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INTERNATIONAL SPACE LAW: HOW RUSSIA AND THE U.S. ARE AT ODDS IN THE FINAL FRONTIER

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INTRODUCTION

The dual-purpose of this article is to 1.) provide insight into the history of Russian-American space relations through the lens of international law, and 2.) show how cooperation between these two world powers is beginning to wane. In particular, the arrival of China on the space scene has finally given Russia a non-Western minded partner in space. Advancements in military technology in space have also raised concerns for the future of space relations, as we see the importance of satellites for on-the-ground operations continue to grow and become commonplace for the U.S., Russia, and now China. This article will show that as Russia and the U.S. grow further apart in space, they risk breaking with a tradition of cooperation that has sustained peace for decades.

I. THE INTERNATIONAL SPACE STATION: A PRODUCT OF U.S.-RUSSIA COOPERATION

The U.S. and Russia have been long-time partners in space. Russians and Americans have been working together in space for over two decades, and have been quite literally working together in space since astronaut Bill Shepherd and cosmonauts Yuri Gidzenko and Sergei Krikalev became the first crew to reside onboard the International Space Station (ISS) in November 2000.[1] While the ISS has had visitors from nineteen countries, over its history it has principally been a joint Russian-American endeavor, exemplified by how the station itself is divided into two sections: the Russian Orbital Segment (ROS) operated by Russia, and the United States Orbital Segment (USOS) run by the United States and other partner nations.[2] The International Space Station Intergovernmental Agreement, or IGA, is a January 1998 international treaty signed by the fifteen governments involved in the Space Station project.[3] This agreement establishes "a long-term international cooperative framework among the Partners, on the basis of genuine partnership, for the detailed design, development, operation, and utilization of a permanently inhabited civil Space Station for peaceful purposes, in accordance with international law."[4] The IGA marks the first of a series of agreements that govern every aspect of the ISS, ranging from jurisdictional issues to a code of conduct among visiting astronauts.[5] Commencing

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[1] *History and Timeline of the ISS*, ISS NATIONAL LABORATORY, https://www.issnationallab.org/about/iss-timeline/ (last visited Nov. 23, 2021).

[2] *See* Peter B. de Selding, *Russia — and Its Modules — To Part Ways with ISS in 2024*, SPACE NEWS, (Feb. 25, 2015), https://spacenews.com/russia-and-its-modules-to-part-ways-with-iss-in-2024/. *See generally* Mark Garcia, *Visitors to the Station by Country*, NASA, https://www.nasa.gov/feature/visitors-to-the-station-by-country/ (last visited Nov. 23, 2021).

[3] *International Space Station legal framework*, THE EUROPEAN SPACE AGENCY, https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/International_Space_Station/International_Space_Station_legal_framework (last visited Nov. 28, 2021).

[4] The International Space Station Intergovernmental Agreement, art. 1, Jan. 29, 1998, https://www.state.gov/wp-content/uploads/2019/02/12927-Multilateral-Space-Space-Station-1.29.1998.pdf.

[5] *See* André Farand, *Astronauts' behaviour* [sic] *onboard the International Space Station: regulatory framework*, INTERNET ARCHIVE,

only a few short years after the end of the Cold War and the fall of the Soviet Union, the IGA represents the beginning of a new, cooperative regime of peaceful space exploration by the United States and Russia.

II. THE OUTER SPACE TREATY

This multilateral space regime traces its roots back to Russian-American cooperation on The Outer Space Treaty of 1967 (OST), a treaty that lists the principles governing the activities of states in the exploration and use of space.[6] The treaty serves as the foundation of international space law, namely prohibiting deployments of nuclear weapons in space, the construction of military facilities on the Moon, and the national appropriation of natural space objects, as well as requiring all off-world facilities to be open to all visitors.[7] The exact language used in the treaty is important, as current developments in space militarization may soon threaten the once-harmonious space relationship between the U.S. and Russia.

Article IV of the OST provides that:

> States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner. The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military maneuvers on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.[8]

The prohibition on positioning nuclear weapons or weapons of mass destruction in space is straightforward, but less straightforward is defining what "peaceful purposes" are. Asking what constitutes "peaceful purposes" is therefore the central question, as that will likely determine whether a nation is in violation of Article IV of the OST. Two popular legal interpretations have emerged to define the "peaceful purposes" language: the "non-military" interpretation and the "non-aggressive" interpretation.[9] Proponents of the "non-military" interpretation argue that "exclusively for peaceful purposes" must exclude *any* use for military-related purposes, while

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https://web.archive.org/web/20060913194014/http://portal.unesco.org/shs/en/file_download.php/785db0eec4e0cdfc43e1923624154cccFarand.pdf.

[6] *See generally* Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, (Jan. 27, 1967), https://treaties.unoda.org/t/outer_space.

[7] Lillian Posner & Evan Sankey, *The U.S. and Russia are Parting Ways in Space and That's Risky*, NATIONAL INTEREST (May 7, 2021), https://nationalinterest.org/feature/us-and-russia-are-parting-ways-space-and-thats-risky-184506 (last visited Dec. 3, 2021).

[8] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, art. 4, Jan. 27, 1967, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html [hereinafter Outer Space Treaty].

