The quest for optimum order is complicated by the divergence between the two systems of world public order in space: one led by the United States through the Artemis Program and the other by China and Russia.[18]

The intellectual task underlying the process of shaping international law for space activities in competing systems of world public order requires a departure from the formalistic application of rules in favor of a contextual appreciation of interactions between various participants in light of changing circumstances and their goals, interests, and points of leverage.[19] Yet where it comes to both descriptive and prescriptive analysis, existing legal scholarship has primarily assessed emerging claims and negative externalities in outer space from the perspective of "law," as a body of rules, rather than as a field of "governance."[20] Through what may be described as "rule-

16. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies art. IV, Jan. 27, 1967, 610 U.N.T.S. 205 [hereinafter 1967 Treaty] (prohibiting the placement of nuclear weapons in outer space and the establishment of military bases, weapons testing, and military maneuvers on celestial bodies).

17. McDougal, *supra* note 15, at 160.

18. On the two competing space programs, see generally NASA, The Artemis Accords: Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes (2020) [hereinafter Artemis Accords], https://www.nasa.gov/specials/artemis-accords/index.html [https://perma.cc/25ZC-RKS4]; Deng Xiaoci & Fan Anqi, *Exclusive: China, Russia to Sign New 5-year Space Cooperation Program, Build Intl Lunar State by 2035: Roscosmos*, Global Times (Dec. 29, 2021), https://www.globaltimes.cn/page/202112/1243731.shtml [https://perma.cc/4WP5-AUYW]; Mike Wall, *China lays out ambitious space plans for next 5 years*, Space, (Jan. 29, 2022), https://www.space.com/china-five-year-plan-space-exploration-2022 [https://perma.cc/NF4H-UCYW]; The State Council of the People's Republic of China, China's Space Program: A 2021 Perspective (2022), http://english.www.gov.cn/archive/whitepaper/202201/28/content_WS61f35b3dc6d09c94e48a467a.html [https://perma.cc/SP82-E2VE]; Mark Whittington, *The New Race to the Moon: The Artemis Alliance vs. the Sino-Russian Axis*, Hill (Mar. 28, 2021), https://thehill.com/opinion/technology/545280-the-new-race-to-the-moon-the-artemis-alliance-vs-the-sino-russian-axis [https://perma.cc/JN5Z-CAG9].

19. *See, e.g.*, Gershon Hasin, *Confronting Space Debris Through the Regime Evolution Approach,* 97 Int'l L. Stud. 1073, 1098–114, 1128–31 (2021). On the two modes of decisionmaking, see also W. Michael Reisman, The Quest for World Order and Human Dignity in the Twenty-First Century: Constitutive Process and Individual Commitment 123–42 (2nd ed., 2022).

20. A prime example would include articles published as part of the Proceedings of the International Institute of Space Law on an annual basis. Other examples will be referred to in the discussion below. Besides the previous publications of the current author, there are several notable exceptions that have begun discussing space governance. *See, e.g.*, Melissa J. Durkee, *Space Law as Twenty-First Cen-*

crunching" and "regime transplantation," scholarship has both failed to appreciate the process through which international law is shaped and overestimated the authority, control, comprehensiveness, and endurance of applicable norms, as well as the ability of these norms to shape policy-choices. The mistakes stemming from such approaches become ten-fold in face of competing systems of world public order.

The first trend in prevailing legal scholarship on space activities is "rule-crunching."[21] This refers to an approach through which a specific rule, is interpreted and applied, producing policy suggestions, claims of illegality, or outlines of proposed governance.[22] Such approach usually relies for its analysis on a principle of the 1967 Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space ("Outer Space Treaty" or "1967 Treaty")[23] or one of its auxiliary instruments.[24] The rule is

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*tury International Law,* 6 J.L. & INNOVATION (forthcoming 2023); Melissa J. Durkee, *Interpretive Entrepreneurs*, 107 VA. L. REV. 431, 465–70 (2021); Sophie Goguichvili et. al., *The Global Legal Landscape of Space: Who Writes the Rules on the Final Frontier?*, WILSON CTR. (Oct. 1, 2021), https://www.wilsoncenter.org/article/global-legal-landscape-space-who-writes-rules-final-frontier [https://perma.cc/3KLG-T4VY]. Projects have been led by Saadia Pekkanen, the Director of the Center of Space Law, Data, and Policy of the University of Washington, and Timiebi U. Aganaba from Arizona State University. *See Space Law, Data, and Policy*, UNIVERSITY OF WASHINGTON SCHOOL OF LAW, https://www.law.uw.edu/academics/programs/global-business-law-institute/sldp [https://perma.cc/D75T-TPU5] (last visited Mar. 9, 2023); *Founder of the ASU Space Governance Lab*, Dr. Timiebi Aganaba-Jeanty, Joins the Advisory Board!, SPACE GENERATION ADVISORY COUNCIL (Apr. 10, 2020), https://spacegeneration.org/founder-of-the-asu-space-governance-lab-dr-timiebi-joins-the-advisory-board [https://perma.cc/9EN7-HQBF].

21. On the term 'rule-crunching' and modes of legal decisionmaking, see generally REISMAN, *supra* note 19, at 126.

22. *See, e.g.*, FRANCIS LYALL & PAUL LARSEN, SPACE LAW: A TREATISE 163–88, 272 (2d ed. 2018); Frans G. von der Dunk, *Asteroid Mining: International and National Legal Aspects*, 26 MICH. ST. INT'L L. REV. 83, 86 (2017); P.J. Blount & Christian J. Robison, *One Small Step: The Impact of the U.S. Commercial Space Launch Competitiveness Act of 2015 on the Exploitation of Resources in Outer Space*, 18 NORTH CAROLINA J. L. & TECH. 160 (2016); RICKY J. LEE, LAW AND REGULATION OF COMMERCIAL MINING OF MINERALS IN OUTER SPACE 166–92 (2012); FABIO TRONCHETTI, THE EXPLOITATION OF NATURAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES: A PROPOSAL FOR A LEGAL REGIME 26–29 (2009); Paul B. Larsen, *Asteroid Legal Regime: Time for a Change,* 39 J. SPACE L. 277–90 (2014) [hereinafter Larsen, *Asteroids*]; Edwin W. Paxson, III, Note, *Sharing the Benefits of Outer Space Exploration: Space Law and Economic Development*, 14 MICH. J. INT'L L. 487, 491–96 (1993); Leslie I. Tennen, *Towards a New Regime for Exploitation of Outer Space Mineral Resources*, 88 NEB. L. REV. 794, 804–11 (2010); Paul B. Larsen, *Solving the Space Debris Crisis*, 83 J. AIR L. & COM. 475, 491, 518–19 (2018) [hereinafter Larsen, *Solving*]; Chelsea Muñoz-Patchen, *Regulating the Space Commons: Treating Space Debris as Abandoned Property in Violation of the Outer Space Treaty*, 19 CHICAGO J. INT'L L. 233, 246 (2018); Ram S. Jakhu, Yaw Out Nyampong & Tommaso Sgobba, *Regulatory Framework and Organization for Space Debris Removal and on Orbit Servicing of Satellites*, 4 J. SPACE SAFETY ENGINEERING 129, 131–33 (2017); Arpit Gupta, *Regulating Space Debris as Separate from Space Objects*, 41 U. PA. J. INT'L L. 224, 236–41 (2019); Joel A. Dennerley, *State Liability for Space Object Collisions: The Proper Interpretation of "Fault" for the Purposes of International Space Law*, 29 EUR. J. INT'L L. 281 (2018); Vishakha Gupta, *Critique of the International Law on Protection of the Outer Space Environment*, 14 ASTROPOLITICS, 20, 37 (2016).

23. 1967 Treaty, *supra* note 16.

24. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 672 U.N.T.S. 119; Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 961 U.N.T.S. 187 [hereinafter Liability Convention]; The Convention on Registration of Objects Launched into Outer Space, Nov. 12, 1974, 1023 U.N.T.S. 15.

often treated not only as authoritative and thus affecting policy choices but also as enduring and necessarily foundational to any proposed regime.[25]

The second trend in legal scholarship on space activities is "regime transplantation," where, in tackling an international problem or externality relating to space activities, an existing regime governing another field of human activities is proposed to be transplanted, *mutatis mutandis*, to govern the space activity.[26] Such an approach fails to account for the complexity of the international lawmaking process, proposing instead to simply transplant a legal regime onto an entirely different set of interactions.[27] Thus, it focuses on the law aspect rather than the process through which global governance develops and functions.

The legalistic approach thus fails to appreciate the processes of international lawmaking and law-applying, and gives rise to fallacies in both descriptive and prescriptive analysis. This article proposes that, at least for as long as the foreseeable future is marked by competing systems of world public order, developing policies to preserve minimum order and promote optimum order requires detaching from a "space law" mode of thinking in favor of a "space governance" one. This is not merely semantics. As will be explained, this entails adopting a policy-oriented perspective focused on the international legal process, which accounts for the complexity stemming from the myriad of applicable regimes and competing systems of world public order. From a descriptive perspective, policy-oriented jurisprudence attempts to understand an instrument and how it shapes the decisions of state and non-state actors toward the common interest. But from a prescriptive perspective, which looks to how the law should be shaped, we consider not the "best governance" but rather the "best plausible governance" in light of existing and anticipated interactions.

25. *See generally supra* note 22; *infra* note 26; *see also* Building Blocks for the Development of an International Framework on Space Resources Governance: A Commentary (Olavo de O. Bittencourt Neto et. al. eds. (2020).

26. *See, e.g.*, Larsen, *Solving*, *supra* note 22, at 496–517; Tronchetti, *supra* note 22, at 44–85; Larsen, *Asteroids, supra* note 22, at 322–26; Lee, *supra* note 22, at 273–313; Gbenga Oduntan, Sovereignty and Jurisdiction in the Airspace and Outer Space: Legal Criteria for Spatial Delimitation 218–19 (2012); Yangzi Tao & Guoyu Wang, *The International Regime Governing Exploitation of Natural Resources in Outer Space: Potential Process of Formulation*, *in* 58th IISL Colloquium on the Law of Outer Space, Proceedings of the International Institute of Space Law 43, 51 (Rafael Moro-Aguilar et al. eds., 2015); Paxson, *supra* note 22, at 510; Tennen, *supra* note 22, at 827–29; Mary Button, *Cleaning Up Space: The Madrid Protocol to the Antarctic Treaty as a Model for Regulating Orbital Debris*, 37 Wm. & Mary Env't. L. & Pol'y Rev. 539, 558–67 (2013).

27. Hasin, *supra* note 19, at 1079, 1118–22; *see also* Gershon Hasin, *Developing a Global Order for Space Resources: A Regime Evolution Approach*, 52 Geo. J. Int'l L. 77, 141–46 (2020) [hereinafter Hasin, *Resources*].

## I. The Fallacies of the Space Law Approach to the Regulation of Outer Space Activities

Professor W. Michael Reisman explains that "[i]mages of a court and the tools appropriate for it are so deeply embedded in our minds that in academic inquiries we hypothesize problems or conflicts as if they are going to be resolved by a court — even when no court or tribunal is in sight."[28] Operating in what Reisman described as "offshore zones" of international law, which are, in simpler terms, un- or under- developed fields of international law and governance,[29] one must remember that a "*lawful* resolution may require a different method of advocacy and decision from the usual textual and rule-based methodologies applied in a legal enclave; *lawful* resolution may not be as tidy as the simple application of a rule."[30] As Reisman explains with characteristic eloquence:

> In the international political process, there are many situations in which radical political and legal change is not proceeding in the institutions (if any) which are supposed to be making those decisions. In contexts in which the power to make choices meaningful depends not on an effective institution, such as you would find in an idealized developed legal system, but rather on securing (which may mean compelling) agreement between actors in shifting coalitions with different power configurations and different interests and in situations in which those actors are trying to innovate or terminate law, international lawyers operate at their peril and the peril of those they represent, if they proceed as if they were before a court, relying on inherited legal texts. They disserve those who have entrusted their lives and treasure to them if, like the proverbial economist on a desert island with nothing but a can of beans who "assumes a can-opener," international lawyers assume constitutive arrangements, when there is no court with the power to give effect to them and the arrangements in those legal texts have no remit in that situation. Yet international lawyers betray international law if they simply assume that a lawful decision cannot be made in each unique situation.[31]

The governance of outer space today from the perspective of international law is not merely an offshore zone, it is practically a remote desert. As further elaborated below, the 'rules' are composed primarily of broad and vague 'principles,' non-legally binding instruments, and lack any meaningful enforcement. These 'rules,' if they may be labelled that way, have become

28. Reisman, *supra* note 19, at 31.
29. *Id.* at 24–25.
30. *Id.* at 31 (emphasis in original).
31. *Id.* at 34.

outdated with the changing participants, circumstances, and interactions. Not only is the authoritativeness of these "rules" questionable, but no constitutive arrangements are in sight.

The fallacies produced by the space law perspective stem, inter alia, from the use of terminology which gives the illusion of comprehensiveness, authority, control, and endurance to the applicable rules. Lawyers operating within the rule-based mode are trained to seek analogies in caselaw, different legal fields, and through comparative analysis of other jurisdictions. Thus, when scholars and lawyers analyze the regulation of outer space activities from the perspective of space law, by analogy we assume the rules are comprehensive, authoritative, or enduring, as if we were analyzing aspects of international environmental law, international investment law, or the Law of the Sea. Analogies have even been drawn to concepts from these fields of global governance.[32] Similarly, referring to the 1967 Treaty as the "Outer Space Treaty," draws an apparent parallel between it and the "Law of the Sea Convention." Yet these fields of law and instruments are profoundly different.

The 1967 Treaty, which is the main instrument of "law" in outer space activities, is a relic of the Cold War era and represents a balancing exercise between the values of the capitalist and communist systems of public order.[33] The treaty is mainly an instrument of minimum order intended to prevent foreseeable conflicts and enforced through reciprocity. It provides for weapons control, repatriation of personnel and equipment, prohibits military maneuvering, and denies sovereignty claims (which are, to this day, in any event unenforceable against others).[34] As for optimum order, it provides only vague principles whose prospective effectiveness is doubtful at best.[35] The instrument lacks any enforcement mechanism and is subject to a rapid unconditional denunciation provision.[36] Such treaties or even non-legally

32. A common analogy concerns the Law of the Sea and primarily the International Area and the Common Heritage of Mankind. *See* Hasin, *Resources, supra* note 27, at 141–48.

33. *See, e.g.*, Blount & Robison, *supra* note 22, at 167–68 (suggesting that the instrument balances between capitalist and communist perspectives).

