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The Artemis Theory of Warfare

MARK J. SUNDAHL

OUTER SPACE, LONG THE PROVINCE of peaceful competition and international cooperation, is being rapidly militarized. We stand today at a rare inflection point in history that deserves careful thought as humanity moves forward. In short, we face the following choice: we can either protect and build on the special nature of space norms and customs to preserve space as a “laboratory of peace,” or we can militarize space as the new “highest ground” under largely the same rules that govern terrestrial warfare.¹ The sad reality is that our history, being inextricably linked to warfare, predicts that the dream of a peaceful future in space will almost certainly remain just that—a dream. That said, if you point out a problem, you should always propose a solution. I will propose a solution to the threat of warfare in space at the end of this article. But, before we get there, I will take a step back and explain some of the assertions above. Why do I call space a “laboratory of peace?” And why is this special status of outer space in jeopardy?

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SPACE AS A “LABORATORY OF PEACE”

After the Soviet Union shocked the world by launching Sputnik into orbit in 1957, the United Nations (UN) created an ad hoc Committee on the Peaceful

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Uses of Outer Space to address the world's concerns about this new field of human operations.² The first legal instrument created by the new committee was the non-binding 1962 Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space. The principles therein were codified five years later in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, otherwise known as the Outer Space Treaty (OST). This document, often referred to

Unfortunately, however, space is not sufficiently protected from the threat of warfare by existing law, which places few limitations on the use of conventional weapons.

as the Magna Carta of space law, established the basic principles governing space activities. Opened for signature in 1967, the OST enshrined into international law the free use of

outer space, the ban on the national appropriation of celestial bodies, obligations of transparency and information-sharing regarding space endeavors, liability for damage caused by space objects, and—most relevant to this paper—limits on the military use of space.³ In fact, some would say that the OST is primarily an arms control agreement. Unfortunately, however, space is not sufficiently protected from the threat of warfare by existing law, which places few limitations on the use of conventional weapons. Another method of protecting space from the scourge of war is needed.

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The OST's limitations on military activity in space are found in Article IV, which begins with the following rule:

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.⁴

This provision amounts to a total ban on the presence of weapons of mass destruction (WMDs) in space, with the clear exception of WMDs not in orbit or otherwise "station[ed]" in space.⁵ This caveat allows for the transient presence of nuclear warheads in space during the flight of an intercontinental ballistic missile. Apart from this exception, the OST renders outer space free of WMDs, which has become the cornerstone of space's status as a sanctuary of peace. This ban on stationing nuclear weapons in space is a stark departure from the laws of war on

Earth, which obviously do allow for the stationing of nuclear weapons on both land and sea. However, conventional weapons are not addressed in Article IV, raising the question of whether there are any limits to the use of such weapons in space. Article IV continues with the following provision:

The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes.⁶

A literal reading of this sentence suggests that the “peaceful purposes” requirement applies only to the use of the moon and celestial bodies and not to other regions of outer space. Such a reading would allow for the militarization of the Earth’s orbit (except for WMDs). An alternative interpretation posits that the “peaceful purposes” doctrine generally applies to all of outer space, including Earth’s orbit. In support of this broader interpretation, one can point to the language of the OST’s preamble which twice emphasizes the “use of outer space for peaceful purposes.”⁷ Under the Vienna Convention on the Law of Treaties, the context and purpose of a treaty as described in the preamble must be taken into account when interpreting treaty language.⁸ If this broader understanding prevails, the drafters of the OST appear to have created a celestial paradise free from the pestilence of war. The Outer Space Treaty would therefore make a promise of peace as humanity expands its presence into the solar system and beyond. But is this promised utopia truly attainable?

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The answer to this question depends on the meaning of the word “peaceful.” In fact, the word may mean very little. The United States has always taken the stance that “peaceful” is equivalent to “non-aggressive,” while the term “non-aggressive,” is defined as any action taken in accordance with the UN Charter, such as those needed for self-defense or those authorized by the UN Security Council.⁹ In effect, “peaceful” has been interpreted out of existence. The right to self-defense and the ability to take military action when authorized already exists under international law. Thus, under this interpretation, the “peaceful purposes” provision adds no new restrictions on the use of force in space.

So, what exactly can the military do in space according to the “peaceful purposes” principle? Based on a long track record, there is an established understanding that the military can use satellites for communications, logistics, and the gathering of intelligence. But now something more aggressive is on the horizon.