[9] Jeremy J. Grunert, Grounding the Humā: The Legality of Space Denial and (Potential) American Interference in the Iranian Space Program, 81 A.F. L. REV. 76, 101 (2020), https://www.afjag.af.mil/Portals/77/documents/Law%20Review/Law%20Review%2081.pdf?ver=PqiJkS0AI3-MH--aS6YcXA%3d%3d.

proponents of the "non-aggressive" interpretation argue that the language only prohibits uses that are inherently aggressive — violations of the U.N. Charter and international law.[10]

It has been the longstanding approach of the United States, and indeed the majority of nations, to support the "non-aggressive" interpretation of "peaceful purposes."[11] When interpreting treaties, Article 31 Section 3 Part III of the 1969 Vienna Convention on the Law of Treaties requires that, "A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose."[12] Thus, we must look to the ordinary or customary meaning of the words "peaceful purpose." Dr. Alex Meyer applies this rule to the OST by looking to the Charter of the United Nations, where the term "peaceful" is ordinarily regarded to mean "non-aggressive."[13] To define "non-aggressive", we look toward the General Assembly's adoption of Resolution 3314 (XXIX) in December 1974.[14]

Article 3 of Resolution 3314 (XXIX) clarifies what constitutes aggressive acts:

> Any of the following acts, regardless of a declaration of war, shall, subject to and in accordance with the provisions of article 2, qualify as an act of aggression:
>
> The invasion or attack by the armed forces of a State of the territory of another State, or any military occupation, however temporary, resulting from such invasion or attack, or any annexation by the use of force of the territory of another State or part thereof,
>
> Bombardment by the armed forces of a State against the territory of another State or the use of any weapons by a State against the territory of another State;
>
> The blockade of the ports or coasts of a State by the armed forces of another State;
>
> An attack by the armed forces of a State on the land, sea or air forces, or marine and air fleets of another State;
>
> The use of armed forces of one State which are within the territory of another State with the agreement of the receiving State, in contravention of the conditions provided for in the agreement or any extension of their presence in such territory beyond the termination of the agreement;
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> The action of a State in allowing its territory, which it has placed at the disposal of another State, to be used by that other State for perpetrating an act of aggression against a third State;

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[10] *Id.*
[11] *Id.* at 101-02.
[12] Vienna Convention on the Law of Treaties, art. 31, May 23, 1969, 1155 U.N.T.S. 331, https://legal.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf.
[13] Manasa S Venkatachalam, *What does it take to violate Article IV of the Outer Space Treaty: Looking to Artemis for the celestial answer*, ILA Reporter, Aug. 27, 2021, https://ilareporter.org.au/2021/08/what-does-it-take-to-violate-article-iv-of-the-outer-space-treaty-looking-to-artemis-for-the-celestial-answer-manasa-s-venkatachalam/.
[14] Grunert, *supra* note 9, at 103-04.

> The sending by or on behalf of a State of armed bands, groups, irregulars or mercenaries, which carry out acts of armed force against another State of such gravity as to amount to the acts listed above, or its substantial involvement therein.[15]

Thus, looking to Resolution 3314 (XXIX), "aggressive" conduct in space is much more limited compared to the more broadly encompassing "military" uses, as a "military-related purpose" could be anything just slightly associated with the military.[16] Many space technologies are inherently dual-use with the military, such as rocketry, satellite navigation, remote sensing, satellite observation, and so on.[17] Anything that involves observing the surface of the Earth will naturally include surveillance and information gathering which then can be used for military purposes. It's no wonder, then, that a majority of nations agree that the "non-military" interpretation is untenable; not only is it too over encompassing, it's also just not practical. There is already extensive use of satellites for military reconnaissance, namely by the U.S., which in turn provides information to the armed services of allies like Canada, the UK, and the Netherlands, indicating an international acceptance of satellite use for military purposes that is not considered to violate the "peaceful purposes" requirement of Article IV of the OST.[18]

Article IV of the OST is not alone in causing a rift between the U.S. and Russia. Conflicting interpretations over Articles II and XII of the treaty have also led to the U.S. acting more unilaterally in space, such as through the Artemis Accords.[19] The Artemis Accords is a component of the Artemis Program, a United States-led international human spaceflight program, the primary goal of which is to return humans to the Moon by 2024.[20] The Artemis Accords are a non-treaty agreement portion of the Artemis Program that asserts, among other things, signatories' right to own mineral wealth extracted from the Moon, and declares "safety zones" around each nations' space operations to prevent harmful interference by other space actors.[21] Russia and China, which have become an increasingly major players in space, argue that this agreement is in violation of Articles II and XII of the OST.[22] Article II provides that, "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."[23] Article XII provides that, "All stations, installations, equipment, and space vehicles on the moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty on a basis of reciprocity."[24] Although it would seem that the plain language of these provisions bans a nation from extracting and owning lunar minerals, as well as the exclusive "safety zones" that would be used to protect national interests on the Moon, under America's specific interpretation of the language these operations would be permissible; notably, of the fourteen signatories to the agreement, only the United States

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[15] *Id.*
[16] *Id.* at 104.
[17] *Id.* at 102.
[18] Ricky J. Lee & Sarah L. Steele, *Military Use of Satellite Communications, Remote Sensing, and Global Positioning Systems in the War on Terror*, 79 J. AIR L. & COM. 69, 77, (2014), https://scholar.smu.edu/cgi/viewcontent.cgi?article=1334&context=jalc.
[19] Posner & Sankey, *supra* note 7.
[20] *Explore Moon to Mars*, NASA, https://www.nasa.gov/specials/moontomars/index.html (last visited Nov. 29, 2021).
[21] Posner & Sankey, *supra* note 7.
[22] *Id.*
[23] Outer Space Treaty, *supra* note 8, at art. 2.
[24] *Id.* at art. 12.