34. 1967 Treaty, *supra* note 16, arts. II, IV, V, VIII. Some minimum order provisions were, unconvincingly, interpreted by scholars to apply to aspects of the optimum order such as resource extraction. *See* Hasin, *Resources, supra* note 27, at 87–97.

35. 1967 Treaty, *supra* note 16, arts. I, III, VI, VII, IX, X, XII. *See, e.g.,* Paul B. Larsen, *Does New Space Require New Liability Laws*, 68 GERMAN J. AIR & SPACE L. 196 (2019) (discussing the limits of liability where it comes to space activities); *see also* Hasin, *supra* note 19, at 1084–88 (discussing the limited obligations and ramifications of the applicable rules for space debris mitigation).

36. Any party to the treaty may withdraw from it upon one year notice for any reason. 1967 Treaty, *supra* note 16, art. XVI. It is interesting to compare it to other treaties concerning arrangements of minimum order. *See, e.g.*, G.A. Res. 50/245, Comprehensive Nuclear-Test-Ban Treaty, arts. VI, XI (Sept. 17, 1996) (providing for dispute settlement subject to consent and 6-months withdrawal); 1963 Test Ban Treaty, art. IV, May 8, 1963, 480 U.N.T.S. 43 (providing for 3-months withdrawal notice). Legally binding dispute settlement is quite rare in international law but there have been verification mechanisms for compliance such as in the Intermediate-Range Nuclear Forces Treaty.

binding instruments may in fact shape policy choices.[37] Yet crunching the rules may result in an overestimation of control over decision.

Rather than acknowledging its nature and referring to it as the "1967 Treaty on Principles," treating it as the 'Outer Space Treaty' gives the instrument an undeserved aura of authority, control, comprehensiveness, and endurance. As if this treaty, which is merely two-pages long, with seventeen provisions including administrative ones, is conceptually comparable to the United Nations Convention on the Law of the Sea ("UNCLOS"). The latter is a small book, extending to over three hundred provisions, not including its Annexes, which provide for, inter alia, legally binding dispute settlement mechanisms.[38] In the same vein, treating the applicable rules as "space law," implies not only authority and comprehensiveness but also endurance and an assumption of ability to control the policy choices of participants. When one approaches a situation from the perspective of "law" and understands the problem solely in terms of a "rule" that has purportedly been breached, the act is naturally treated judgmentally, rather than considering how other participants perceive it, and thus how the governance will evolve in its wake.[39]

In addition, the term space law is too constricted a term to encompass how international law shapes decisions of participants in outer space. It has long been recognized that where it comes to the governance of a human activity, international law shapes the decisions of participants through both direct and indirect rules.[40] With regards to outer space, the direct rules are the formal treaties such as the 1967 Treaty, and the indirect rules include international rules governing transnational trade, investment, environmental harm, and more. It is clear that with respect to space activities, preventing conflicts, ameliorating any negative externalities, and optimizing gains in values for international stakeholders depends not only on the formal treaties directly applicable to such activities but also on the application of indirect rules.[41] Given the limited scope and authority of direct rules, the comprehensive international rules governing transboundary harm, trade, or invest-

37. *See* Susan Biniaz and Jonathan Pershing, Negotiating the Paris Agreement 143–44 (2021); Susan Biniaz, *Comma but Differentiated Responsibilities: Punctuation and 30 Other Ways Negotiators Have Resolved Issues in the International Climate Change Regime*, 6 Mich. J. Env't. & Admin. L., 37, 57–60 (2016).

38. United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].

39. *See* W. Michael Reisman, *International Incidents: Introduction to a New Genre in the Study of International Law*, 10 Yale J. Int'l L., 1, 4, 17 (1984) (contrasting the approach of lawyers with the realities of international incidents as norm generators).

40. Direct rules refer to those international norms that directly govern the specific sphere of human activities, while indirect rules refer to those which govern other spheres of human activity but produce a spillover effect on the former sphere of human activity. On regime complexity, see Karen Alter & Kal Raustiala, *The Rise of International Regime Complexity*, Ann. Rev. L. & Soc. Sci. (2018); *see also* Eyal Benvenisiti & George Down, *The Empire's New Clothes*, 60 Stan. L. Rev. 595, 597–98 (2007) (criticizing the effects of fragmentation on international regulation).

41. *See, e.g.*, Peter Malanczuk, *The Relevance of International Economic Law and the World Trade Organisation (WTO) for Commercial Outer Space Activities*, *in* Proceedings of the Third ECSL Colloquium 305 (R.A. Harris ed., 1999); Hasin, *supra* note 19, at 1091–98.

ment, may shape policy choices concerning space activities more than a "principle" from the 1967 Treaty (such as the "harmful contamination" principle, which merely provides for a due regard obligation and "consultations"). The 'space law' approach thus fails to appreciate the complexity of governance in space and overestimates the effects of direct rules.

Furthermore, when observing the international legal process, it becomes clear that certain disputes, such as those concerning the textual rules-based application of norms, may be essential for promoting the common interest.[42] Such conflicts in fact promote the rule-based public order rather than producing conflicts which threaten the security of participants.[43] Yet with limited and vague international norms in place, and absent any dispute settlement through which a textual-rules-based approach may be effectively applied, disputes over aspects of space activities may indeed lead to the deterioration of inter-state relations. Members of the authoritarian public order have already threatened security where it comes to space activities through weapons testing and threats to the International Space Station.[44] International instruments must therefore reduce security risks to preserve minimum order, but also provide for broad participation in the decisionmaking process to promote human dignity to secure value generation for as many participants as possible.

To illustrate the inappropriateness of the law approach to current interactions and applicable rules in outer space, this article will consider two fields of governance: the extraction of space resources and the mitigation of space debris. These fields offer a keen insight into the future of space governance from two distinct directions. The former concerns the long-term development of a regime regulating access to resources and deals with policies of broad application such as property rights, safety regulations, the exclusion of others, international equity, and perhaps aspects of sovereignty itself. The latter is of more immediate concern and relates to space traffic, security, and financial risk management and perhaps has environmental and human rights implications. With respect to the goals of minimum order and optimum order, moreover, both fields give rise to potential divergence points for the authoritarian and democratic systems of public order. The article will explain the misconceptions produced by the law approach, first as to the extraction of space resources and then as to the mitigation of space debris.

42. *See* Monika Hakimi, *Constructing an International Community,* 111 Am. J. Int'l L. 317 (2017) (suggesting that "conflict, especially conflict that manifests in law, is not necessarily corrosive to an international community. To the contrary, it often is a unifying force that helps constitute and fortify the community and support the governance project.").

43. *Id.*

44. *See supra* text accompanying notes 11–18.

### A. The Extraction of Space Resources

When it comes to developing a regime to govern space resources, scholarship has been preoccupied with the interpretation and application of the rules in the 1967 Treaty,[45] while overestimating their authority, control, and endurance.[46] In addition to this process of "rule-crunching," scholars have dealt far too heavily in "regime transplantation," primarily through analogies to the current Law of the Sea.[47] Both avenues fail to appreciate the international process of authoritative decision making, thus constraining our ability to think about the potential and anticipated development of space governance.

Much ink has been spilled on the interpretation of the principle found in Article II of the 1967 Treaty and its application to space resource extraction.[48] This provision, which in fact relates more to the preservation of minimum order by prohibiting *de jure* and *de facto* claims of sovereignty,[49] has led to widespread claims that the extraction of space resources is illegal or only conditionally legal.[50] Other scholars have distinguished resource exploitation from sovereignty claims and have consequently not interpreted the pro-

45. As the principles are drafted broadly and vaguely, it is, in fact, their interpretation by the specific author which is treated as authoritative by that author. A different author, with a different perspective, may assume that an entirely different interpretation is thus authoritative.

46. *See, e.g.*, Dunk, *supra* note 22, at 86; LEE, *supra* note 22, at 166–92; LYALL & LARSEN, *supra* note 22, at 163–88; TRONCHETTI, *supra* note 22, at 26–29; Larsen, *Asteroids*, *supra* note 22, at 277–90; Paxson, *supra* note 22, at 491–96; Tennen, *supra* note 22, at 804–11; Blount & Robison, *supra* note 22, at 169.

47. ODUNTAN, *supra* note 26, at 218–19; Tao & Wang, *supra* note 26, at 51; Paxson, *supra* note 22, at 510; TRONCHETTI, *supra* note 22, at 244–85; Larsen, *Asteroids, supra* note 22, at 314; LYALL & LARSEN, *supra* note 22, at 186; J. O'Donnell, *Benefit Sharing: The Municipal Model, in* PROCEEDINGS OF THE THIRTY-NINTH COLLOQUIUM ON THE LAW OF OUTER SPACE, INTERNATIONAL INSTITUTE OF SPACE LAW OF THE INTERNATIONAL ASTRONAUTICAL FEDERATION 156 (1996); Tennen, *supra* note 22, at 827–29; Samuel Roth, *Developing a Law of Asteroids: Constants, Variables, and Alternatives*, 54 COLUM. J. TRANSNAT'L L. 827, 861–62 (2016); LEE, *supra* note 22, at 273–313. Others have proposed to mimic it on the regulation of frequencies and orbits by the International Telecommunications Union. *See, e.g.*, Frans G. von der Dunk, *Private Property Rights and the Public Interests in Exploration of Outer Space*, 13 BIOLOGICAL THEORY 142, 144–45 (2018); Larsen, *Asteroids*, *supra* note 22, at 306–07, 320; Rishari Baruah & Nandini Paliwal, *Sustainable Space Exploration and Use: Space Mining in Present and Future Perspectives*, 58 PROC. INT'L INST. SPACE L. 23, 37–39 (2015); Ezra J. Reinstein, *Owning Outer Space*, 20 NW. J. INT'L L. & BUS. 59, 84–93 (1999).

48. The provision provides: "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." *See supra* note 46 and accompanying text.

49. Hasin, *Resources, supra* note 27, at 96.

50. *See, e.g.*, Melissa K. Force, *The Paradox of United States' Position in the Regulation of Space Resource Extraction*, *in* 59TH IISL COLLOQUIUM ON THE LAW OF OUTER SPACE, PROCEEDINGS OF THE INTERNATIONAL INSTITUTE OF SPACE LAW 259, 267 (P.J. Blount & R. Moro-Aguilar eds., 2016); Irmgard Marboe, *The End of the Concept of 'Common Heritage of Mankind'? The Views of State Parties to the Moon Agreement*, *in* 59TH IISL COLLOQUIUM ON THE LAW OF OUTER SPACE, PROCEEDINGS OF THE INTERNATIONAL INSTITUTE OF SPACE LAW 225, 230 (P.J. Blount & R. Moro-Aguilar ed., 2016). ODUNTAN, *supra* note 26, at 208, 218–19; Baruah & Paliwal, *supra* note 47, at 25; Paxson, *supra* note 22, at 494; Tennen, *supra* note 22, at 811; Andrew Lintner, *Extraterrestrial Extraction: The International Implication of the Space Resources Exploration and Utilization Act of 2015*, 40 FLETCHER F. WORLD AFFS. 139, 146–47 (2016); *see also* Larsen, *Asteroids*, *supra* note 22, at 282–84.

vision to mean that there is a prohibition on resource exploitation.[51] In addition to this provision, some scholars have even treated the broadly-worded provisions of Article I, including the phrases "the benefit and in the interests of all countries," "free for exploration and use," and "the province of all mankind,"[52] and the due regard obligation in Article IX, which merely requires "consultations" with parties that could be adversely affected by planned activities, as relevant instruments for shaping the decision of participants with regards to the extraction of resource.[53] More extreme versions included claims by scholars that there is customary law concerning extraction of space resources,[54] despite the absence of any relevant practice,[55] and of course, claims that Article II of the 1967 Treaty provides for a principle of *jus cogens*.[56] The "law" approach presumes that the applicable rules of the 1967 Treaty are enduring, control decision-making, and must necessarily lie at the foundation of any regime. The fallacy of such an assumption is clear from the recent Artemis Accords, which recognize property rights as between the parties,[57] and the emphasis of the Chinese space program, which will likely serve as the foundation for an alternative framework in cooperation with Russia on resource extraction.[58] The norms governing the extraction of resources are developing in light of changing circumstances and interactions, rather than being contained by a textual interpretation of existing "rules."[59] Recently, the Japanese company ispace was granted a license to extract resources on the Moon which it will sell to NASA;[60] this provides for a clear example of lawmaking and norm creation via the Artemis program.

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51. *See, e.g.*, Roth, *supra* note 47, at 841; Marboe, *supra* note 50, at 232. Such interpretation was adopted by the United States in the U.S. Commercial Space Launch Competitiveness Act, § 402, 51 U.S.C. §§ 51301–03, and recently in the Artemis Accords.

52. *See, e.g.*, Lee, *supra* note 22, at 158, 161; von der Dunk, *supra* note 22, at 86–87.

53. *See, e.g.*, Lee, *supra* note 22, at 159–60; von der Dunk, *supra* note 22, at 88.

54. *See, e.g.*, Lee, *supra* note 22, at 171; Lyall & Larsen, *supra* note 22, at 170–73; Ram S. Jakhu & Steven Freeland, *The Relationship Between the Outer Space Treaty and Customary International Law*, 59 Proc. Int'l Inst. Space L. 183, 191–92 (2016); Oduntan, *supra* note 26, at 193–94, 204–05.

55. *See* Hasin, *Resources*, *supra* note 27, at 108.

56. *See, e.g.*, Lyall & Larsen, *supra* note 22, at 73; Carl Q. Christol, *Judge Manfred Lachs and the Principle of Jus Cogens*, 22 J. Space L. 33, 43–44 (1994); Jakhu & Freeland, *supra* note 54, at 191.

57. Artemis Accords, §10, art. 3. Although there was some initial pushback, the Artemis framework is gaining momentum.

58. *See generally* The State Council Information Office of the People's Republic of China, *China's Space Program: A 2021 Perspective* (Jan. 28, 2022), http://www.china.org.cn/china/2022-01/28/content_78016843.htm [https://perma.cc/SN5P-SNR3]. Although Russia initially objected to the U.S. recognition of property rights to space resources, its objection seems to have wavered as it pursues its own resource exploitation with China. *See* von der Dunk, *supra* note 47, at 149.

59. *See generally* Hasin, *Resources*, *supra* note 27 (suggesting that the Accord's treatment of space resources could be viewed as a claim to modify applicable norms through interpretation).