THE THREAT TO PEACE IN SPACE

The clearest glimpse into the future of the militarization of space is the X-37B

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program overseen by the U.S. Space Force's Delta 9 wing—which is currently preparing for orbital warfare. The X-37B, an unmanned space plane built by Boeing, possesses the capabilities to patrol and inspect satellites in low-Earth orbit during missions that have lasted over two years. X-37B's payload bay, the space inside the shuttle orbiter where cargo is kept, can be easily outfitted with weapons to carry out the actions described in the following announcement by Delta 9:

The mission of Delta 9 is to prepare, present, and project assigned and attached forces for the purpose of conducting protect-and-defend operations and providing national decision authorities with response options to deter and, when necessary, defeat orbital threats.¹⁰

In short, we are witnessing the emergence of spacecraft that could engage in hostile kinetic attacks (e.g., missiles) or akinetic attacks (e.g., electromagnetic pulses) on enemy spacecraft in orbit if needed for self-defense.¹¹ What does this say about how the rules governing the use of military force in space differ from those on Earth? Once again, Article IV of the OST sheds some light on this question:

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The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden.¹²

This provision of Article IV reveals another significant departure from the terrestrial laws of war. States are not permitted to construct military bases, test weapons, or engage in military maneuvers on any celestial bodies, such as the moon or Mars. However, in the final sentences of Article IV, this broad ban on military activity on celestial bodies is undercut:

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.¹³

Is it possible that the construction of bases, the testing of weapons, and the conduct of war games could be permitted so long as they are deemed “peaceful,” i.e., “non-aggressive?” An answer to this question has been provided by Colonel Eric Felt of the United States Space Force, who stated that the Space Force's activities on the moon will evolve as needed for security and stability “wherever that may take us.”¹⁴

HOW THE RULES OF MILITARY ACTIVITY ARE DIFFERENT IN SPACE

Now I will synthesize what we have learned. To the distress of those optimists who see a war-free future in space, we observe that space is not immune to militarization or war. If we accept the idea that the “peaceful purposes” language of the OST is largely devoid of meaning, the rules of existing space law only differ from the terrestrial laws of war in three ways:

1. No WMDs may be tested in space. (Limited Test Ban Treaty)
2. No WMDs may be stationed in orbit or elsewhere. (Art. IV OST)
3. No military bases, weapon tests, or military maneuvers are permitted on celestial bodies. (Art. IV OST)

Just as important as understanding the content of these rules is recognizing what they fail to mention. Given the prevailing interpretation of “peaceful purposes” by the United States and its allies as equivalent to “non-aggressive,” it can be said that the Outer Space Treaty places few limitations on conventional warfare in space. Even the ban on WMDs is trumped by the right to self-defense under the UN Charter, which further weakens these limitations.¹⁵

To soften any criticism of the existing limits on the use of military force in space, we should praise the Outer Space Treaty. Although it does not eradicate the possibility of war in space, it does make powerful strides in mitigating military activity. If the OST were being drafted today, it is unlikely that the UN could reach a consensus on such wide-ranging issues as the ban on the stationing of nuclear weapons in space and the establishment of military bases on the moon. Given the cur-

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achieved through the combination of legislative solutions and other approaches to mitigating the risk of war in space. New laws alone will not solve the problem. We must also look to other approaches that will allow for the peaceful evolution of international activity in space, such as technological and operational solutions.

COOPERATION AS A PATH TO PEACE IN SPACE

Few problems can be solved solely through legislation. In some cases, technology can help provide the solution. In other cases, society finds solutions through the establishment of private institutions that promote norms of behavior without the compulsion of law, such as private charities, industry groups, or grassroots organizations with various interests and goals.

We should, of course, consider all potential solutions to the challenges that await as we return to the moon. First, the OST provides the legal framework for the peaceful use and exploration of space. Second, engineers are regularly dismantling the technological barriers to harmonious coexistence among states and private operators in space by, for example, developing standards of interoperability that will allow habitation module airlocks, electricity and water infrastructure,

The vast history of peaceful cooperation between the United States and Russia in space serves as the best example of the proposition that, when viewed against the void of outer space, our similarities outweigh our differences.

and life support systems to connect. However, a third component is necessary for a comprehensive plan to promote long-lasting peace in space: the creation of organizations, agreements, and initiatives that foster

the cooperation of states and private actors on matters beyond the surface of our planet. The vast history of peaceful cooperation between the United States and Russia in space serves as the best example of the proposition that, when viewed against the void of outer space, our similarities outweigh our differences, and the best way to approach the greatest challenges is to work together.

THE HISTORY OF U.S.-RUSSIAN COOPERATION IN SPACE

Even at the height of the Cold War, space was a place of *détente* characterized by peaceful collaboration and healthy competition. Although geopolitical enemies, the United States and the Soviet Union partnered on many unmanned and two manned scientific missions in space. The first joint manned mission was the Apollo-Soyuz docking on 17 July 1975, which required U.S. and Soviet scientists to collaborate in creating a universal docking technology.¹⁶ Between 1994 and 1998, U.S. astronauts were flown on the Soyuz to the Russian Mir space station on seven occasions. Additionally, the Space Shuttle Atlantis docked

with the Mir in 1995, marking the second time U.S. and Russian astronauts entered each other's respective craft after docking in orbit.¹⁷ These manned missions showcased humanity's ability to rise above political differences and work together in the face of seemingly impossible challenges.