has the potential to conduct such operations.[25] Under the U.S. Space Resource Exploration and Utilization Act of 2015, the U.S. doesn't assert "sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body", which would be in violation of the OST, but instead "provides for property rights relating to minerals *already extracted*.[26] Given that the exclusive nature of the Artemis Accords heavily favors the U.S. through this interpretation, Russia and China have refused to sign the agreement.[27]

III. SOVIET-ERA SPACE TREATIES

Although Russia challenges the U.S.'s interpretation of Articles II and XII of the OST, historically the U.S. and Russia have seen eye to eye on international space law and are signatories to the same international treaties that govern state behavior in space: the Partial Test Ban Treaty of 1963, the Outer Space Treaty of 1967, the Rescue Agreement of 1968, the Liability Convention of 1972, and the Registration Convention of 1976.[28] Neither Russia, the U.S., nor China (i.e., the three countries that engage in self-launched human spaceflight) are signatories to the 1984 Moon Treaty; as such, the treaty holds little to no relevancy in international law.[29] These remaining treaties combine to form the present-day rule of law in space, an accomplishment which wouldn't have been possible without U.S.-Russia cooperation.

Prior to the OST, which has already been discussed at length, the only international law on space activity was the Partial Test Ban Treaty of 1963. This treaty, signed one day short of the eighteenth anniversary of the first atomic bomb falling on Hiroshima, prohibited nuclear weapons testing under water, in the atmosphere, or in outer space.[30] This treaty proved that the United States and Russia (then the USSR) could cooperate in space, an important accomplishment in of itself, considering that it was signed just a year after the Cuban Missile Crisis brought the two nations dangerously close to nuclear war.[31]

After the OST came the Rescue Agreement of 1968, the shortest of the international space treaties at only ten articles, which is primarily concerned with ensuring astronauts (here, referring to American astronauts and their Soviet/(Russian) counterparts, cosmonauts) are returned safely

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[25] Posner & Sankey, *supra* note 7; Jeff Foust, *Mexico joins Artemis Accords*, SPACE NEWS (Dec. 10, 2021), https://spacenews.com/mexico-joins-artemis-accords/ (last visited (Dec. 20, 2021).

[26] Paul Arthur Berkman et al., *OUTER SPACE LAW: RUSSIA – UNITED STATES COMMON CHALLENGES AND PERSPECTIVES*, 1 MOSCOW J. INT'L L. 20, 23 (2018), https://www.researchgate.net/publication/326948007_OUTER_SPACE_LAW_RUSSIA_-_UNITED_STATES_COMMON_CHALLENGES_AND_PERSPECTIVES (quoting Space Resource Exploration and Utilization Act of 2015, H.R. 2262, 114th Cong. § 51303 (2015) www.congress.gov/bill/114th-congress/house-bill/2262/text>).

[27] *Id.*

[28] *See generally Space Law Treaties and Principles*, UNITED NATIONS OFF. FOR OUTER SPACE AFF., https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html (last visited Nov. 29, 2021).

[29] Jonathan Sydney Koch, *Institutional Framework for the Province of all Mankind: Lessons from the International Seabed Authority for the Governance of Commercial Space Mining*, 16 INT'L J. SPACE POL. & POL'Y 1, 3 (2018). https://www.tandfonline.com/doi/pdf/10.1080/14777622.2017.1381824?casa_token=F_azMKp0HWQAAAAA:ApEjnuFXQhkXvOkEa-8Dcrrxb5VtdD5W6gEuS6TdAEzhpR8XNh8yKRkzJPS1iN8RnlgM-KP1V4eV.

[30] *NUCLEAR TEST BAN TREATY*, JOHN F. KENNEDY PRESIDENTIAL LIBRARY AND MUSEUM, https://www.jfklibrary.org/learn/about-jfk/jfk-in-history/nuclear-test-ban-treaty (last visited Nov. 29, 2021).

[31] *Id.*

to Earth.[32] "Currently it has 90 states parties and a further 24 states as signatories"—quite a large basis of support considering that at the time it was signed only two states, the U.S. and Russia, had astronauts; an example of how Russian-American cooperation has historically dominated international space relations.[33]

Next came the Liability Convention of 1972, which in Article II declares that a "launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft flight."[34] Article III explains that in the slightly different context of damage caused to a space object by a space object of another launching State, "the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible."[35] The Liability Convention's terms have only been invoked once, during "the Cosmos 954 fiasco of 1978", "when a Soviet satellite inadvertently fell to Earth in uninhabited Canadian territory."[36] Ultimately, the Canadian claims against the USSR were not brought before a claims commission established under the Liability Convention.[37] Instead, the countries found a diplomatic solution where the U.S. would assist Canada in debris cleanup and transfer the Soviet satellite remnants to the U.S.[38] This avoided a messy legal dispute between one of America's closest allies and its great-power rival. Because Canada's claim was for the cost of cleanup, rather than property damage, it was not clear whether the Liability Convention was the controlling authority.[39] This diplomatic solution on the part of the U.S. shows how important healthy relations with Russia in space have been for the international community, even when the initial incident didn't directly involve the U.S.