60. Press Release, ispace, inc., Ispace Receives License to Conduct Business Activity on the Moon from Japanese Government (Nov. 8, 2022), https://ispace-inc.com/wp-content/uploads/2022/11/EN_ispace_release_20221108_SpaceResourcesAct.pdf [https://perma.cc/MC85-HEUG]; Edd Gent, *NASA Will Buy Lunar Dust in the First Commercial Transaction on the Moon*, Singularity Hub (Nov. 14, 2022), https://singularityhub.com/2022/11/14/a-japanese-startup-is-about-to-carry-out-the-first-ever-commercial-transaction-on-the-moon/ [https://perma.cc/A5NP-SM2L].

Many authors both assume that the purported prohibition on resource commercialization in the 1967 Treaty is enduring and refer to the Law of the Sea as a potential source for "regime transplantation." Scholarship has consistently proposed making the regulation of space resources mimic the International Area under UNCLOS, the Common Heritage of Mankind, through an international entity akin to the International Seabed Authority.[61] This is puzzling for two reasons. First, ocean governance illustrates both a strong preference for exclusive rather than inclusive resource allocation.[62] Second, ocean governance demonstrates that governance of a common area is neither *a priori* nor enduring but rather evolves with the changing circumstances in connection with the interests and capabilities of participants to actually exploit resources.[63] The resources regime of the seabed and the subsoil, or the continental shelf, provides a prime example of this development. Rather than simply looking at the text of UNCLOS and the 1994 Implementation Agreement and transplant the regime of the International Area to space resources, it is preferable to understand what that regime is, how and why it developed, which resources it was intended to govern, and how it was shaped and delineated. As the Area is "the seabed and ocean floor and subsoil thereof, *beyond the limits of national jurisdiction*,"[64] the delineation of the "national jurisdiction," that is, the continental shelf and exclusive economic zone, is critical for understanding the context of the arrangement rather than confining ourselves to its text.[65]

The continental shelf is the natural extension of the coastal state's territory into and under the sea that includes sovereign rights to extract resources, particularly petroleum and natural gas.[66] Tracking the Law of the Sea back to the 19th century, we emerge at the age of the *mare liberum*, the free ocean. Given the unique risks they faced, coastal states were allowed a narrow exclusive security zone, called the territorial sea.[67] Beyond the narrow territorial sea, interactions were governed by the freedom of the high seas, with inclusive access to resources.[68] But after technological developments in the twentieth century began to enable the extraction of seabed and

61. *See, e.g.*, Larsen, *Asteroids*, *supra* note 22, at 314; LEE, *supra* note 22, at 273–313; LYALL & LARSEN, *supra* note 22, at 186; Paxson, *supra* note 22, at 510; Tennen, *supra* note 22, at 827–29; TRONCHETTI, *supra* note 22, at 244–85; ODUNTAN, *supra* note 26, at 218–19; Tao & Wang, *supra* note 26, at 51; O'Donnell, *supra* note 47, at 156; Roth, *supra* note 47, at 830, 861–62.

62. Eric Posner & Alan Sykes, *Economic Foundation of the Law of the Sea*, 104 AM. J. INT'L L. 569, 570 (2010); Jonathan Charney, *Rocks That Cannot Sustain Human Habitation*, 93 AM. J. INT'L L. 863, 865–66 (1999); *see also* Gershon Hasin, *Ocean Governance in the 21st Century: A New "Package-Deal" to Balance Mare Liberum and Mare Clausum*, 48 YALE J. INT'L L. (forthcoming). It would be interesting to see whether this paradigm may change with the recent High Seas Treaty.

63. *See generally* Posner & Sykes, *supra* note 62.

64. UNCLOS, *supra* note 38, art. 1.

65. *See also* Hasin, *Resources*, *supra* note 27, at 141–48.

66. UNCLOS, *supra* note 38, art. 76.

67. DONALD ROTHWELL & TIM STEPHENS, INTERNATIONAL LAW OF THE SEA 1–4, 60–66 (2nd ed., 2016).

68. *See id.*

subsoil resources, in 1945, the United States decided to claim exclusive sovereign rights over the resources of its continental shelf.[69] This represented, for all intents and purposes, a seizure of otherwise inclusive resources by a very powerful actor. Through the process of claim and counterclaim, the lawmaking process then produced the 1958 Convention on the Continental Shelf, which allowed a seaward extension of coastal state rights that were governed by an ambiguous exploitability criteria for shelf resources.[70] In 1982, UNCLOS proclaimed that the continental shelf rights of coastal states would be extended *ipso facto* up to the edge of the continental margin, even though they would in part be subject to verification and revenue-sharing.[71] The margin was defined through two scientific formulas intended to capture the bulk of accessible and commercially viable resources for the coastal states.[72] Only the least accessible, and as yet commercially unexploitable, resources were left as the Common Heritage of Mankind to be inclusively exploited.[73] In other words, the UNCLOS regime was founded on a "package-deal" that balanced the interests of broad margin and narrow margin states,[74] producing a regime that allocated most of the then accessible ocean resources to coastal states.[75]

Formerly inclusively-used resources forming part of the *mare liberum* were transformed through the international lawmaking process into what seemed to be the exclusive possessions of all coastal states.[76] This transformation illustrates that the international norms for governing common areas are neither *a priori* nor enduring; rather, they are shaped through interactions in light of changing circumstances and technological innovation. It thus exposes the fallacy of attempting to impose an outcome, in this case, the governance of the International Area, onto space resources which are part of an entirely distinct set of interactions.[77] A focus on outcomes rather than the interactions producing them fails to appreciate that a proposed regime must be feasible for adoption by the participants considering their conflicting and correlating goals, interests, and points of leverage. By focusing on the text of UNCLOS as to the International Area, rather than trying to understand the context of the arrangement and the distribution it produced, one risks falling into a "mirage" trap. The Common Heritage of Mankind is delineated

69. *Id.*

70. Convention on the Continental Shelf, Apr. 29, 1958, 433 U.N.T.S. 311.

71. UNCLOS, *supra* note 38, arts. 76, 77, 82.

72. *Id.*, art. 76.

73. This regime was effectively modified in 1994 to accommodate the interests of developed coastal States. G.A. Res. 48/263 (Aug. 17, 1994).

74. Hasin, *Resources*, *supra* note 27, at 141–46.

75. The subjection of OCS resources to revenue-sharing and verification providing for only limited inclusivity for otherwise exclusive rights. It should also be mentioned that most fisheries are located within 200nm from coasts thus falling within the regime of the exclusive economic zone. Donald Rothwell & Tim Stephens, International Law of the Sea 87 (2nd ed., 2016).

76. The EEZ regime, which incorporates the shelf within 200nm of coasts, provides such rights irrespective of natural prolongation. UNCLOS, *supra* note 38, at art. 56–57, 76.

77. Hasin, *supra* note 27, at 141–46.

by assigning most accessible and commercially viable resources, oil and natural gas, exclusively to coastal states, reserving inaccessible precious metals for inclusive use. If the Law of the Sea developed to prefer exclusive rather than inclusive resource rights, why would states agree to subject all the resources of space to inclusivity? If the Law of the Sea could serve as a blueprint for space resources, it should be evaluated in its context and broad sense, not the narrow sense of the Area.[78]

In addition to the mistaken 'regime transplantation' methodology, the 'law' approach follows a misguided legalistic process. The erroneous treatment of the principles of the 1967 Treaty as authoritative, controlling, and enduring norms is best exemplified by their purported elevation to customary law and *jus cogens*. Simply put: there is no actual, general state practice when it comes to space resources, especially by non-parties to the 1967 Treaty, and we should avoid treating a technological inability to exercise a claim as an indication that the contrary claim is customary law.[79] This article will focus on purported claims to *jus cogens* or peremptory norms and, specifically, claims that Article II of the 1967 Treaty gives rise to such a norm concerning sovereignty and commercial resource extraction in outer space.[80]

It is arguable that the 1967 Treaty should be, at least, credited with establishing the norm that space is a non-sovereignty area as a hard "rule," so to speak, of international law. In other words, even if one rejects the norm's application to resource extraction, its regime concerning sovereignty is enduring. But there are several problems with such a perspective. Sovereignty or lack of it, over parts of a common area, is subject to change due to technological development and changing circumstances. This has been observed, for example, with respect to the recognition of the sovereign territorial sea over areas previously governed by the *mare liberum,* as explained above. The erosion of this norm is further exhibited by the concept of evolving safety zones, as promoted by the Artemis Accords. As further risks and challenges emerge, the safety zones may develop to further enclose the open range. In any event, treating the governance of a common area, including norms of sovereignty or its equivalent over parts of it, as enduing or peremptory is unconvincing.

There are two international instruments that refer to peremptory norms:[81] the Vienna Convention on the Law of Treaties ("VCLT") and the International Law Commission ("ILC") Draft Articles on State Responsibility for Internationally Wrongful Acts ("ASR"), parts of both of which are consid-

78. *Id.* at 141–48.

79. *See id.* at 104–09.

80. *See, e.g.*, LYALL & LARSEN, *supra* note 22, at 73; Carl Q. Christol, *Judge Manfred Lachs and the Principle of Jus Cogens*, 22 J. SPACE L. 33, 41 (1994); Jakhu & Freeland, *supra* note 54, at 191.

81. The ILC is currently in the process of considering the topic of peremptory norms. *See* International Law Commission, Peremptory Norms of General International Law (Jus Cogens) (Jan. 16, 2023), https://legal.un.org/ilc/guide/1_14.shtml [https://perma.cc/BB7J-GFTA].

ered to reflect customary international law.[82] Articles 40 and 41 of the ASR concern breaches of peremptory norms and their implications for state responsibility. Comment 5 to Article 26 on the identification of peremptory norms provides that:

> The criteria for identifying peremptory norms of general international law are stringent. Article 53 of the 1969 Vienna Convention requires not merely that the norm in question should meet all the criteria for recognition as a norm of general international law, binding as such, but further that it should be recognized as having a peremptory character by the international community of States as a whole. So far, relatively few peremptory norms have been recognized as such. But various tribunals, national and international, have affirmed the idea of peremptory norms in contexts not limited to the validity of treaties. Those peremptory norms that are clearly accepted and recognized include the prohibitions of aggression, genocide, slavery, racial discrimination, crimes against humanity and torture, and the right to self-determination.

Although the Commentary recognizes that the listed norms are not exclusive and that other norms may be generated, several statements indicate the essential normative aspects of peremptory norms. As the Commentary explains "[t]he obligations referred to in article 40 arise from those substantive rules of conduct that prohibit what has come to be seen as *intolerable because of the threat it presents to the survival of States and their peoples and the most basic human values.*"[83] The Commentary refers to "aggression," "slavery and the slave trade, genocide, and racial discrimination and apartheid," "torture," and the "right to self-determination," as recognized peremptory norms. Thus, peremptory norms typically have a type of moral "black-flag" flying over them, to borrow a phrase from military law.[84]

Recognized peremptory norms immediately call to mind an old Latin term, *hostis humani generis*—the enemy of all mankind. The pirate, the slaver, the aggressor, the mass murderer, even the torturer[85]—all rightfully labelled

82. *See, e.g.*, Armed Activities on the Territory of the Congo (Democratic Republic of the Congo v. Uganda), *Judgment*, para. 70, 2022 I.C.J. Rep. (Feb. 9, 2022); *see also* Vienna Convention on the Law of Treaties, May 23, 1969, 1155 U.N.T.S. 331; Draft Articles on Responsibility of States for Internationally Wrongful Acts, [2001] 2 Y.B. Int'l L. Comm'n., U.N. Doc. A/CN.4/SER.A/2001/Add. 1 (Part 2) [hereinafter ILC Articles on State Responsibility]. The presumption that the Articles on State Responsibility were intended to be strict rules reflecting customary law is disputed. *See* W. Michael Reisman & Mahnoush H. Arsanjani, *Has Attribution Lost Its Way* (forthcoming) (on file with the author).

83. *See* ILC Articles on State Responsibility, *supra* note 82, at 112 (emphasis added).

84. CM MR 3/57, *Military Prosecutor v. Major Malinki and Others*, Isr. D.C. 17 90 (1957) (Israel). On manifestly unlawful order, see Antonio Cassese, International Criminal Law 268–78 (2nd ed., 2008); Int'l Comm. of the Red Cross, *Rule 155 Defence of Superior Orders*, https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule155 [https://perma.cc/43SY-VGTC].

85. Brownlie's Principles of Public International Law 581–83 (9th ed., James Crawford ed., 2019); Report of the International Law Commission, Seventy-First Session, at ch. V, conclusion 23, U.N. Doc. A/74/10 (2019); William E. Conklin, *The Peremptory Norms of the International Community*, 23 Eur. J.

*hostis humani generis*.[86] Per the ILC Articles, a breach by a state of such norms leads to its isolation from the international community as a pariah.[87] Yet extending the concept of peremptory norms to the regulation of a common area is unconvincing. Not only is it inconsistent with the fact that such international norms evolve with technological innovation as explained above, but can we truly ascribe to the notion that a claim breaching a norm governing the distribution of access to resources in a common area is "intolerable because of the threat it presents to the survival of states and their peoples and the most basic human values"? Does anyone truly believe that, even if, arguendo, Article II of the 1967 Treaty on Principles does prohibit exclusive resource extraction, the space resource extractor is the enemy of all mankind? Was President Truman the enemy of all mankind when he proclaimed exclusive sovereign rights over the continental shelf in contrast to the prevailing *mare liberum*? Yet even if a state gains the military ability to exclude others and claims sovereignty in space or on a celestial body, is that substantively different from the emergence and development of the territorial sea? Would it threaten basic survival or undermine basic human values? It would not. Such an act would simply be a response to the changing technological and factual circumstances that will evolve through the international legal process. The notion of treating the governance of an area as peremptory is not only substantively and conceptually wrong but it also unnecessarily constrains policy thinking.

As the Law of the Sea demonstrates, the governance of a common area is a dynamic process of claims and counterclaims, and treating any element of it as enduring in the face of changing circumstances and technological innovation is unhelpful.[88] Thus, when developing a global order to govern space resources, the "law" approach leads to misconception and unnecessarily constrains our policy thinking through "rule-crunching" and "regime transplantation." It is preferable to approach the regulation of common areas from a governance perspective, focusing on how interactions between the participants will — and prospectively should — shape the regime. In considering the existing and anticipated interactions between the participants involved, one can identify an evolutionary development process for space

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INT'L L. 837, 858 (2012); W. Michael Reisman, *Unilateral Action and the Transformations of the World Constitutive Process: The Special Problem of Humanitarian Intervention*, 11 EUR. J. INT'L L. 3, 15 (2000); Office of the U.N. High Commissioner for Human Rights, *Abolishing Slavery and its Contemporary Forms*, 3, HR/PUB/02/4 (2002); Joaquín Alcaide Fernández, *Hostes humani generis: Pirates, Slavers, and Other Criminals*, in THE OXFORD HANDBOOK OF THE HISTORY OF INTERNATIONAL LAW (Bardo Fassbender & Anne Peters eds., 2012); Erika de Wet, *The Prohibition of Torture as an International Norm of Jus Cogens and Its Implications for National and Customary Law*, 15 EUR. J. INT'L L. 97, 98 (2004).