This history of space as a place for peaceful collaboration took deeper root when Russia joined the United States along with 11 other partners to construct and operate the International Space Station (ISS). Russian and U.S. flight crews first took up continuous occupation of the ISS in November 2000 and since then, the ISS partners have worked together as an inspirational example of humanity's potential to maintain space as a "laboratory of peace."

Unfortunately, the cooperative fabric of the ISS was torn on 30 April 2022 when Dmitry Rogozin, the General Director of the Russian State Space Corporation "Roscosmos," announced that Russia would be withdrawing from the partnership. Rogozin unceremoniously added that without the propulsion provided by the Russian module, the ISS would likely fall onto U.S. or European landmasses. Then on 3 July 2022, Roscosmos released a video of cosmonauts Oleg Artemyev, Denis Matveev, and Sergei Korsakov celebrating Russia's seizure of Ukraine's Luhansk and Donetsk regions. Rogozin's actions, perceived as retaliation against U.S. sanctions imposed on Russia, ended more than two decades of peaceful, apolitical, and effective cooperation among all ISS partners.

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At the time of writing, Russia had not yet given formal notice of withdrawal but neither had there been a retraction. As evidence that U.S.-Russian collaboration has not entirely ceased, NASA made an announcement on 15 July 2022 that it had entered into an agreement with Russia to share astronaut seats on the Dragon and the Soyuz capsule rides to the ISS.¹⁸ The same day, Putin fired Rogozin, likely due to his erratic public remarks.¹⁹ Most recently, Russian officials have stated that Moscow would like to keep flying its cosmonauts aboard the ISS until a new Russian space station, nicknamed "Ross," is operational.²⁰ The latest indications are that the station will not be completed until 2028.²¹

THE ARTEMIS THEORY OF WARFARE

Whether or not Russia follows through with its threat to withdraw from the ISS partnership has limited repercussions since the ISS is slated to be decommissioned and deorbited by 2031.²² The ISS has served well to promote the diplomatic sanctity of outer space for more than two decades but is reaching the end of its expected life. The question now is about what will replace the ISS as the hub of international cooperation in space.

The answer to this question lies in the model of cooperation exemplified by NASA's Artemis Program which aims to establish a continuous presence on the moon. NASA has issued a standing invitation for like-minded nations to join its lunar program by signing the Artemis Accords, an inter-agency agreement that reaffirms the rule of international law and implements a set of basic ground rules that will govern the Artemis program. The motivating purpose of the Accords is "to increase the safety of operations, reduce uncertainty, and promote the sustainable and beneficial use of space for all humankind."²³ At the time of writing, the number of Artemis partners had risen to 20.²⁴ This style of multinational partnership helps secure a lasting peace by establishing norms of behavior, developing best practices, and, most importantly, tying each partner's success to the triumph of the collective group. Beyond new rules of law and technological innovation, the cooperation of states that share the same goals may be the approach that will best protect us from the threat of war in space.²⁵ This concept of cooperation is at the core of my Artemis Theory of Warfare, which I state simply as follows:

*No signatory of the Artemis Accords has engaged in military operations in space against another signatory.*²⁶

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Although, at the time of writing, only two years have passed since the Artemis Accords were first signed on 13 October 2020, the Artemis Theory of Warfare has yet to be disproven. Only time will tell if continued cooperation and intertwined destinies will save space from the specter of war. 🌐

NOTES

1. The author first referred to space as a "laboratory of peace" in his March 12, 2022 post on the STARLAW Blog; Mark J. Sundahl, "Space as a Laboratory of Peace," *STARLAW*, March 12, 2022, <http://www.starlawblog.com/uncategorized/space-as-a-laboratory-of-peace>.

2. William J. Jordan, "Soviet Fires Earth Satellite Into Space; It Is Circling the Globe at 18,000 M.P.H.; Sphere Tracked in 4 Crossings Over U.S.," *New York Times*, October 5, 1967; UN General Assembly, Resolution 1962 (XVIII), Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, A/RES/1962, www.unoosa.org/oosa/oosadoc/data/resolutions/1963/general_assembly_18th_session/res_1962_xviii.html (December 13, 1962).