Lastly, there is the Registration Convention of 1976. Ratification of this treaty was not as widespread as the previous ones: "only 44 states are parties to the Convention, with a further 4 states having signed but not ratified."[40] This is likely due to the fact that ratification is really only relevant to states launching objects into outer space, which is still a minority of countries.[41] Like the Rescue Agreement and the Liability Convention, the Registration Convention is essentially elaborating on one specific Article of the OST.[42] That Article is Article VIII, which already provides the framework for the registration of space objects and the possibility to exercise jurisdiction over such objects once they've been registered.[43] The primary motivation for states to ratify this treaty stems from the fact that only states party to the Convention are entitled to formally

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[32] Frans G. von der Dunk, *A SLEEPING BEAUTY AWAKENS: THE 1968 RESCUE AGREEMENT AFTER FORTY YEARS*, 34 J. SPACE L. 411, 411 (2008) https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1028&context=spacelaw.
[33] *Id.* at 418-19.
[34] Trevor Kehrer, *Closing the Liability Loophole: The Liability Convention and the Future of Conflict in Space*, 20 CHICAGO J. INT'L L. 180, 183 (2019) https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1756&context=cjil.
[35] *Id.* at 183-84.
[36] *Id.* at 185.
[37] *Id.* at 185-86.
[38] *Id.* at 186.
[39] *Id.*
[40] Frans G. von der Dunk, *THE REGISTRATION CONVENTION: BACKGROUND AND HISTORICAL CONTEXT*, AM. INST. AERONAUTICS AND ASTRONAUTICS 450, 450 (2003), https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1031&context=spacelaw.
[41] *Id.*
[42] *Id.*
[43] *Id.* at 451.

protest and bring forward legal claims in case another party to the Convention fails to comply with its duties under it.[44] This is because, under general public international law, only states parties to a treaty may consider their rights to be violated if another party does not fulfil the relevant obligations.[45]

These treaties are very real legal obligations that the U.S. and Russia have to each other as fellow signatories, but they also serve as reminders of how, despite decades of hostile relations with one another, these two countries have been able to come to an agreement (in this case, many agreements) that hold one another accountable for their actions in space. However, complacency is dangerous. Considering that the last of these treaties entered into force in 1976, it should come as no surprise that those forty-five years of inactivity have led to peaceful relations beginning to chill. There's a paradigm shift happening in space, and as the rift between the U.S. and Russia widens, it can only spell disaster for the international space community.

IV. RUSSIAN SPACE LAW

To understand the paradigm shift happening in space, we must first understand domestic space law in Russia. Russian space law is largely governed by Federal Law No. 5663-1.[46] "This law is directed at ensuring the legal regulation of space activities for the purpose of developing the economy, science and technology, strengthening the defense and the security of the Russian Federation[,] and furthering the international cooperation of the Russian Federation."[47] Adopted in 1993, this law highlights that the exploration and use of outer space is the "highest priority of the [state's] interests," and outlines the scope of space activities, including such activities as scientific research, technology uses, manned space flights, etc.[48] This federal law codifies that Russian space activities are subject both to Russian domestic law and international treaties signed by Russia, and that Russia will defer to relevant international agreements to settle issues such as the jurisdiction and control over space objects, the registration of such objects, and ownership rights.[49] Federal Law No. 5663-1 also covers how space activities are related to Russian national security. Discussed in the purpose statement and reiterated again in Article II, one of the areas covered by space activities is "the use of space technology, space materials and space technology in the interests of the defense and security of the Russian Federation."[50] Article IV notes that space activities, "shall be implemented with the observation of the requirements, as established by law, for the protection of state secrets, military and commercial secrets[,] as well as the results of

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[44] *Id.*
[45] *Id.*
[46] Seonhee Kim, *SPARC Brief: Russia***,** U. WASH. SPACE POL'Y AND RES. CTR., https://www.sparc.uw.edu/russia/ (last visited Dec. 2, 2021); *see generally*
SOBRANIE ZAKONODATEL'STVA ROSSIISKOI FEDERATSII [SZ RF] [Russian Federation Collection of Legislation], Dec. 18, 2006, No. 5663-1 (Russ.),
https://www.wto.org/english/thewto_e/acc_e/rus_e/wtaccrus58_leg_375.pdf [hereinafter Federal Law No. 5663-1].
[47] Federal Law No. 5663-1, *supra* note 46.
[48] Kim, *supra* note 46; Federal Law No. 5663-1, *supra* note 46.
[49] Kim, *supra* note 46; Federal Law No. 5663-1, *supra* note 46.
[50] Kim, *supra* note 46; Federal Law No. 5663-1, *supra* note 46, at art. 2.

intellectual activities and exclusive rights to them."[51] As such, it seems this federal law recognizes the need and intent for Russia to use space for military purposes.[52]

Outside of the use of space for military purposes, Russia law has also allowed for the commercial use of space. As mentioned above, Article IV of Federal Law No. 5563-1 establishes use of space for the protection of commercial secrets, as well as the protection of commercial secrets of foreign organizations and citizens under the jurisdiction of the Russian Federation per Article XXVII.[53] Additionally, Article VI provides that the Federal Space Program "organize and coordinate the work of commercial space projects and assists [sic] in their implementations . . . ."[54] To this end, Roscosmos, the Russian Federal Space Agency, is deeply embedded in the global space market, serving as the coordinating hub for both civilian and military space activities.[55] Russia engages in the commercialized space market through Roscosmos, promoting its technologies, launch capabilities, and human capital to countries with developed space industries like the U.S.[56] For example, Russian space exports such as the RD-180 rocket engines and in-space electric propulsion technologies are vital to American customers like NASA, SpaceX, and Lockheed Martin.[57]