86. The U.S. Court of Appeals wrote in *Filartiga:* "the torturer has become—like the pirate and slave trader before him—hostis humani generis, an enemy of all humankind." Filartiga v. Pena-Irala, 630 F.2d 876, 890 (2nd Cir., 1980).

87. ILC Articles on State Responsibility, *supra* note 82, art. 41.

88. This proposition is true even today where it comes to the regime established by the UNCLOS. *See generally* Hasin, *Ocean Governance*, *supra* note 62.

resource governance, following a series of stages that are, in turn, feasible, effective and manageable.[89] Once each stage fails to provide for optimum order or threatens minimum order, norms will evolve to the next feasible stage.[90] A governance rather than a law approach thus produces policy proposals attuned to the realities of interactions and the process of claims and counter-claims through which international law develops.

### *B. The Negative Externality Produced by Space Debris Proliferation*

Space debris is a negative externality of immediate concern which presents increasing risks and challenges to space traffic.[91] Ameliorating the effects of this transboundary negative externality through mitigation and adaptation is a current policy problem, stemming from the increase in participants, privatization, and weapons testing.[92] Confronting the proliferation of space debris may prove essential as space activities develop and privatize. But approaching this externality from the perspective of law, leads again to an overestimation of the authority, control, and endurance of applicable rules, producing policy proposals that are ultimately not feasible.

The recent exchanges between the United States, the Russian Federation, and China at the United Nations concerning space debris mitigation present the perfect example for the limited ability of applicable rules to shape policy choices for space debris. When China complained that the private U.S. initiative, Starlink, presented risks to its space operations,[93] the United States responded by de facto indicating that any such risk is within that anticipated by the applicable rules which the United States follows.[94] When the United States complained that a Russian weapons test produced significant quantities of debris, moreover, Russia explained that the test did not violate its commitments under the non-legally binding mitigation guidelines.[95] In

89. Hasin, *Resources*, *supra* note 27, at 146–60.

90. *Id.*

91. *See* Alexander William Salter, *Space Debris: A Law and Economics Analysis of the Orbital Commons*, 19 STAN. TECH. L. REV. 221, 224–27 (2016); Akhil Rao & Giacomo Rondina, Cost in Space: Debris and Collision Risk in the Orbital Commons (2020) (unpublished manuscript) (on file with the author); Molly K. Macauley, *The Economics of Space Debris: Estimating the Costs and Benefits of Debris Mitigation*, 115 ACTA ASTRONAUTICA 160, 161 (2015); U.N. Office for Outer Space Affairs, *Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space* (2007), [hereinafter COPUOS Guidelines]; G.A. Res. 74/82, International Cooperation in the Peaceful Uses of Outer Space, A/RES/74/82 (Dec. 26, 2019); Inter-Agency Space Debris Coordination Committee, *IADC Space Debris Mitigation Guidelines* (Sept. 2007) [hereinafter IADC Guidelines]; Space Policy Directive-3: National Space Traffic Management Policy, 2018 Daily Comp. Pres. Doc. 431 (June 18, 2018).

92. *See* Hasin, *Debris*, *supra* note 19; Larsen, *Solving*, *supra* note 22.

93. Note Verbale Dated 3 December 2021 from the Permanent Mission of China to the United Nations (Vienna) Addressed to the Secretary-General, U.N. Doc. A/AC.105/1262 (Dec. 10, 2021).

94. Note Verbale Dated 28 January 2022 from the Permanent Mission of the United States of America to the United Nations (Vienna) Addressed to the Secretary-General, U.N. Doc. A/AC.105/1265 (Feb. 3, 2022).

95. *See* Theresa Hitchens, *No Love from Russia for UN Military Space Norms Meeting*, BREAKING DEFENSE (Feb. 9, 2022), https://breakingdefense.com/2022/02/no-love-from-russia-for-un-military-space-norms-meeting/ [https://perma.cc/2267-UJRD].

a similar sense, the recently-concluded Artemis Accords between the United States and its allies simply provide for a vague best efforts obligation to mitigate debris, rather than any strict obligations in that regard.[96] These examples demonstrate that the applicable law is ill-equipped to provide an effective solution, yet the "law" approach would have states and scholars believe that applicable rules are authoritative and control the decisions of states regarding space debris mitigation.

The 1967 Treaty contains provisions for liability, responsibility, and ownership regimes for space objects and accidents.[97] Yet the treaty provides no enforcement mechanism, and while the supplemental 1972 Liability Convention does provide for a dispute settlement mechanism in form of a claims commission, its award would only be legally-binding if the states consented.[98] For anyone versed in international investment law, it is clear that the difference between a treaty which provides for state consent to arbitration and one in which dispute settlement is conditioned on consent to arbitration is the difference between an investor potentially recouping losses and the investor being thrown out of court, so to speak. When it comes to affecting policy choices of states, non-legally binding dispute settlement often produce the same result as "consultations" with the other state — that is, they could accomplish very little.[99] Yet scholarship dealing with debris is preoccupied with legalistic analysis of applicable rules on liability and responsibility, assuming that their mere invocation will incentivize states to mitigate debris.[100] In a similar sense, it assumes that the "ownership" of a piece of debris somehow precludes an interested participant from removing that debris.[101] As if Russia would take countermeasures if the United States removed a piece of Soviet debris. The law approach thus wrongfully assumes that applicable rules are authoritative and controlling without considering their effects on interactions.

The concept of "responsibility" illustrates even further the fallacy of the 'law' approach where it comes to applicable law and its development. The 1967 Treaty provides for state responsibility over "national activities," whether governmental or not, and requires states to authorize and supervise such activities.[102] This has been widely interpreted as imposing state responsibility for the effects of all activities by "nationals."[103] It is questionable

96. Artemis Accords, *supra* note 16, § 12.

97. 1967 Treaty, *supra* note 16, arts. VI, VII, VIII.

98. Liability Convention, *supra* note 24, art. XIX(2).

99. Standard setting agreements and other soft law instruments do play a role in the lawmaking process, but they are no substitute for arrangements that are enforceable.

100. *See* Hasin, *supra* note 19, 1080–89.

101. *Id.*; *see also*, *e.g.*, Larsen, *Solving*, *supra* note 22, at 486, 518–19; Muñoz-Patchen, *supra* note 22, at 246; Jakhu et al., *supra* note 22, at 130–33; Arpit Gupta, *supra* note 22, at 238–41.

102. 1967 Treaty, art. VI.

103. *See generally* Frans G. von der Dunk, *The Origins of Authorisation: Article VI of the Outer Space Treaty and International Space Law*, *in* National Space Legislation in Europe 3 (2011).

whether such an interpretation is sound from a textual perspective.[104] In any event, from a contextual vantagepoint, the increase and potential independence of private space activities undermines the effectiveness and manageability of such a rule of responsibility, especially where technical elements such as those underlying debris proliferation are concerned.[105] In other words, as state control over activities is reduced, is it still reasonable to impose responsibility for private activities on states which may translate to internationally wrongful acts by the state? If corporations may become outliers on their own accord,[106] is this a manageable or effective international policy to impose overall responsibility over their activities on states? As space activities mature and privatize, the international community ought to consider adjusting state responsibility over private activities. International norms in this regard should either align with the rules of attribution under the ILC's Articles on State Responsibility or confine state responsibility over private activities to mere supervision which is a 'due diligence' type of norm.[107] Yet the legalistic approach simply assumes that the existing norms, and their interpretations, are authoritative, controlling, and enduring.

Moving from the descriptive to the prescriptive, the space law approach significantly constrains our thinking about the development of international law. Two misconceptions must be fleshed out. First, taking a law approach leads one to assume that top-down command and control rules may be feasible, appropriate, or will successfully sway the policy choices of participants toward increased mitigation of an externality. Second, a law approach limits our prescriptive analysis to evaluating rules directly governing outer space activities, rather than recognizing their limited effectiveness and instead considering the potential of indirect norms to affect policy choices.

Many have proposed economic measures, such as fees or taxes, when it comes to space activities in general or debris mitigation in particular,[108] but

104. The treaty provides:

> States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty.

1967 Treaty, *supra* note 16, art. VI. Even from a purely textual perspective, "national activities" does not mean all activities by nationals.

105. Hasin, *supra* note 19, 1136–37.

106. *See, e.g.*, Caleb Henry, *FCC Fines Swarm $900,000 for Unauthorized Smallsat Launch*, Space News (Dec. 20, 2018), https://spacenews.com/fcc-fines-swarm-900000-for-unauthorized-smallsat-launch/ [https://perma.cc/4PDB-J239].

107. Hasin, *supra* note 19, 1136–37.

108. *See, e.g.*, Megan R. Plantz, *Orbital Debris: Out of Space*, 40 GA. J. Int. & Comp. L. 585, 610–17 (2012) at 607; Lyall & Larsen, *supra* note 22, at 514; Muñoz-Patchen, *supra* note 22, at 255; Larsen, *Solving*, *supra* note 22, at 485–86; Peter Stubbe, State Accountability for Space Debris 449

such an approach disregards the international lawmaking process.[109] In domestic settings economic instruments are widely used to affect the decisions of those subject to the law, but such an approach works, inter alia, because the individual's consent to be bound by the rule is not a prerequisite. Smokers cannot excuse themselves from a tax on tobacco products; that would defy common sense.[110] But international law works in precisely that way. For economic measures to affect decisions concerning space debris mitigation they must be accepted, complied with, and enforced on virtually all relevant participants. With the increase in privatization, coupled with the emergence of a competing system of public order, an outlier state not subject to such an instrument may easily attract private investors by reducing costs and could thus undermine the effectiveness and manageability of economic measures.[111]

An exclusively space law perspective is also too narrow in this regard. The fragmentation of international legal arrangements may have adverse effects in certain instances, yet where it comes to governing intractable problems on the international plane,[112] it may produce benefits by overcoming a collective action dilemma. In a recent publication, the author suggested considering how small modifications to the applicable rules governing international investment may shape, even incrementally, decisions which affect space governance and how the incentives and capabilities of the various participants are geared toward such modifications.[113] As the process of claims and counter-claims initiated by the Artemis Accords unfolds and develops rules through interactions, we must recognize that rules governing, for example, human rights, trade, environmental protection, or investment, indirectly affect decisions which reduce international externalities in space activities. For some problems, this strategy may prove increasingly beneficial in face of a gridlocked international lawmaking process.

## II. Space Governance: A Policy-Oriented Perspective

Given the limited 'law' in outer space, and especially its limited authority, control, and endurance, it is more appropriate to approach the regulation of activities in outer space from the perspective of space governance.

(2018); Nodir Adilov, Peter J. Alexander & Brendan M. Cunningham, *An Economic Analysis of Earth Orbit Pollution*, 60 Environ. & Resource Econ. 81, 83–85 (2015).

109. Hasin, *supra* note 19, at 1122–25.

110. *Id.*

111. *Id.*

112. *See generally* Kelly Levin et al., *Playing it Forward; Path Dependency, Progressive Incrementalism, and the "Super Wicked" Problem of Global Climate Change* (2010) (unpublished manuscript), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.464.5287&rep=Rep1&type=pdf [https://perma.cc/CM4T-KA35]; Richard J. Lazarus, *Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future*, 94 Cornell L. Rev. 1153, 1159 (2009); Horst W. J. Rittel & Melvin M. Webber, *Dilemmas in a General Theory of Planning*, 4 Pol'y Scis. 155 (1973).

113. Hasin, *supra* note 19, at 1147–57.

Space governance is distinct from space law in two aspects. First, it approaches incidents, policy questions, or regime formulation, not through the lens of applicable law, via the rule-based approach, but rather through problem solving by focusing on the participants involved, their bases of power, the circumstances in which interactions occur, and the probable and preferred outcomes of those interactions. Second, it views the regulation of outer space activities through a broad perspective, taking account of norms directed at other fields of human activity such as, inter alia, trade, investment, human rights, and environmental protection.[114] Although this approach may be applied to other developing aspects of international law, this article is focused on space activities. This section will therefore first (A) explain the general contours of policy-oriented jurisprudence, and then (B) explain its application as a space governance perspective to the regulation of outer space activities.

### *A. Policy-Oriented Jurisprudence*

The *Regime Evolution Approach*, introduced and developed in the author's previous work,[115] lays at the foundation of the proposed space governance perspective. This approach is derived from the policy-oriented jurisprudence of the New Haven School of International Law,[116] which treats the development of international law as a process of claims and counterclaims between the various participants involved in the international legal process. A policy-oriented jurisprudence is "a 'theory *about* law' rather than a 'theory *of* law,'" which observes international law from a "vantage point outside of it."[117] A policy-oriented jurisprudence does not merely "map the complex and changing international decision process" but is shaped to enable the scholar and policymaker to "project the range of probable outcomes and to enhance the skills necessary for influencing them so that preferred outcomes ensue."[118] This approach focuses on the process of the development of norms, through domestic and international interactions by various actors.[119] In basic terms, from a New Haven School perspective international arrangements are

114. This is not to say that such norms should be transplanted, *mutatis mutandis*, to govern a specific space activity but rather that such norms de facto shape space activities by affecting the policy choices of participants.

115. *See generally* Hasin, *supra* note 27; Hasin, *supra* note 19; Hasin, *supra* note 62.

116. *See generally* McDougal et al., *supra* note 7; Myres S. McDougal, Harold D. Lasswell & W. Michael Reisman, *The World Constitutive Process of Authoritative Decision*, 19 J. Legal Educ. 253 (1967); W. Michael Reisman, Siegfried Wiessner & Andrew R. Willard, *The New Haven School: A Brief Introduction*, 32 Yale J. Int'l L. 575, 576 (2007).

117. Reisman, *supra* note 19, at 30; Myres S. McDougal, Harold D. Lasswell & W. Michael Reisman, *Theories about International Law: Prologue to a Configurative Jurisprudence*, 8 Va. J. Int'l L. 188, 199 (1968).

118. Reisman, *supra* note 19, at 30–31.

119. *See generally* Harold Hongju Koh, *Transnational Legal Process*, 75 Neb. L. Rev. 181, 181–206 (1996); Harold Hongju Koh, *Is There A "New" New Haven School of International Law?*, 32 Yale J. Int'l L. 559–72 (2007); On the evolution of social norms *see generally* Robert C. Ellickson, *The Evolution of Social Norms: A Perspective From the Legal Academy*, *in* Social Norms 35–75 (Karl-Dieter Opp & Michael Hechter eds., 2001).

instruments intended to affect the policy choices of participants toward the common interest. This means two things.