3. UN General Assembly 2222 (XXI), Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, A/RES/2222, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html> (January 27, 1967). This treaty is not the only arms control agreement in space. The 1963 Limited Nuclear Test Ban treaty signed prohibited nuclear weapon tests "any place under its jurisdiction or control (including) in the atmosphere; beyond its limits, including outer space; or under water, including territorial waters or high seas"; *Treaty Banning Nuclear Weapon Tests in the*

Atmosphere, in Outer Space and Under Water, U.S.-U.K.-U.S.S.R., Aug. 5, 1963, 14 U.S.T. 1313.

4. Treaty on Principles, art. IV.

5. Treaty on Principles, art. IV.

6. Treaty on Principles, art. IV.

7. Treaty on Principles, Preamble.

8. *Vienna Convention on the Law of Treaties*, May 23, 1969, 1155 U.N.T.S. 331, art. 31.

9. Regarding the interpretation of “peaceful purposes” see Setsuko Aoki, *Law and Military Uses of Outer Space*, in *Routledge Handbook of Space Law*, 2017, 197, 201–04.

10. Remington Sawade (Peterson-Schriever Garrison), “Space Delta 9 Builds Orbital Warfare Tradecraft from the Ground Up,” *United States Air Force*, <http://www.schriever.spaceforce.mil/News/Article-Display/Article/2510837/space-delta-9-builds-orbital-warfare-tradecraft-from-the-ground-up>.

11. Although the X-37B is the most visible example of increased military capability in space, the United States is not alone in pursuing these capabilities. There is evidence that other countries are also pursuing advanced on-orbit capabilities with potential military applications. Mike Wall, “Did Russia just launch a spacecraft to stalk a US spy satellite?,” *Space.com*, August 3, 2022, <https://www.space.com/russia-spacecraft-stalk-us-spy-satellite>.

12. Treaty on Principles, art. IV.

13. Treaty on Principles, art. IV.

14. Bryan Bender, “Moon battle: New Space Force plans raise fears over militarizing the lunar surface,” *Politico*, March 12, 2022, www.politico.com/news/2022/03/12/space-force-moon-pentagon-00016818.

15. *Charter of the United Nations*, October 24, 1945, 1 UNTS XVI, art. 51. The Charter states that “[n]othing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations.”

16. John Noble Wilford, “Apollo and Soyuz End 2-Day Union and Do Final Test,” *New York Times*, July 20, 1975.

17. William J. Broad, “Shuttle, Mir Part Company After Historic Linkup,” *New York Times*, July 5, 1995.

18. Jackie Wattles and Uliana Pavlova, “SpaceX rockets to fly Russian cosmonauts with new NASA deal,” *CNN Business*, July 15, 2022, www.cnn.com/2022/07/15/tech/spacex-russia-nasa-ride-share-agreement-scn/index.html.

19. “Dmitry Rogozin dismissed from post of Roscosmos Director General,” *Official Website of the President of Russia*, July 15, 2022, <http://en.kremlin.ru/acts/news/68946>.

20. Elizabeth Howell, “Russia wants to build its own space station, as early as 2028,” *Space.com*, July 28, 2022, www.space.com/russian-space-station-ross-2028-timeline.

21. Joey Roulette, “Russia tells NASA space station pullout less imminent than indicated earlier,” *Reuters*, July 27, 2022, www.reuters.com/business/aerospace-defense/russia-nasa-sticking-with-space-station-until-least-2028-2022-07-27.

22. Marcia Smith, “NASA Solidifies Planning to Deorbit ISS in 2031,” *Space Policy Online*, <https://spacepolicyonline.com/news/nasa-solidifies-planning-to-deorbit-iss-in-2031>.

23. *NASA Artemis Accords*, sec. 1, www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf.

24. The 20 signatories of the Artemis Accords are the space agencies of the United States, United Kingdom, United Arab Emirates, Japan, Italy, Canada, Australia, Luxembourg, South Korea, New Zealand, Brazil, Ukraine, Israel, Poland, Mexico, Romania, Bahrain, Singapore, Colombia, and France.

25. China and Russia have announced their own multinational program to establish a lunar base, the International Lunar Research Station. However, no underlying agreement establishing ground rules has been published and there has been no announcement of any additional partners joining the project.

26. The Artemis Theory of Warfare is inspired by Thomas Friedman’s Golden Arches Theory

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of Conflict which, in his words, posits that “no two countries that both have a McDonald’s have ever fought a war against each other.” Friedman’s idea underlying this theory was that “[t]he question raised by the McDonald’s example is whether there is a tip-over point at which a country, by integrating with the global economy, opening itself up to foreign investment and empowering its consumers, permanently restricts its capacity for troublemaking and promotes gradual democratization and widening peace.” Thomas L. Friedman, “Foreign Affairs Big Mac,” *New York Times*, December 8, 1996.