A. AN ASCENDANT V. DESCENDANT PRIVATE SPACE SECTOR

Although Roscosmos engages in big business with governments and companies around the world, CNN reported in 2015 that the agency is plagued by shady transactions and corruption scandals. In 2014 alone, Roscosmos committed 92 billion rubles ($1.8 billion) worth of financial violations, according to Russia's public spending watchdog agency.[58] At the center of this financial crisis is the construction of the Vostochny Cosmodrome, the new space launch site in the eastern part of Russia that was originally set to open by the end of 2015.[59] The cosmodrome is crucial for Russia's ability to independently launch rockets, as the country still relies on the Soviet-era Baikonur Cosmodrome in Kazakhstan for rocket launches. Construction for the project started in 2012, and since then it has suffered a series of setbacks due to funding problems, as Roscosmos' budget for the next decade was slashed in 2015 by 35% to 2 trillion rubles ($37 billion).[60]

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[51] Federal Law No. 5663-1, *supra* note 46, at art. 4.
[52] Kim, *supra* note 46.
[53] Federal Law No. 5663-1, *supra* note 46, at art. 4, 27.
[54] Federal Law No. 5663-1, *supra* note 46, at art. 6.
[55] Kim, *supra* note 46.
[56] *See supra* text accompanying note 46.
[57] *See supra* text accompanying note 46.
[58] Ivana Kottasova, *$1.8 billion disappears in Russian space program*, CNN BUSINESS, May 25, 2015, https://money.cnn.com/2015/05/25/technology/russia-space-corruption/ (last visited Dec. 3, 2021).
[59] *Id.*
[60] Kottasova, *supra* note 58; *Four More Jailed For Corruption At Cosmodrome Project In Russia's Far East*, RADIO FREE EUROPE/RADIO LIBERTY, https://www.rferl.org/a/russia-vostochny-cosmodrome-corruption/31558418.html (last visited Dec. 3, 2021).

2two trillion rubles ($37 billion).[61] To add to the financial woes, Tatyana Golikova, the audit chief, said the cosmodrome's construction costs have ballooned by 20%.[62]

The project also suffered from alleged corruption. In 2015, a crewless cargo space ship burned up in the Earth's atmosphere after a communication failure, and a Proton-M carrier rocket carrying a Mexican satellite crashed in Siberia, both of which were blamed at the time on chronic corruption in the space industry by then-deputy prime minister Dmitry Rogozin. And the corruption allegations haven't improved since then. In 2019, a Kremlin spokesman said that eleven billion rubles ($154.2 million) had been embezzled during the construction of the Vostochny Cosmodrome.[63] Prosecutors said later that year that 163 probes had been launched against individuals involved in the construction, and that about 60 people had already been convicted.[64] Construction continues at the time of writing.[65]

In contrast to the languishing efforts of Russia to have a space industry that can stand on its own two feet, the U.S.'s private sector companies have entered a space renaissance, spurring investment in a wide array of complementary services necessary for the success of private sector and government spacecraft alike.[66] For example, in February 2020, Maxar Technologies was awarded a $142 million contract from NASA to develop a robotic construction tool that would be assembled in space for use on a low earth orbit spacecraft.[67] In 2019, Made In Space, Inc. received a $74 million contract to 3Dprint large metal beams in space for use on a NASA spacecraft.[68] Future private sector spacecrafts will have similar manufacturing needs, which these space infrastructure companies will be well positioned to fulfill.[69]

While the growing volume of tech companies providing essential goods and services to NASA is certainly a great achievement for the private space sector, arguably the greatest achievement for the industry has been the success of SpaceX. In 2012 SpaceX became the first company to launch a resupply mission to the ISS.[70] Three years later, it landed the first stage of an orbital rocket for the first time in history.[71] The company now operates the most powerful rocket in the world, *Falcon Heavy*, and in 2019, it launched 13 of the 21 U.S. flights to orbit.[72] But what is the achievement that has received the most coverage? SpaceX was the first company to fly humans into orbit on its own spacecraft and was followed in July 2021 by two more American

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[61] *See* Kottasova, *supra* note 58; see also *Four More Jailed For Corruption At Cosmodrome Project In Russia's Far East*, RADIO FREE EUROPE/RADIO LIBERTY (Nov. 12, 2021), https://www.rferl.org/a/russia-vostochny-cosmodrome-corruption/31558418.html.
[62] Kottasova, *supra* note 58.
[63] *Four More Jailed For Corruption At Cosmodrome Project In Russia's Far East*, *supra* note 61.
[64] *Id.*
[65] *See id.*
[66] Mehak Sarang & Matt Weinzierl, *The Commercial Space Age Is Here*, HARV. BUS. REV. (Feb. 12, 2021), https://hbr.org/2021/02/the-commercial-space-age-is-here.
[67] *Id.*
[68] *Id.*; Karen Northon, *NASA Funds Demo of 3D-Printed Spacecraft Parts Made, Assembled in Orbit*, NASA, https://www.nasa.gov/press-release/nasa-funds-demo-of-3d-printed-spacecraft-parts-made-assembled-in-orbit (last visited Dec. 3, 2021).
[69] Sarang & Weinzierl, *supra* note 66.
[70] Jay Bennett, *How SpaceX became NASA's go-to ride into orbit*, NAT'L GEOGRAPHIC (Nov. 12, 2020), https://www.nationalgeographic.com/science/article/how-spacex-became-nasas-go-to-ride-orbit.
[71] *Id.*
[72] *Id.*

companies who ventured into space—Virgin Galactic and Blue Origin.[73] Virgin Galactic launched 53.5 miles above the Earth's surface on one of the company's rocket-powered planes, while Blue Origin launched 62 miles aboard its *New Shepard* rocket. Both planes landed at the edge of space and achieved zero-gravity.[74] In November 2021, SpaceX successfully brought four astronauts to the *ISS*, who joined three inhabitants already on the space station: a NASA astronaut and two Russian cosmonauts, who were in the middle of a nearly yearlong mission.[75] The arrival of four American astronauts on a commercial spaceflight, rendezvousing with two Russian cosmonauts whose country doesn't have a fully constructed space center to launch rockets, is indicative of just how far the split between Russian and American space capabilities has become.[76]