First, the "authoritativeness" of an international instrument is not treated as a given. When a rule is purportedly breached, a New Haven scholar is concerned with the responses of other participants to such events to understand the rule's authority, and the process through which international law develops. For example, when approaching the interpretation of a treaty, it is important to first consider the enforcement mechanism and the denunciation provision and only afterwards review the rest of the treaty. Understanding the enforcement and durability of the instrument informs our reading of the substantive provisions of the treaty. It helps us understand what type of governance regime the parties intend to establish, how authoritative it is, and whether in fact, and if so how, it was intended to shape the policy choices of the parties, and perhaps indirectly, those of non-parties. However, enforcement mechanisms alone are not determinative of a treaty's authority. A *weak* legally binding instrument may be the intended result of its creators, or a treaty's rules become outdates as a product of a change in circumstances after its formation. Meanwhile, non-legally binding instruments may compel surprising authority.[120]

Second, the New Haven School looks at law not merely as an instrument to affect policy choices, but also as one intended to shape such choices toward the common interest. The common interest is not the interest of everyone—that is an error many make. The common interest is a balance produced between the participants involved based on their correlating and conflicting goals, interests, and points of leverage. The common interest includes the preservation of minimum order, which is defined as the prevention of conflict, and the promotion of optimum order, which is defined as the aggregate gain in international values for as many participants as possible.[121] While the New Haven School is geared toward reducing international problems stemming from negative externalities, its primary focus is the common interest—and not the most efficient outcome, which is the focus of an economic approach.

For both a descriptive and prescriptive analysis, the Regime Evolution Approach proposes to split the discussion into three inter-connected elements termed "feasibility," "effectiveness," and "manageability." Feasibility refers to whether a proposed governance regime is likely to be adopted by the participants involved, accounting for their conflicting and correlating goals, interests, and points of leverage. Effectiveness considers whether the proposed regime will actually optimize the gains in international values for the participants. The final element, manageability, considers the ability of an arrangement to sway the policy-choices of reluctant participants, or outli-

120. *See* Reisman, *supra* note 19, at 110 (discussing the proposition that non-legally binding arrangements may be authoritative and controlling).

121. *See supra* notes 15–17.

ers, to contribute to its effectiveness.[122] By considering these three elements, one can identify whether an existing regime is no longer effective or manageable and whether it is likely to evolve to one which is. But when searching for potential avenues, one must bear in mind that a regime must be feasible and correspond to the interests of participants.

One must also bear in mind that the transnational legal process through which international and domestic norms are shaped encompasses both domestic and international interactions and may revolve around fields of governance other than those directly relating to the regulated sphere of activity.[123] The process of claims and counterclaims occurs domestically and internationally, producing rules which shape the policy choices of participants toward the common interest. But, as alluded to above, it is also important to consider how indirect rules shape the decisions of participants toward the common interest.

### *B. Analytical Components of the Space Governance Perspective*

A policy-oriented jurisprudence analysis follows six analytical steps: (1) delineate the public policy problem in terms of all the values implicated; (2) identify the participants involved and their goals, interests, and points of leverage; (3) define the international values participants will employ and the regime must optimize; (4) place the public policy problem within the complex international public order; (5) consider the interactions between the participants; and (6) ascertain the anticipated outcomes of the interactions.

At its core, the shift from space law to space governance requires shedding the predominant textual-rules-based approach to legal analysis of outer space activities in favor of the contextual-policy-based mode of thinking.[124] Although the formulation of a policy-oriented approach through the review of participants, values, and interactions, may seem mechanical or susceptible

122. *See* Hasin, *supra* note 62.

123. On regime complexity, see generally Alter & Raustiala, *supra* note 40.

124. As Michael Reisman explains:

> Rather than the question as to which rules apply, the questions underlying the contextual-policy-based decision-making are (1) what ought to be the goal values of the community with respect to the values concerned; (2) which practicable arrangements will most efficiently optimize the production and distribution of those goal values in short-term and longer-term projected contexts; and (3) how can those arrangements be installed. The tasks involved in answering these questions include, at a minimum, (1) the clarification and specification of community policy; (2) the examination of the extent to which that policy is currently being achieved in ways compatible with other relevant policies; (3) the identification of the factors that account for achieving or failing to achieve the policies; (4) the extent to which existing arrangements are likely to realize the policies in various imagined futures; and, if the prognosis is that the policies are unlikely to be secured, (5) the invention of alternative arrangements which are more likely to realize the policies. Instead of compliance with rules, the decision-maker operating in this mode is concerned with assessing the production and distribution of values in preferred ways.).

Reisman, *supra* note 19, at 127–28.

to abuse, it is a dynamic rather than a mechanical methodology. A space governance discussion needs not follow these elements mechanically, but consider all these components in a descriptive or prescriptive evaluation of a public policy challenge in outer space activities.

1. *Delineating the Public Policy Problem*

A policy-oriented analysis first requires delineating the specific public policy problem within the process of international lawmaking and applying. One should thus consider (i) the common interest, and (ii) the applicable law.

The nature of the common interest is context-dependent, and thus requires placing the public policy problem within the overall objective of the governance regime. In other words, a policy-oriented perspective is interested in understanding how the emerging public policy problem affects the preservation of minimum and the promotion of optimum order. For example, where it comes to space debris proliferation, it is important to appreciate that the goal is not to reduce space debris but rather to promote space activities. This may indicate, for example, that adaptation and mitigation serve to complement one another where it comes to producing a balance that promotes the public policy goal.[125] While certain types and locations of debris, such as weapons testing, may produce conflicts which undermine the minimum order, other aspects, for example, increased costs due to complex traffic management or potential accidents, may sound in optimum order, thus requiring a more nuanced approach.

The second part of this component includes considering the applicable domestic and international law governing the specific activity. In contrast to a space law approach, the space governance analysis refrains from a legalistic analysis, in favor of considering whether, and if so how, applicable law affects the decisions of participants toward the common interest.[126] For example, by distinguishing between claims of sovereignty and resource extraction,[127] the United States chose to retain effective policies of minimum order in the 1967 Treaty, while laying a claim to amend one of optimum order. The prohibition on placing nuclear weapons in space affects policy-choices through mere reciprocity given its effects on minimum order. The same, however, cannot be said to be true where it comes to "harmful contamination" and the testing of anti-satellite weapons. This is so due to the actual or perceived need of world powers to perfect such capabilities, pre-

125. Hasin, *supra* note 19, at 1078–80.

126. REISMAN, *supra* note 19, at 127 ("The examination of rules and authoritative texts are not excluded from the scope of the contextual-policy-based mode of decision. Rules in extant legal arrangements will be examined, but rather than the grammatical and syntactical examination of the textual-rule-based mode, the rules are now considered in terms of the extent to which the social and economic consequences of their application will approximate the value goals of the relevant community.").

127. *See, e.g.*, U.S. Commercial Space Launch Competitiveness Act § 402, 51 U.S.C. §§ 51301–03.

sumably, to preserve the minimum order. Yet where it comes to optimum order, vague principles and non-legally binding dispute settlement bear little effect on policy choices. While "[i]nternational lawyers should certainly be committed to the application of formal authority and its enhancement and extension," it would be "irresponsible" as Reisman put it, to rely on "texts of formal authority uncorrected by verification that formal authority will be effective in that situation."[128]

The consideration of applicable law, however, must not remain limited to direct rules. Indirect rules about trade, investment, or environmental protection, may affect policy choices about a specific public policy problem in space. Understanding the way applicable law affects policy choices must thus extend not only to considering domestic norms which may shape international decisions, but also include indirect rules governing other spheres of activity.

### 2. *Identifying the Participants Involved*

To properly understand the process of international lawmaking and applying for outer space activities, one must identify the participants involved and their correlating and conflicting goals, interests, and points of leverage with regards to the public policy problem delineated in the previous step. It is important to bear in mind that various actors play a role in international and domestic decision-making processes. These include participants with formal powers, and actors which, though lacking official roles, continuously shape norms and policy choices through domestic and international interactions.[129] Where it comes to modern space activities, participants may be broadly distinguished into four groups: space-capable states, space-incapable states, international organizations, and private investors.

*Space-capable states* are participants which currently possess various space relevant capabilities which may affect the outcomes of interactions in outer space. Although states may have space capabilities which do not include travel, such as control over satellites or weapons, given the focus on interests and points of leverage, this category includes primarily those with space-faring capabilities. For certain public policy problems such as the testing of anti-satellite weapons, the category may prove to be more dynamic as the interests, goals, and leverages change based on subdivisions in relation to a specific public policy problem. Space-capable states may have divergent in-

128. Reisman, *supra* note 19, at 35.

129. Reisman, Wiessner & Willard, *supra* note 116, at 578 ("The participants in any decision process include those formally endowed with decision competence, such as executives, legislators and judges, and all those other actors who, though not endowed with formal competence, may nonetheless play important roles in influencing decision outcomes. In international decision, this means examining, in addition to formal international organizations, state officials, non-governmental organizations, pressure groups, interest groups, gangs, and individuals, who act on behalf of other participants and on their own".); Eyal Benvenisti, The Law of Global Governance ch. 2 (2014) (explaining the different entities of global governance: formal, informal, public-private, and private).

terests on certain issues in light of divisions between the competing systems of public order.

*Space-incapable states*, or states which currently lack space capabilities, form a separate interest group and comprise the majority of the international community. Given that inherent technological and financial limitations on access to space exist, the ability of these actors to exercise power where it comes to space activities, is quite limited. Nevertheless, with ever developing cyber capabilities, the ability to control satellites, development of anti-satellite weapons, and the attraction of space investors, the capacity of these participants to shape international norms is increasing. In certain aspects the interests of these participants may be aligned and in other aspects views may be diverse.[130] As a participant gains further capabilities, its interests, goals, and leverages may change, affecting interactions.

*International organizations,* either public or private, may shape decisions about space activities. Such organizations extend beyond the foundational organizations of the world public order, for example, the Organs of the United Nations, and may eventually extend to those focused on other fields, such as the World Bank, the World Trade Organization, the International Labour Organization, and the World Health Organization. States forming the authoritarian public order are espousing not only their alternative view of international law,[131] but also establishing competing institutions.[132]

Finally, *Private investors* are becoming ever more important participants in the development and application of international law for outer space activities. As investors may become outliers of their own accord, whether through independent launch or by relocating to a more favorable jurisdiction, a space governance approach must account for their interests and leverages in considering the application and formulation of governance regimes. As capabilities develop together with the increased distance from governmental control, the incorporation of investors in governance may become unavoidable and even keenly beneficial in certain aspects.[133]

The interests of the participants are complex, and may include financial, political, and security aspects, in addition to prestige, technological development, environmental protection, and pure power as a base for securing other objectives. As space activities develop and the technological and factual realities evolve, the participants may change, as well as their interests, leverages, interactions, and outcomes.

130. *See, e.g.*, Hasin, *supra* note 27, at 119–22 (discussing the divergence between space incapable states where it comes to resource extraction).

131. *See generally* Tom Ginsburg, *Authoritarian International Law?*,114 Am. J. Int'l L. 221 (2020).

132. *See, e.g.*, Owen, *supra* note 4.

133. *See* Daniel C. Esty & Dena P. Adler, *Changing International Law for a Changing Climate*, 112 AJIL Unbound 279, 284 (2018); Hasin, *supra* note 19, at 1137.

### 3. *Defining the Values*

The interactions between the participants, which will sound in international law making and applying, are shaped by base values, which are used to secure other values, and scope values, which are the values sought to be optimized. The ability of a participant to employ values to promote its interests affects the leverage it may exercise in interactions, while any proposed governance regime ought to optimize the gain in values for all participants: "[a] public order of human dignity is defined as one which approximates the optimum access by all human beings to all things they cherish."[134] Although the international values, as any norms,[135] may change as circumstances and capabilities develop, a modern space governance analysis must consider the following international values: wealth, skill or innovation, equity, security, health and safety, human dignity, environmental protection, and in certain circumstances, respect.

*Wealth* is a critical component for developing the necessary *innovation* for space activities. As space activities develop and privatize, the generation of wealth is rapidly becoming an essential component of any governance regime. The development and execution of space activities depends on wealth while commercialization indicates that the installation of rules allowing for the generation of wealth is essential. The degree of innovation a participant is able to generate will shape its ability to exert leverage on other participants. To promote space activities, any rules must promote innovation by participants for scientific, military, or commercial objectives, including spacecraft, facilities, communication, and more. Yet it is also important to appreciate that the accumulation and employment of wealth and innovation with respect to space activities is undergoing a transformation. Private actors may now employ wealth to access space and could even exercise leverage over public actors.

*Equity* in the distribution of access to space and the benefits to be provided is becoming ever more important. For the democratic public order to promote its values over the authoritarian order, equity is essential for generating cooperation by the developing world. In a world of competing systems of public order, neglecting equity in favor of the maximization of wealth or innovation may present risks to *security*. As mentioned above, emerging disputes in the application and development of international norms indicate that broad participation in the decision-making process is essential to promote *human dignity* and secure value production for as many affected stakeholders as possible. Opening the Artemis Accords to signature by other states is an important yet incomplete step to generate participation in the decision-making process.

134. Reisman eet al., *supra* note 116 at 576.

135. On the evolution of social norms, see generally Ellickson, *supra* note 119.

Where it comes to the optimum order, it is important to recognize that in addition to other values, *health and safety* of either personnel in space or people on the Earth will be affected by space activities. Whether positively through scientific research or negatively through accidents, space activities may produce significant effects on these values. Finally, the development of space activities produces positive and negative effects on the promotion of *environmental protection* whether on the Earth or, in the future, on other celestial bodies. Space activities are essential for mitigation and adaptation to climate change,[136] yet activities also produce various adverse environmental effects, such as emissions and debris, and must be balanced.[137] In this sense, it is important to ensure that innovation is geared toward sustainability as well as the aggregation of wealth and increase in power.

*Respect* or prestige, described by some sociologists as esteem,[138] is one of the core base values of the New Haven School.[139] While respect or prestige has been a core component shaping the decision-making of states throughout the second half of the 20th century, and particularly in the space arena,[140] its importance seems to have somewhat diminished on the international plane.[141] Nevertheless, with the resurgence of competing systems of world public order, prestige may become ever more important in certain spheres of activity, primarily in outer space.[142] It is also important to appreciate that because private entities are central participants in driving modern space activities, domestic interactions that in turn shape international norms will become increasingly important.[143] Because respect or esteem, plays a part in the evolution of norms by affecting the decisions of 'change agents'

136. *See, e.g.*, Paul B. Larsen, *Climate Change Management in the Space Age*, 45 WM. & MARY ENV'T. L. & POL'Y REV. 103 (2020).