This paradigm of success between two equally old space programs perhaps further entrenches the idea in U.S. policy makers that America doesn't need cooperation with Russia to be successful in space. Yet, hope is not lost. An agreement is in the works for an astronaut exchange program, where a Russian cosmonaut will fly aboard a SpaceX mission to the *ISS* in September 2022 in exchange for a future flight with a NASA astronaut onboard Russia's *Soyuz* spacecraft.[77] While hope remains for future Russian-American space cooperation, the militarization of space signals that soon the partnership that birthed the *ISS* may be replaced by a space arms race.

V. THE MILITARIZATION OF SPACE

That the U.S. and Russia, who have engaged in great power competition for decades, subject themselves to the same international laws in space and have historically good-working relations is an often underappreciated fact. But that relationship has taken a hit as the world looks toward space as the next and final stage for how nations wage war. The 2006 U.S. National Space Policy authorized the United States to actively defend its interests in space and to deny access to space to nations that the United States determined were using space in a way hostile to U.S. national interests.[78] Russia, along with China, criticized the U.S. for this aggressive, unilateral approach.[79] The 2006 U.S. National Space Policy states in relevant part that the United States will "preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; [and] respond to interference."[80] This policy, which George W. Bush issued as a presidential directive, largely reiterates the rights that international space treaties already granted to the U.S., namely the OST, and how the U.S. will take "actions

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[73] *Id.*; Tim Levin, *Jeff Bezos just launched to the edge of space. Here's how Blue Origin's plans stack up to SpaceX and Virgin Galactic.*, BUS. INSIDER (July 20, 2021, 10:28 AM) https://www.businessinsider.com/elon-musk-jeff-bezos-branson-spacex-blue-origin-virgin-2021-5.
[74] *Id.*
[75] Joey Roulette, *SpaceX Delivers NASA's Crew-3 Astronauts to Space Station*, N.Y. TIMES (Nov. 12 2021) https://www.nytimes.com/2021/11/11/science/spacex-nasa-docking.html.
[76] *Id.*
[77] *Id.*
[78] Todd Barnet, *United States National Space Policy*, 23 FLA. J. INT'L L. 277, 282 (2011), https://activityinsight.pace.edu/tbarnet/intellcont/UNSNSP%2020062012-1.pdf.
[79] *Id.*
[80] *Id.* at 282-83.

necessary" to defend these rights.[81] However, Russia's criticism of this policy stems from it implying the potential for the U.S. to engage in military action to protect U.S. national interests in space—a possible violation of the OST.[82] This implication is made especially clear in the portion of the policy that states that the U.S. may "deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests.", which would necessarily involve military power.[83] Article I of the OST provides that space "shall be free for exploration and use by *all* States without *discrimination of any kind*, on a basis of equality and in accordance with international law."[84] Exclusion of a nation from space would likely constitute discrimination, and thus enforcement of this provision of the policy is likely prohibited by the OST.[85]

The 2006 U.S. National Space Policy also provides that "the United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit US access to or use of Outer Space."[86] This rejection of any new multilateral treaty that seeks to limit American activities in space was the beginning of the U.S.'s march toward unilateralism, as ever since, the U.S. has avoided negotiating on any new international space laws and has doubled down on protecting its existing rights, like the 2015 U.S. Space Resource Exploration and Utilization Act's protection of property rights to minerals in space.[87]

In June 2010, President Barack Obama issued a new presidential directive on National Space Policy (NSP10) that echoed many of the same goals as the NSP06 but with a more cooperative tone.[88] In contrast to the language found in the NSP06, which implied the necessary use of military force as a means of discriminating against nations hostile to U.S. interests, the language of the NSP10 focuses more on self-defense, an uncontested right, and deviates from the previous nationalistic tone by applying this to allied space systems: "[C]onsistent with the inherent right of self-defense, [the United States may] deter others from interference and attack, defend our space systems and contribute to the defense of allied space systems, and, if deterrence fails, defeat efforts to attack them."[89] Another stark contrast with the NSP06 can be found in the new policy's call for openness and transparency—signaling a move away from the Bush Administration's more unilateral attitude.[90] Additionally, the more hostile language of the NSP06, like denying a nation access to space, was removed, signaling how the U.S. may now be more amenable to stricter international space armament laws.[91] Still, the NSP10 is ultimately a continuation of the strong national security stance taken in the NSP06.

Although the U.S. has pulled back on the strong language found in the NSP06, the level of space cooperation very well could be dependent on the presidential administration, with Republican administrations following the militaristic posture found in Bush's national space policy, and Democratic administrations following the cooperative posture found in Obama's directive. Evidence seems to point toward this space policy flipflopping being a predictable

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[81] *See id.*
[82] *See id.* at 283.
[83] *Id.* at 284.
[84] *Id.* (emphasis added).
[85] *See id.*
[86] BERKMAN ET AL., *supra* note 26, at 25.
[87] *Id.* at 23.
[88] Barnet, *supra* note 78, at 278.
[89] *Id.* at 285.
[90] *Id.*
[91] *Id.* at 285-86.

pattern, including the Trump Administration's establishment of the United States Space Force, an overt move toward preparing for military action in space.[92] This frequent change by the world's strongest military in an area as important as space warfare toys with international expectations of how the U.S. will react to dilemmas in space. Will the United States pursue a legal solution when confronted with possible threats in space, or will it exercise its "right" to deny hostile nations space access? This unpredictability can only lead to miscalculation. If current trends progress, there is a very real possibility that Russia will be the one making the miscalculation.

Speaking at a disarmament conference in Geneva in February 2019, Russian Foreign Minister Sergei Lavrov expressed Moscow's concern over the militarization of space, saying, "The plans of the United States, France and the North Atlantic Alliance as a whole to launch weapons into space are gaining more and more real shape."[93] Clearly, the U.S.'s increased military interest in space has not gone unnoticed. But the U.S. is not alone. As of 2018, according to the Union of Concerned Scientists, the U.S. military uses over 170 satellites, while the Russian military operates 97 satellites.[94] American and Russian military use of satellites have played a part in their recent conflicts in the Middle East—conflicts where the two sides have supported opposing factions, using intel from their respective satellites to further their military goals on the ground. [95] As Russia and the U.S. increasingly use space for opposing military actions planet-side, Russia has begun looking elsewhere for partnership in space.

VI. THE RUSSIA-CHINA SPACE GANG

The split in American-Russian space relations has led Russia to seek out a more equal partnership with China.[96] Where the ISS once served as a symbol of U.S.-Russia cooperation, with American astronauts often launched there aboard Russian Soyuz spacecraft, that cooperation is now breaking down.[97] "The success of NASA's commercial crew partnership with SpaceX and Boeing means that American astronauts will increasingly fly to low Earth orbit on American spacecraft rather than the Russian Soyuz[,]" the National Interest reports.[98] The most expensive object ever constructed at over $100 billion, the ISS will likely run out of U.S. funding by 2030, and Russia has announced that it is considering withdrawing from the ISS in 2025 to develop its own space station.[99]

Not only does Russia have plans to build its own space station, but in March 2021 Russia also announced that it and China have agreed to jointly construct a lunar space station dedicated

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[92] Establishment of the United States Space Force, 84 Fed. Reg. 6049 (Feb. 19, 2019), https://www.govinfo.gov/content/pkg/FR-2019-02-25/pdf/2019-03345.pdf.
[93] Roger McDermott, *Russia's Military Exploitation of Outer Space*, JAMESTOWN FOUND., https://jamestown.org/program/russias-military-exploitation-of-outer-space/ (last visited Dec. 10, 2021).
[94] KEHRER, *supra* note 34 at 191.
[95] *See* Joe Pappalardo, *How a Syrian Airstrike Got Help From Space*, POPULAR MECHANICS, https://www.popularmechanics.com/military/weapons/a19980968/syrian-airstrike-from-space/. (last visited Dec. 14, 2021).
[96] Posner & Sankey, *supra* note 7.
[97] *Id.*
[98] *Id.*
[99] *Id.*; *Most expensive man-made object*, GUINNESS WORLD RECORDS, https://www.guinnessworldrecords.com/world-records/most-expensive-man-made-object (last visited Dec. 14, 2021).

to "strengthening research cooperation and promoting the exploration and use of outer space for peaceful purposes in the interests of all mankind."[100] This international lunar scientific research station (ILRS), despite having no completion timeline, is perhaps the biggest wake-up call to American politicians and military leaders to China's rise in space capabilities, which it has accomplished without U.S. assistance thanks to an American law known as the Wolf Amendment, which bans cooperation with China in space.[101] This means that Russia and other nations outside the close inner circle of American allies may now form their own space bloc with China.[102] The China National Space Administration said in its statement that the ILRS would be "open to all countries," and Roscosmos said that the two space agencies planned to "promote cooperation on the creation of an open access ILRS for all interested countries and international partners. . . ."[103] Despite the promises of being an internationally pen space station dedicated to peaceful research and exploration, a joint Russia-China space station is a threat to America's position in space. As we covered above, space is becoming increasingly important militarily, and as tensions ramp up with China planet-side, a stronger China in space partnering with Russia raises grave national security concerns.

The Wolf Amendment, named after Congressman Frank Wolf (R-Va.) who introduced it in 2011, has arguably led to a more powerful, independent China in space.[104] The amendment was included in the NASA authorization bill and prohibits the space agency and the White House Office of Science and Technology Policy from spending any appropriated money on cooperation with China.[105] In order to work with China, the agency would have to get permission from the FBI, who would have to certify that there were no risks to sharing information and that none of the Chinese officials involved had committed human rights abuses.[106] Though admirable in its attempt to punish China for human rights abuses, the Wolf Amendment is mutually damaging to the U.S. because it forced China to not rely on American cooperation in space, leading to Chinese advancements that threaten to rival American space dominance. Such advancements since 2011 include: the launch of a Chinese space station, the deployment of new heavy-lift rockets, and successful robotic missions to the Moon and Mars.[107] Additionally, in December 2020, China's unmanned Chang'e mission brought lunar samples back to Earth, making it only the third country to have successfully collected rocks from the moon.[108] China also has plans underway to send astronauts to the moon by the 2030s; if successful, China would become only the second country after the U.S. to put a citizen on the moon.[109]

Despite Wolf's retirement from Congress in 2015, the Wolf Amendment language has been included in each year's appropriations bills.[110] Given that the ISS is expected to retire by 2030,