137. *See* Hasin, *supra* note 19, at 1092–96.

138. Ellickson, *supra* note 119, at 37–38 (discussing the concept of esteem, indicating that others have referred to it as "future exchange opportunities").

139. MCDOUGAL, *supra* note 15, at 54.

140. *See* R. P. Dore, *Prestige Factor in International Affairs*, 51 INT'L AFFS. 190 (1975); Robert Kehler, *Power and Prestige in the Space Domain*, AEROSPACE SEC. (Apr. 12, 2018), https://aerospace.csis.org/power-and-prestige-in-the-space-domain/ [https://perma.cc/LUB5-U66T]; PETER STUBBE, STATE ACCOUNTABILITY FOR SPACE DEBRIS 41 (2017); PRESIDENT'S SCI. ADVISORY COMM., INTRODUCTION TO OUTER SPACE, (Mar. 26, 1958), https://history.nasa.gov/sputnik/16.html [https://perma.cc/PBL6-X8YD].

141. While U.S. President Obama has generated much respect, and was even awarded the Nobel Peace Prize, after his 2009 Cairo speech, respect toward the United States has failed to generate meaningful progress, while other values, and primarily security and wealth, have been able to reshape Middle-East relations during a rather un-esteemed period. *See, e.g.*, The Abraham Accords Declaration, Sept. 15, 2020, https://www.state.gov/the-abraham-accords/ [https://perma.cc/GV9E-DZS2].

142. *See* Yuen Foong Khong, *Power as Prestige in World Politics*, 95 INT'L AFFS. 119 (2019); *See, e.g.*, Emma Graham-Harrison & Tom Phillips, *China Hopes "Vaccine Diplomacy" Will Restore its Image and Boost Its Influence*, GUARDIAN (Nov. 29, 2020), https://www.theguardian.com/world/2020/nov/29/china-hopes-vaccine-diplomacy-will-restore-its-image-and-boost-its-influence [https://perma.cc/T4WD-HFWU]. While the prestige of Russia has suffered in Ukraine, this has not led to a halt on its operations as of July 2022, and one may even argue that the conquest of Ukraine must continue to restore Russia's prestige and thus its power.

143. On the process through which domestic interactions shape international norms, see generally Koh, *supra* note 119.

and 'norm entrepreneurs,'[144] it may shape international norms in space more than it does other types of international norms. Simply put, prospective gains in respect may offset losses in other values, primarily wealth, thus provoking participants to advocate a change in norms through practice or advocacy.[145] Examples for such process include the launch of a car to space,[146] or a trip by a wealthy individual,[147] irrespective of the negative externalities produced in the process.

Consideration of how these values are employed and optimized with respect to each public policy problem informs us not only on the interests and leverages of participants, but on the strategies they will employ to optimize their gain in values internationally. It is therefore essential to understand these values before considering the interactions which will shape international and domestic norms of space governance.

### 4. *Placing the Problem Within the Complex Global Order*

The public policy problem must be placed within the complex global order before turning to an evaluation of the interactions between the participants. Although international rules in general are intended inter alia to ameliorate negative externalities,[148] the problems facing international policymakers may include elements of cooperation, coordination, or regulation,[149] and even exhibit characteristics of what has been termed "wicked" or even "super-wicked" problems.[150] Defining the specific public policy problem allows scholars to understand how the conflicting and correlating goals, interests, and leverages of the participants will shape the process of international lawmaking. While a certain problem may allow for convening a parliamentary diplomatic arena, allowing for broad participation, a different problem may exhibit characteristics which make it unlikely for such an arena to materialize or succeed.

144. Ellickson, *supra* note 119, at 40–45 (discussing change agents and norm entrepreneurs).

145. *Id.*

146. Kevin McKenna, *We've Trashed the Oceans; Now We are Turning Space Into a Junkyard for Billionaires*, GUARDIAN (Feb. 10, 2018), https://www.theguardian.com/commentisfree/2018/feb/11/weve-trashed-oceans-now-turning-space-into-junkyard-for-billionaires-elon-musk-tesla [https://perma.cc/AB8F-3XFX].

147. Jackie Wattles, *Jeff Bezos Just Went to Space and Back*, CNN (July 20, 2021), https://www.cnn.com/2021/07/20/tech/jeff-bezos-blue-origin-launch-scn/index.html [https://perma.cc/A9LW-WZZM].

148. Eric Posner & Alan Sykes, *Economic Foundation of the Law of the Sea*, 104 AM. J. INT'L L. 569, 569–70 (2010).

149. *See* Eyal Benevenisti, *The WHO—Destined to Fail?: Political Cooperation and the COVID-19 Pandemic*, 114 AM. J. INT'L L. 588, 589–90 (2020).

150. These are problems that essentially defy solution because of: (i) various conflicting interests; (ii) uncertainties about future effects of the externality; (iii) uneven distributions of costs, benefits, and responsibility between participants; (iv) no ability to define an "end" for the problem; (v) long-term effects, path dependency of adopted governance; and critically, (vi) the discounting of certain long-term and undefined risks by decision-makers. On wicked problems, see Levin et al., *supra* note 112; Lazarus, *supra* note 112, at 1159; Rittel & Webber, *supra* note 112; *see also* Hasin, *supra* note 19, at 1129–30.

It is therefore important to reflect on the development of other international regimes, not to mimic extant ones through regime transplantation. We should understand how, and critically why, certain problems led to a particular process of lawmaking, producing certain outcomes.[151] The legislative history of other regimes can inform how policymakers should approach novel problems. The focus must be the *characteristics* of the public policy problem underlying the interactions which developed other regimes, rather than the specific regime produced by the interactions, which is a unique outcome. Applied to emerging problems in outer space, it is helpful to consider other regimes of global governance only to the degree that the characteristics of the interactions underlying those regimes' development are similar; attempting to imprint an outcome without accounting for its feasibility will have only accidental benefit.

In addition, it is also important to appreciate the interrelation between the specific public policy problem and other aspects of global governance. Understanding how existing rules of global governance shape the policy choices which affect the specific public policy problem allows for a more complete understanding of interactions. Existing regimes shape interactions and decision-makers must account for such realities when responding to emerging issues. It is important to appreciate how existing regimes such as trade, investment, human rights, humanitarian law, environmental protection, labor, liability, and others shape the governance of human activity in outer space. The space law element is, in fact, a very limited part of the overall mosaic of international and domestic rules shaping policy choices in space.

5. *Considering the Interactions Between Participants*

The analysis conducted in the previous steps lays the foundation for appreciating the current or anticipated interactions between the various participants involved in the process of international lawmaking and law-applying. Understanding the public policy problem, the interests of the participants, the international values, and the circumstances which underlie the interactions, one may grasp how the interactions and outcomes will unfold. Interactions revolve around the application of existing norms as well as the development of norms due to changing circumstances. Interactions will be affected by the strategies participants will employ to optimize their gain in values, whether on the Earth, in outer space, or on celestial bodies.

It is important to appreciate that not all rules are authoritative and controlling to a similar degree. When incidents in which a rule is supposedly breached are concerned, as indicated above, it may be more important to consider the reactions of other participants, than to engage in rule-crunching. In this sense, interactions may indicate the interpretation of a rule by

151. *See* REISMAN, *supra* note 19, at 138; Hasin, *supra* note 19, at 1118.

participants and whether an evolutionary interpretation may be appropriate. Interactions may indicate that a rule is to be enforced, amended through interpretation, disregarded, or even revoked and abandoned as outdated. Interactions may indicate the limited authoritativeness of a given rule due to vagueness or give rise to disputes in the application of the law. Not all disputes in this sense would endanger the minimum order to the same degree. As Monika Hakimi pointed out, disputes on the application of law and the identification of custom are in fact integral components of international law.[152] Disagreements over applicable rules are at the heart of recent disputes between the United States, Russia, and China concerning space debris mitigation.[153] Although these disputes may promote the development of norms with that effect, the substance of the disagreement indicates the rather vague and unenforceable nature of existing norms which limits their ability to shape policy choices.

The same holds true for interaction occurring in the process of international lawmaking. Disagreements may lead to discussions which develop norms, yet conflicts of interests may limit the ability to reach consensus and adopt norms. It is thus unhelpful to propose an international rule detached from the interactions between the participants, as they may hold limited potential for adoption. The divide between the competing systems of public order exacerbates problems associated with international lawmaking and must be taken into account in prospective analysis of potential interactions which will shape international law. Where it comes to the development of governance for space resource extraction, for example, the responses of other participants to the 2015 U.S. legislation recognizing property rights and the Artemis Accords adopted in their wake are key factors in the process of prescribing space governance. In the same sense, when considering the development of rules concerning space debris mitigation, the interactions surrounding weapons testing and the Starlink program may indicate the potential avenue for international law. The analysis of interactions forms the foundation for identifying the outcomes.

### 6. *Ascertaining the Outcomes*

Outcomes of interactions comprise the final and first step in a policy-oriented analysis. It is the last step because one may identify whether an applicable rule should remain or how it may evolve. It is the first step because the outcomes of interactions will then instigate a process of claim and counterclaim through which the rules will evolve, producing new interactions and outcomes. The evaluation of outcomes must be based on a realistic appraisal of the anticipated interactions. As Reisman cautioned:

152. *See* Hakimi, *supra* note 42, at 356.
153. *See supra* Section I.B.

> [i]t would be lovely if every problem in the international legal process were simply the Jessup Moot writ large, if all the challenges which the international lawyer will confront in the twenty-first century were susceptible to a quick fix, such as an amendment to one of the major architectonic documents of the twentieth century or the creation of some new institution or dreaming up a novel legal argument for an international tribunal. Unfortunately, things are often more complicated . . . .[154]

For legal or policy suggestions to affect policy choices, they must be feasible for adoption and manageable vis-à-vis outliers, not merely effective at ameliorating a specific transboundary problem.

Where it comes to prescriptive analysis the international legal process indicates that space governance will develop in stages through a process of regime evolution.[155] Rather than attempting to jump to a world of countless participants and impose an overall regime disconnected from interactions, a space governance approach must develop the rules in incremental steps as circumstances change. This is the approach taken by the United States in the Artemis Accords in the form of evolving safety zones.[156] Space governance may evolve to include cooperation, coordination, and regulation as interests and circumstances change. Yet each such outcome must be attuned to the interactions between the participants in order to gain consensus and be adopted. Such an outcome must be feasible, effective, and manageable. But when the outcome is no longer effective and manageable given a change in circumstances, it will evolve to one which is.

## III. Application of the Space Governance Perspective

Having explained the fallacies of the space law perspective and delineated the components of the space governance analysis, it is important to briefly illustrate its application. As alluded to above, the application of policy-oriented jurisprudence to public policy aspects of space resource extraction and space debris proliferation has been done elsewhere.[157] This Section first briefly recalls the application of the approach to resource extraction and space debris, and then comments on two issues facing space governance in light of the resurgence of conflict between competing systems of world public order. Given the theoretical focus of this Article, the pursuant analysis will be brief; an in-depth analysis is reserved for future work.

International norms governing the extraction of space resources, as other common areas, are shaped to allocate inclusive and exclusive rights and obli-

154. Reisman, *supra* note 19, at 35–36.
155. *See* Hasin, *supra* note 27, at 146–59.
156. *See* Artemis Accords, *supra* note 18.
157. *See, e.g.*, Hasin, *supra* note 27; Hasin, *supra* note 19.

gations.[158] Considering the participants involved in extracting space resources, the values affected, and the anticipated interactions, the process of claims and counter-claims will generate international norms through four successive stages: pioneers, coordination, allocation, and regulation.[159] The current norm of inclusive access will slowly be shaped through interactions to include initial coordination between relevant actors to prevent disputes and conflicts, to then evolve to an ex ante exclusive allocation of access founded on the initial coordination.[160] In this process, states, international organizations, and private entities, through the process of claims and counter-claims (others may distinguish such claims as between change agents, norm entrepreneurs, or opinion leaders[161]), will produce a regime balancing exclusive and inclusive rights, consistent with the changing participants and the evolving technological and factual circumstances in each stage of development.[162]

Space debris, from a public policy perspective, is a negative externality which increases costs and risks for participants in space. Yet given the benefits of space activities and the need to promote the capabilities of developing actors, international norms must "prioritize the protection and promotion of the benefits and reduction of the costs from space activities for all participants, rather than be fixated on mitigating a particular activity's externality."[163] A policy-oriented analysis is geared toward not only identifying gaps in international norms but applying a contextual analysis to propose revisions which will be the most effective and manageable at optimizing gains in values. Given the conflicting and correlating interests, goals, and points of leverage of the various participants concerning space debris, interactions may produce a bottom-up, nationally-based, regime of cooperation which is not only feasible but effective at optimizing the aggregated gain in values for affected stakeholders and will be manageable vis-à-vis outliers.[164]

Based on lessons learned from the development and application of regimes governing climate change, the law of the sea, and international investment law, a feasible, effective, and manageable regime for space debris should be composed of seven elements: principle norms of best efforts, dynamic target setting for mitigation, verification of compliance through transparency, bot-

158. *See, e.g.*, McDougal, *supra* note 15 (focusing on space resources); Hasin, *supra* note 62 (focusing on ocean governance); Harold Demsetz, *Towards a Theory of Property Rights*, 57 Am. Econ. Rev. 347 (1967) (focusing on property rights but using different terminology).

159. Hasin, *supra* note 27, at 146–59.

160. *Id.*

161. Ellickson, *supra* note 119, at 40–51.

162. Hasin, *supra* note 27, at 146–59. From a policy-oriented perspective, changes in circumstances include not only technological, normative, and factual realities but also changes in the composition and interests of the participants. From a sociological perspective, these changing circumstances may be distinguished as events which produce events triggering change in norms: consider an exogenous shock creating new economic conditions within a stable group, or a group adding or losing members. *See* Ellickson, *supra* note 119, at 49–51.

163. Hasin, *supra* note 19, at 1075.

164. *Id.* at 1133–58.

tom-up engagement of the private sector, dispute settlement, assistance in traffic management, technological and monetary assistance for mitigation, and the adjustment of arrangements governing international investment to counteract incentives for a regulatory race to the bottom.[165]

Let us turn now to the resurgence of competing systems of world public order and their effects on the governance of outer space. The Russia-Ukraine War of 2022 has shown that an authoritarian public order is emerging to compete with the democratic public order. It is important to appreciate that China is not satisfied in merely being a naysayer in a U.S.-led global order. China has been promoting alternative international institutions to compete with those of the U.S.-led public order,[166] and the sanctions imposed by the West on Russia only hastened the separation between the Russian economy and the West but have yet to bring about changes in Russian practices. The authoritarian order is asserting its own values and interpretation of international norms and arrangement.[167] As the divergence clarifies, outer space again becomes an arena of conflict, and disputes between the competing systems of world public order manifest themselves.

As mentioned above, shortly after its invasion of Ukraine, a high-level official of the Russian Federation threatened to de-orbit the International Space Station. That may have been an impulsive and empty threat, but it has led the United States to rethink international cooperation in space, seeking alternatives to existing arrangements.[168] The threat itself followed a process in which Russia and China have allied themselves in promoting a space program to compete with the Artemis framework of the United States and its allies.[169] The Artemis Accords and the competing Chinese Space Program demonstrate the likely trajectory for the development of space governance in the coming years. Rather than trying to achieve agreement through a parliamentary diplomatic arena and to generate broad consensus, the path is to respond to immediate and foreseeable concerns between some or all of the active and relevant participants.[170]

Given the differences between the two systems of public order, there will likely be some divergence in norms governing the activities of participants within each system based on different political and social vantagepoints. Yet interactions between members of the two systems which will generate disputes and conflicts between them may promote convergence on new norms to preserve minimum order or even promote optimum order. To be sure, the divergence itself does not preclude the installment of arrangements between

165. *Id.*

166. *See* Owen, *supra* note 4.

167. *See* Ginsburg, *supra* note 131, at 223.

168. *NASA Exploring ISS 'Flexibility' After Russia Threatens Space Station Collaboration*, TIMES ISR. (Feb. 28, 2022), https://www.timesofisrael.com/nasa-exploring-iss-flexibility-after-russia-threatens-space-station-collaboration/ [https://perma.cc/Y2XB-3XBB].

169. *See supra* note 18 and accompanying text.

170. As a point of reference, as of April 2023, 21 states have signed the Artemis Accords.

the two systems, when interactions and circumstances provide for the necessary incentives. As a point of reference, many arrangements of general application were installed during the Cold War. It was a period in which many key international arrangements existing today were negotiated and installed.

The competing systems of public order may create risks to the preservation of minimum order. While the United States is yet to alter the regime governing the militarization of space, the U.S. Space Force has been pursuing the development of spy satellites in the corridor between the Earth and Moon, including a lunar base.[171] In a similar sense, there is the Chinese-Russian initiative to establish a lunar base.[172] Though these participants have yet to lay claims to alter the current norms of sovereignty and military activities, as circumstances change, such claims may materialize and the process of claims and counter-claims will continue.[173] Where it comes to the testing of anti-satellite weapons, the major powers have been conducting them with limited regard to the effects of space debris generated in the process. However, given that the leading participants in both systems of public order, the United States, China, and Russia, have conducted successful tests of such weapons, the events surrounding the prohibition of atmospheric testing of nuclear weapons may repeat given that the risks now outweigh the benefits of continued testing as the powers have achieved that capability.[174] As a point of reference, to prevent an arms race, the United States has recently imposed a self-ban on the testing of anti-satellite weapons, and instigated the adoption of a resolution at the General Assembly calling for such a ban.[175] It should, however, be noted that Russia and China objected to this resolution with India abstaining,[176] and other emerging space powers may be reluctant to consent given the need to develop such

171. Bryan Bender, *Moon Battle: New Space Force Plans Raise Fears over Militarizing the Lunar Surface*, POLITICO (Mar. 12, 2022), https://www-politico-com.cdn.ampproject.org/c/s/www.politico.com/news/2022/03/12/space-force-moon-pentagon-00016818?_amp=true [https://perma.cc/NG89-AUZ5].

172. *See supra* note 18 and accompanying text.

173. As a point of reference, U.S. officials have accused China of planning to occupy the moon, a claim China has strongly denied. *See NASA Accuses China of Intent to Take over the Moon, China Rejects,* JERUSALEM POST (July 4, 2022), https://www.jpost.com/international/article-711179 [https://perma.cc/MF9U-G6UZ].

174. Hasin, *supra* note 19, at 1106–07.

175. GA Res. 77/41, *Destructive Direct-Ascent Anti-Satellite Missile Testing*, U.N. Doc. A/RES/77/41 (Dec. 12, 2022); *Fact Sheet: Vice President Harris Advances National Security Norms in Space*, WHITE HOUSE, (Apr. 18, 2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/04/18/fact-sheet-vice-president-harris-advances-national-security-norms-in-space [https://perma.cc/T7BU-YT9U]; *Seven Countries Join ASAT Test Ban*, ARMS CONTROL ASSOCIATION (Nov. 2022), https://www.armscontrol.org/act/2022-11/news-briefs/seven-countries-join-asat-test-ban [https://perma.cc/WJ2J-KVDG].

176. China and Russia objected to the resolution, calling for a ban on destructive ASAT testing in the U.N. *See* U.N. Doc. A/RES/77/41, *supra* note 175; *see also 'Stop The Hypocritical Practice' – Russia, China Respond To US Pledge To Ban 'Destructive' Anti-Satellite Weapon Tests,* THE EURASIAN TIMES (Apr. 19, 2022), https://eurasiantimes.com/srussia-china-respond-to-us-pledge-to-ban-anti-satellite-tests/ [https://perma.cc/4HWJ-PV42].

weapons as risks to security increase. As a point of reference, India has conducted such a test in recent years.[177]

To consider the effects of the resurgence of competing systems of public order on space governance we should first understand the effects on the promotion of the common interest and the effectiveness of applicable law. As explained above, the war in Ukraine, and the employment of private and public satellite capabilities during it,[178] indicate significant risks to the preservation of minimum order in space.[179] Although none of the parties has yet to lay claim to amend any of the norms applicable to minimum order in space, the fact that such norms depend on reciprocity may limit their endurance as circumstances change. The push toward militarization together with the inherent mistrust of competing systems of public order will likely generate claims of exclusion where it comes to lunar operations.[180] As for optimum order, a convergence is visible for the extraction of resources, yet the interrelation between such process and arrangements governing trade and investment between the blocs will only become clear as operations unfold. It should, however, be appreciated that the apparent demise of cooperation in space may undermine the optimum order and present risks to the minimum order.

Two immediate problems of public policy arise. First is how to coordinate activities between the two competing frameworks so as to reduce tensions and potential conflicts in lunar operations. Second is how to leverage the fact that both blocs possess anti-satellite weapons capabilities to limit the proliferation of such weapons and prohibit further disruptive testing. By considering the interactions between these various participants, one may identify that the applicable arrangements provide limited avenues for effective remedies. A prescriptive analysis must therefore begin by considering the various participants involved and their correlating and conflicting goals, interests, and points of leverage.

177. Helen Regan, *India Anti-Satellite Missile Test a "Terrible Thing," NASA Chief Says*, CNN (Apr. 2, 2019), https://www.cnn.com/2019/04/02/india/nasa-india-anti-missile-test-intl/index [https://perma.cc/7QPS-LQH5].

178. Vivek Wadhwa & Alex Salkever, *How Elon Musk's Starlink Got Battle-Tested in Ukraine*, FOREIGN POL'Y (May 4, 2022), https://foreignpolicy.com/2022/05/04/starlink-ukraine-elon-musk-satellite-internet-broadband-drones [https://perma.cc/H569-6EYR]; Mike Brest, *Eye in the Sky: Satellite Imagery Proves Vital to Understanding Ukraine War*, WASH. EXAM'R (Apr. 14, 2022), https://www.washingtonexaminer.com/policy/defense-national-security/satellite-imagery-proves-vital-to-understanding-ukraine-war [https://perma.cc/TCM8-YJX5]; Sandra Erwin, *Commercial Spy Satellites Put Russia's Ukraine Invasion in the Public Eye*, SPACE NEWS (Feb. 27, 2022), https://spacenews.com/satellite-imaging-companies-increase-profile-as-they-track-russias-invasion-of-ukraine/ [https://perma.cc/6JV9-FRYU].

179. Borowitz, *supra* note 14, at 4–6; Tingley, *supra* note 14, at 2; Koplow, *Reverse Distinction*, *supra* note 14, at 41.

180. *See, e.g.*, *supra* note 173.

### *A. Coordination Between the Competing Public Orders in Space*

As explained above, the development of human activities in the Earth orbit and on the moon proceeds through the two competing frameworks lead by the United States, and the China-Russia partnership. These developments have already generated disputes between the competing powers with respect to the Earth orbit and will likely further create disputes over lunar operations. Disputes may include conflicts surrounding resources, frequencies for communication and orbits, incidental damage, or reconnaissance and espionage. Although the extent and scope of such disagreements is yet to be revealed, the establishment of evolving safety zones indicates both the recognition of risks and an open-ended approach to their prevention and resolution.[181] It is therefore evident that procedures must be put in place for preventing and arresting the escalation of such disputes to avoid risks to minimum order and ensure optimum gain in values. Yet, when dealing with competing systems of public order, international arrangements of cooperation and firm regulation become elusive and difficult to negotiate and sustain. It is therefore proposed that a limited regime of coordination between the participants is a feasible, effective, and manageable outcome.

The preservation of minimum order requires that such coordination cover, at the very least, activities which may produce adverse effects on security and safety. Yet disputes over access to natural resources may themselves escalate to the inter-state level, and thus, any coordination must extend to prevent mutual interference, even if not yet to govern the ex ante distribution of access to the resources themselves.[182] Where it comes to the optimization of values, minimal coordination may be sufficient to ensure that each party may optimize gains in wealth and innovation, yet for environmental protection and safety, coordination must ensure that activities do not cause mutual harm. While the current rules only require consultations before engaging in activities that may produce "harmful contamination," international environmental law may offer a preferable method. The requirement to conduct an environmental impact assessment for transboundary harm from hazardous activities, accepted to constitute customary international law by the International Court of Justice,[183] may provide for a higher level of coordination to optimize environmental protection, and critically, reduce risks which may undermine minimum order. The ILC's 2001 Draft Articles on Prevention of Transboundary Harm from Hazardous Activities,[184] may provide guidance as to a higher level of coordination, yet one

181. Artemis Accords, *supra* note 18, § 11.

182. Consider, for example, the proposed stage of coordination for space resources. *See* Hasin, *Resources*, *supra* note 27, at 154–56.

183. Construction of a Road in Costa Rica along the San Juan River (Nicar. v. Costa Rica), Judgment, 2015 I.C.J. 665, para. 104 (Dec. 16).

184. International Law Commission, Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, with Commentaries, 56 U.N. GAOR Supp. No. 10, U.N. Doc. A/56/10 (2001), reprinted in [2001] 2 Y.B. Int'l L. Comm'n, U.N. Doc. A/CN.4/SER.A/2001/Add.1 (Part 2).

which does not impose unnecessary limitations on the production and distribution of other values.

An impact assessment would require states to carefully consider the implications of their activities, notify, and consult with other affected states. Where it comes to a common area, such impact assessment may include effects on the international community at large rather than specifically affected states, and require the publication of the State's assessment report.[185] It may also involve a broader "trans-commons impact assessment," which may consider additional affected values, including social, distributional, economical, security related, scientifical, and of course, environmental impacts. It should consider and weigh the negative externalities created by the activity, notify other members of the international community about those effects, and, at least, explain why it considers the benefits to outweigh those risks. Not only will it promote coordination and reduce tensions, but it will provide a level of transparency necessary to allow other actors and civil society to employ pressure to alter harmful policy choices. It is a necessary aspect of a global order which strives to end negative externalities.[186]

From a public policy perspective, the main challenge concerns generating incentives to establish meaningful coordination between two competing systems of public order in space, while accounting for the participants' mistrust and disputes. The participants involved include primarily the space-capable states, which ought to be separated between those forming part of the Artemis Accords and those of the Chinese-Russian program. For the major powers on either side of the aisle, interests include the aggregation of wealth, projection of power, development of technological innovation, and may be promoted through a strategy which includes the expansion of their control over spatial areas and resources. Yet a correlation may exist where it comes to security, safety, and environmental protection. As the aggregation of wealth may depend on safety and security, a window opens for establishing arrangements for pre- and post-coordination. Given the increase in private participants and the ability of space-incapable states to participate through the attraction of investors, these participants may exert leverage, though limited, in efforts to promote equity and human dignity. For them, it would be important to ensure that the major powers' conflict does not produce a type of "gold-rush,"[187] thus preserving access to resources for those in the process of developing capabilities. While investors may be encouraged to increase investment and hasten their pace, a safe and secure investment environment has always been recognized as essential for success.

185. *See, e.g.*, UNCLOS, *supra* note 36, arts. 204–06.

186. On the end of externalities approach to environmental law, see E. Donald Elliot & Daniel C. Esty, *The End of Environmental Externalities Manifesto: A Rights-Based Foundation for Environmental Law,* 29 N.Y.U. Env't L.J. 505, 506–25 (2021). From a normative perspective, the end of externalities approach evaluates environmental policy from the prism of human dignity rather than economic efficiency.

187. This refers to a situation in which the active participants are incentivized to claim and exploit as many resources as possible while discounting negative externalities. *See* Hasin, *supra* note 27, at 138.

With all active participants aspiring to optimize gains in wealth and innovation, a limited degree of coordination may be feasible. As indicated by the process through which the Artemis framework is promoted, space-capable states lack the incentive to coordinate and subject their activities to the interests of the other members of the international community. As such lawmaking process undermines gains in equity and human dignity for others, space-incapable states may exert pressure, join, or participate indirectly through investors, as some have already done.[188] As exemplified by the example of the Japanese company ispace, the Artemis Accords provide an opportunity to create international norms through practice, such as commerce and the evolving safety zones. By having a company from one country sell resources to another country, norms are generated. In addition, we should keep in mind that other countries, and primarily developing countries, have strong incentives to join either the U.S.-led or the China-led space programs.[189] While they could develop space capabilities on their own, joining an established actor is preferrable, as otherwise they risk being left behind and losing the associated benefits. As we have seen with the Artemis Accords, such a path allows the space powers to shape international norms by dictating their acceptance. This holds both challenges and opportunities.

International organizations may play a part in the developing interactions by providing room for coordination and negotiations between the various participants as has recently been done with respect to weapons testing.[190] Yet in a world of competing systems of public order, organizations' ability to affect policy choices may be reduced if one side deems them to be overly sympathetic to the other.[191] Because China and Russia promote competing international organizations, the ability of existing organizations to affect their decision-making process may become limited. It is, however, important to appreciate that where it comes to operations in outer space, the leverage of space-incapable states is much lower than with respect to weapons testing. This indicates that existing forums, like the United Nations, may not prove appropriate for coordination in the short-term, until more participants may exert leverage.