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[100] Jessie Yeung, *China and Russia agree to build joint lunar space station*, CNN, https://www.cnn.com/2021/03/09/asia/russia-china-lunar-station-intl-hnk-scli-scn/index.html (last visited Dec. 14, 2021).
[101] *Id.*; Posner & Sankey, *supra* note 7.
[102] *See* Yeung, *supra* note 100.
[103] *Id.*
[104] Jacqueline Feldscher, *Biden space advisers urge cooperation with China*, POLITICO, https://www.politico.com/news/2020/12/20/biden-china-space-448529. (last visited Dec. 14, 2021).
[105] *Id.*
[106] *Id.*
[107] Posner & Sankey, *supra* note 7.
[108] Yeung, *supra* note 100.
[109] Yeung, *supra* note 100.
[110] Feldscher, *supra* note 104.

unless an American company like SpaceX launches a space station, the Chinese station that Beijing is expected to finish building in 2022 may soon be the only choice for Russia, the EU, and Japan, who have all expressed a desire to conduct experiments in low-Earth orbit.[111] Even if a new American space station is built, there is good reason to believe that the flip-flopping of presidential administrations on space issues would serve as a deterrent for nations who would otherwise seek American space cooperation.[112]

Partnered with an ascendent China, Russia has proposed a "Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Object (PPWT), which would ban conventional weapons in space."[113] American commentators have decried this proposal as intended to restrict the U.S.'s capabilities "while doing nothing to address Chinese and Russian ground-based anti-space capabilities."[114] Bradley Bowman, the senior director of the Center on Military and Political Power at the Foundation for Defense of Democracies, wrote in *Foreign Policy* how Russia would use this treaty to tie the U.S.'s hands and then simply continue to test weapons in space. A July 2020 incident indicated that when a Russian satellite fired what appeared to be an anti-satellite space torpedo during a weapons test.[115] Bowman believes Russia's conduct following the PPWT would be similar to how for more than a decade before its demise in 2019, Moscow used the Intermediate-Range Nuclear Forces Treaty to constrain the United States while Russia produced, flight-tested, and fielded a ground-launched intermediate-range cruise missile in direct contravention of the treaty.[116] Even if Russia doesn't blatantly disregard the PPWT, the treaty lacks any verification plan to ensure compliance and contains no restrictions on the development and stockpiling of anti-satellite weapons on the ground.[117] Meaning, if a nation like Russia or China decides to withdraw from the treaty, it could readily deploy space-based weapons previously developed on the ground.[118]

There is a real fear that a Chinese-Russian space alliance will lead to the continual militarization of space as two blocs form, with countries wishing to participate in space forced to pick between a North Atlantic-Japanese bloc led by the U.S., and a Chinese-Russian bloc led by an increasingly advanced China. But for the sake of not sounding alarmist, there is also good cause to believe that any significant threat Russia and China may pose in space is still years off, as right now the balance of power is heavily skewed in the U.S.'s favor.[119] At $40 billion, the combined U.S. civil and military space budget is nearly as large as the rest of the world combined, and of the 3,372 operational artificial satellites now in Earth's orbit, 56% are controlled by the U.S.

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[111] *Id.*
[112] *Id.*
[113] Posner & Sankey, *supra* note 7.
[114] *Id.*
[115] Bradley Bowman & Jared Thompson, *Russia and China Seek to Tie America's Hands in Space*, FOREIGN POL'Y (March 31, 2021), https://foreignpolicy.com/2021/03/31/russia-china-space-war-treaty-demilitarization-satellites/; U.S. Space Command Public Affairs Office, *Russia conducts space-based anti-satellite weapons test*, U.S. SPACE COMMAND (Jul. 23, 2020), https://www.spacecom.mil/MEDIA/NEWS-ARTICLES/Article/2285098/russia-conducts-space-based-anti-satellite-weapons-test/ (last visited Dec. 14, 2021).
[116] Bowman & Thompson, *supra* note 115.
[117] Jeff Foust, *U.S. Dismisses Space Weapons Treaty Proposal As "Fundamentally Flawed"*, SPACE NEWS, Sep. 11, 2014, https://spacenews.com/41842us-dismisses-space-weapons-treaty-proposal-as-fundamentally-flawed/ (last visited Dec. 14, 2021).
[118] *Id.*
[119] Posner & Sankey, *supra* note 7.

government or American entities.[120] Still, to protect national security the U.S. must be wary of the changes in space power and keep abreast of how proposed international laws like the PPWT may advocate for peace on paper, but, in reality, only serve to tip the scales in Russia and China's favor.

CONCLUSION

The United States and Russia have had a long history of space cooperation, an underappreciated fact that is often lost in the tumult of sensational news concerning potential conflicts with Russia and China. This news has its place; we've seen how Russian-Sino cooperation in space is real, and if the United States and its allies are not careful, we may find ourselves in a space-arms race between global powers. But if the United States reflects on how cooperation between Russia and the U.S. in the past has proved beneficial, it may realize that cooperation is the best path going forward, not just for dealing with Russia, but also an emergent China. The Wolf Amendment was passed in light of valid concerns of Chinese human rights abuses, but restricting the U.S.'s ability to cooperate with one of the world's preeminent powers in an area as important as space will only serve to hurt the U.S., and the international space community, in the long run. There already exists a strong base for the rule of law in space thanks to treaties like the OST. It is this mutual obligation under the law that has preserved peace in space. Addressing disputes in space through international forums and continuing to build on regulations is the best way to ensure future cooperation for research, technological advancement, and avoiding the deterioration of the rule of law. There is a hope for peace in space founded on decades of cooperation. As long as Russia and the U.S. continue this tradition, the future of our space relations will show the world that even military rivals can achieve peace in the final frontier.

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[120] *Id.*