Where it comes to the international lawmaking process, it is important to appreciate that for establishing a system of cooperation, a parliamentary diplomatic arena may be ineffective due to its need for broad consensus. The

188. *See, e.g.*, Matthew Weinzierl, *Space, the Final Economic Frontier*, 32 J. Econ. Persps. 173, 189 (2018).

189. For instance, China has recently invited Venezuela to join its moon base project, see Andrew Jones, *China Invites Venezuela to Join Moon Base Project*, SpaceNews (Apr. 6, 2023), https://spacenews.com/china-invites-venezuela-to-join-moon-base-project/ [https://perma.cc/J7TQ-2QFX].

190. *See Open-ended Working Group on Reducing Space Threats*, https://meetings.unoda.org/meeting/oewg-space-2022/ [https://perma.cc/HW4U-EN2F]; U.N. Secretary General, Reducing Space Threats Through Norms, Rules and Principles of Responsible Behaviours, U.N. Doc. A/76/77 (July 13, 2021).

191. This problem has been made acutely clear with respect to the World Health Organization during the Covid-19 pandemic. *See* Benevenisti, *supra* note 149, at 589–90; José E. Alvarez, *The WHO in the Age of the Coronavirus*, 114 Am. J. Int'l L. 578 (2020).

degree of coordination necessary at this early stage may be achieved through bilateral negotiations between the leading parties of each system of public order, or through multilateral negotiations with other space-capable states. Coordination may also extend into issues such as trade and investment. Because international investment law may affect decisions of participants where it comes to debris mitigation,[192] coordination between the two systems of public order may extend to developing or amending international rules to govern investments in outer space activities to optimize their gain in values. Together with adjusting rules governing international trade, both systems of public order may benefit by reducing incentives for their space investors to relocate to other states.

The interactions between the various participants are expected to produce limited coordination, rather than incentivize installment of cooperative or regulatory regimes. Given the realization that current coordination must include only space-capable States, other forums may provide a blueprint for feasible coordination at this stage of development. The coordination required for lunar operations is focused on safety and security and must be flexible given the veil of ignorance where it comes to the future development of activities and risks. It must also be consistent with the fact that consensus is only required between active participants because of the limited, if any, leverage held by other members of the international community. Although given its mandate, the U.N. Security Council seems to be an appropriate forum for coordination to reduce security risks,[193] the organ's ability to issue binding decisions may be hindered through the veto power and the major powers may have limited incentives to bind their own activities in the future. A preferable path may therefore be to initially follow a structure similar to that of the Inter-Agency Space Debris Coordination Committee and establish coordination between the space agencies.[194] To cure some of the drawbacks and limitations of this method for debris mitigation, it is preferable that such arrangement for lunar operations be accompanied by a dispute resolution mechanism which will allow all states to develop norms through arbitration.[195] It is preferable to engage in either bilateral coopera-

192. Hasin, *Debris, supra* note 19, at 1147–57; *see also* Laura Yvonne Zielinski, *Space Arbitration: Could Investor-State Dispute Settlement Help Mitigate the Creation of Space Debris?*, EJIL:TALK! (Mar. 19, 2021), https://www.ejiltalk.org/space-arbitration-could-investor-state-dispute-settlement-help-mitigate-the-creation-of-space-debris/ [https://perma.cc/KC5P-EENG].

193. It is appreciated that the U.N. Security Council, and particularly its composition, has been criticized for lack of representation for the interests of developing countries, including rising space powers such as India.

194. The Inter-Agency Space Debris Coordination Committee is composed of representatives by the space agencies of the leading space-capable-states and it has adopted non-legally binding recommendation on debris mitigation. *See generally* Inter-Agency Space Debris Coordination Comm. [IADC], *IADC Space Debris Mitigation Guidelines* IADC-02-01 Rev. 1 (2007), https://www.unoosa.org/documents/pdf/spacelaw/sd/IADC-2002-01-IADC-Space_Debris-Guidelines-Revision1.pdf [https://perma.cc/EXJ8-MXU3].

195. It is important to appreciate the benefits and challenges of developing international norms through international arbitrations between the relevant actors. This is developed in another project co-

tion between the leading powers or through informal inter-governmental channels. Such processes may produce the desired coordination and its benefits, but limit the need to generate broad consensus through concessions made to participants unable to exert leverage.

A coordination regime will continue to remain effective and manageable as long as the number of active participants and disputes remains rather limited. A procedure similar to an environmental impact assessment may in fact provide for the optimization of environmental protection while reducing conflicts from damage, and safety zones provide for limited security and safety while not amounting to de jure claims of sovereignty. Such arrangements may, however, become obsolete as the number of participants and the complexity of their interactions increase.[196] Once mechanisms of coordination become ineffective or unmanageable, they will evolve further. Yet as long as the two systems of world public order remain separate and distinct, coordination is more likely to develop to systemic allocation rather than a regime of cooperation where it comes to scientific or commercial activities on the moon and in space. Such a process, however, is too remote at this stage to outline.

### *B. Cooperation to Limit the Proliferation and Testing of Anti-Satellite Weapons*

Where it comes to the proliferation and testing of anti-satellite weapons, the correlation between the interests of the major powers may be leveraged to establish a regime of cooperation for the suppression of these weapons. The interests of the major powers with respect to the proliferation of nuclear weapons offer some insight. Atmospheric testing of nuclear weapons produced similar effects on the decision-making process of participants to that of testing of anti-satellite weapons.[197] In fact, atmospheric testing was arrested only after the major powers no longer needed to conduct them for their own nuclear capabilities.[198] Although anti-satellite weapons testing similarly produces adverse effects, the prohibition of testing may only gain support once the major powers have perfected their own capabilities and were thus only exposed to further risks to space traffic without the need to test their weapons. That moment, it is suggested here, may now be upon us.

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authored with Diana A. A. Reisman. Briefly stated, with repeat actors for both arbitrators and litigants, space arbitration provided more room for arbitral law-making. Yet because the applicable norms are vague and outdated, law in outer space may develop through arbitration in a way which favors private interests and the specific public interests of the states involved, rather than accounting for broader public policy concerns.

196. For example, a need to permanently protect populations may require elements of sovereignty and a significant increase in affected participants may necessitate dispute settlement to allow activities to coexist and function.

197. Hasin, *Debris, supra* note 19, at 1106–07. A comparison could also be drawn to chemical weapons. *See generally* David Koplow, *ASAT-isfaction*, 30 MICH. J. INT'L L. 1187 (2009) (proposing mimicking norms governing chemical weapons for ASAT weapons).

198. *Id.*; *see also* W. MICHAEL REISMAN ET. AL., INTERNATIONAL LAW IN CONTEMPORARY PERSPECTIVE 46–71 (2004).

As the United States, China, and Russia, have conducted successful testing of anti-satellite weapons, those participants possess an interest in limiting any future testing. In fact, the United States has recently proclaimed a self-ban on the testing of these weapons.[199] Testing of satellite weapons produces adverse effects on wealth, security, safety, and environmental protection, while the major powers will gain little in technological innovation from any further testing. Given that such testing may produce adverse effects on the preservation of minimum order, the threats produced by testing may no longer be counter-balanced by the interests of these powers to develop capabilities.

As the Chinese and Russian tests clarified, these weapons pose significant risks to space capabilities through massive debris generation. Weapons-derived debris risks devastating effects to the interests of all participants and the use of Earth's orbits in general. While it is not a case of mutually assured destruction as the case of nuclear weapons has been, the adverse effects of such weapons' deployment on modern life elevates them far beyond conventional weapons where it comes to global effects. In fact, anti-satellite weapons may be employed by less developed and space-capable participants, presenting increased risks but also leverage for such participants.[200] For the major powers that depend upon space operations, anti-satellite weapons present much greater risks to their interests and security than conventional weapons.[201] Although the risks may not rise to the level of nuclear weapons, the increased risks and rather limited technological requirements for deployment may encourage imposing a similar regime of non-proliferation and a testing prohibition. Simply put, once the major powers are done reaping the benefits, they only stand to lose from the possible risks, so it is in their interest to ban the proliferation and testing of anti-satellite weapons.

From a public policy perspective, global governance should evolve to view anti-satellite weapons from a perspective of non-proliferation, that is, as a rule of both minimum and optimum order. Global governance provides for minimum order by reducing the spread and confining the use of weapons that may cause significant transboundary and collateral effects on all affected stakeholders. For the optimum order, a regime of non-proliferation is intended to protect the use of outer space for generating wealth, innovation, and security. But because space capabilities are essential for modern life and climate change efforts, non-proliferation and a testing ban will also promote

199. Justin Gomez & Ben Gittleson, *Vice President Kamala Harris Announces US Ban on Anti-Satellite Missile Tests*, ABC NEWS (Apr. 18, 2022), https://abcnews.go.com/Politics/vice-president-kamala-harris-announce-us-ban-anti/story?id=84152287 [https://perma.cc/JM3U-CFDC].

200. *See* Benjamin Bahney, Johnathan Pearl & Michael Markey, *Antisatellite Weapons and Growing Instability of Deterrence*, *in* CROSS-DOMAIN DETERRENCE: STRATEGY IN AN ERA OF COMPLEXITY 121, 121 (John Lindsay & Erik Gartzke eds., 2019); Koplow, *Reverse Distinction*, *supra* note 14, at 67–68; Koplow, *An Inference About Interference: A Surprising Application of Existing International Law to Inhibit Anti-Satellite Weapons*, 35 U. PA. J. INT'L L. 737, 805–06 (2014) (discussing low-tech ASAT weapons possibilities).

201. *See* Bahney et al., *supra* note 200.

environmental protection and the protection of human rights.[202] While the United States has been successful at securing a U.N. General Assembly resolution calling for a ban of testing, China and Russia opposed. The latter two indicated that any such norms must form part of a "package-deal" which includes rules concerning the placement of weapons in space. While both states have proposed such an arrangement before, the United States has objected to it.[203] This issue linkage is sensible and may pave the way to future compromises.

As alluded to above, mechanisms exist to allow for a testing ban and non-proliferation to be implemented absent the consent of other states or to otherwise exert pressure to secure such consent.[204] The U.N. Security Council may in fact be uniquely positioned to issue a resolution prohibiting further testing, assuming that a narrow agreement may be reached between the major powers, and there may be grounds for a non-proliferation agreement providing for some concessions for less developed participants to secure their consent, as was the case of the Treaty on the Non-Proliferation of Nuclear Weapons.[205] Concessions in the form of technology sharing and participation in space activities and benefits may promote human dignity and equity on a global scale. Given that the leading powers in both systems of public order possess such weapons and the interest to arrest their further proliferation and use, common ground may be found to install a cooperative regime.

It is therefore suggested that any further concessions concerning space governance, made by space-capable states to states which are currently in the process of developing space capabilities, must be tied to a non-proliferation and a testing ban on anti-satellite weapons. Given the rare correlation of interests between the major powers, an opportunity exists for cooperation akin to that concerning nuclear weapons in the twentieth century. Such a regime of cooperation ought to be an arrangement which includes as many active and potential participants as possible. To ensure accession and compliance by states developing such capabilities, a carrot and stick approach

202. Note the recent recognition by the U.N. General Assembly of the right to a healthy environment as a human right.

203. Bradley Bowman, *Russia and China Seek to Tie America's Hands in Space*, FOREIGN POL'Y (Mar. 31, 2021), https://foreignpolicy.com/2021/03/31/russia-china-space-war-treaty-demilitarization-satellites/ [https://perma.cc/RLX4-DW35]; Liu Zhen, *China's Military Blasts US Call to Ban Anti-Satellite Missile Tests*, S. CHINA MORNING POST (Oct. 1, 2022), https://www.scmp.com/news/china/military/article/3194508/chinas-military-blasts-us-call-ban-anti-satellite-missile-tests [https://perma.cc/25B8-46U8]; Theresa Hitchens, *At UN Meeting, Space Cooperation Picks Up Momentum, but Moscow and Beijing Play Spoilers,* BREAKING DEF. (Feb. 3, 2023), https://breakingdefense.com/2023/02/at-un-meeting-space-cooperation-picks-up-momentum-but-moscow-and-beijing-play-spoilers/ [https://perma.cc/5FMN-XFNX]; *see also* Bahney, Pearl & Markey, *supra* note 200, at 136; McKayla Swan, *Anti-Satellite Tests: Risk to Security and Sustainability of Space*, 3 LIBERTY U. J. STATESMANSHIP & PUB. POL'Y (2022).

204. To be developed further in Gershon Hasin, *Controlling Decisions on Anti-Satellite Weapons: A Policy-Oriented Perspective*, U. PENN. J.L. & INNOVATION (forthcoming); *see also* David Koplow, *The Fault is Not in Our Stars: Avoiding and Arms Race in Outer Space*, 59 HARV. INT'L L.J. 331 (2018) (proposing incremental steps to develop the governance of ASAT weapons).

205. Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, 729 U.N.T.S. 161, 21 U.S.T. 483.

may be taken. While accession to the ban and non-proliferation may be tied to participation in the space programs and the sharing of certain space technology, compliance may be enforced through the Security Council. Given the significant adverse effects of such weapons and their testing on the security, wealth, innovation, safety, and environmental protection, of all major powers, it is reasonable to assume that, if necessary, power will be exercised to enforce such arrangements.

## IV. Conclusion

As space activities mature and develop, the intellectual task of shaping space governance in the twenty-first century requires shifting from a legalistic analysis tied to outdated rules, to a forward-looking approach, based on the participants involved, and their correlating and conflicting goals, interests, and points of leverage. To facilitate such an objective, this Article outlines a policy-oriented approach to developing the governance of outer space, which may also be applied to other emerging fields of international law. The proposed space governance analysis is not a strict methodology but rather a roadmap which focuses on the essential elements which will shape the process of regime evolution. As the Article suggests, the application of this approach indicates possible paths for the development of international law to govern two emerging problems: coordination in lunar operations and cooperation for arresting the testing and proliferation of anti-satellite weapons. Such paths may include the adoption of impact assessments or the shaping of the competing space programs to promote internationally beneficial policies on anti-satellite weapons.

The privatization, commercialization, and weaponization of space will shape international norms to govern space activities in the coming decades. The participants, circumstances, situations, interactions, and outcomes are significantly different from those underlining the development of the existing space treaties of the 1960s and 70s. The developing norms will be shaped by, and will be required to shape, the decision-making process of participants in entirely distinct and diverging competing systems of world public order in outer space. For international law to truly fulfil its potential in shaping law in outer space to promote the common interest, it must be feasible, effective, and manageable. It must evolve from space law to space governance.