

The Space Arms Race: Global Trends and State Interests

Zeev Shapira and Gil Baram

Today space is an arena with a significant impact on the security, military, economy, and daily routines of many countries around the world and has attracted many stakeholders. As a result, global interest in the development of weapons for use in space—a process known as the “space arms race”—has increased. The purpose of this article is to present the current approaches to the weaponization of space and the activities of the primary and secondary states in this arena, and to propose a new categorization based on their technological standing. The article discusses the similarities and differences between states active in space and their position regarding its weaponization, in order to help understand the map of national and international interests in space at the current time.

Keywords: Weaponization of space, space powers, national security

Introduction

More than a decade after the international community criticized China and the United States for openly conducting anti-satellite missile tests,¹ which helped curb the escalation at the time, countries are now noticeably renewing

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1 Jim Wolf, “U.S. Shot Raises Tensions and Worries over Satellites,” *Reuters*, February 22, 2008, <https://www.reuters.com/article/us-satellite-intercept-vulnerability/u-s-shot-raises-tensions-and-worries-over-satellites-idUSN2144210520080222>; “US, Other Countries Condemn China ASAT Test,” *Spacetoday*, January 19, 2007, <http://www.spacetoday.net/Summary/3637>.

offensive operations in space: Russia conducted suspicious maneuvers in proximity to other countries' satellites; China launched secretive dual-use space systems; the United States is working to establish a separate and independent space force, and in March 2019 India conducted its first test of an anti-satellite weapon. The test by India—a country without a history of offensive space activities—illustrates the dilemma of many countries operating in space: Should they act independently and aggressively in this arena to protect their interests, or should they place their trust in international forums to try to rein in the current space arms race?

The weaponization of space poses two major threats. Firstly, it poses a security threat as unilateral actions by countries to weaponize space increase uncertainty within the international system. For example, space researchers recently warned that the proposed establishment of the US Space Force increases the risk of conflict and escalates tensions with its rivals.² Secondly, it poses an environmental threat as experiments with anti-satellite weapons have led to the creation of large amounts of space debris and have increased the difficulty of conducting operations close to Earth. If the process of the weaponization of space is accelerated, space could become dangerous and inaccessible to the various players.³

Furthermore, the accelerated development of the commercial space market has widened the circle of stakeholders in maintaining space as a neutral arena, but it has also increased the potential risks should it become an arena of war. The value of the space market is currently estimated at \$340 billion and is expected to triple its value in about twenty years.⁴ Part of that growth is the continued increase in investment by space companies.⁵ At the same time, growing political tensions over the past decade between the United States, Russia, and China, combined with new commercial space

2 Laura Grego, "There Are Much Better Options than a Space Force," *Union of Concerned Scientists*, February 19, 2019, <https://www.ucsusa.org/press/2019/there-are-much-better-options-space-force-0>.

3 "Trump's Proposed Space Force Could Worsen Earth's Orbital Debris Problem," *Washington Post*, August 10, 2018, <https://www.washingtonpost.com/world/2018/08/10/trumps-proposed-space-force-could-worsen-earths-orbital-debris-problem/>.

4 Jeff Foust, "A Trillion-Dollar Space Industry Will Require New Markets," *Spacenews*, July 5, 2018, <https://spacenews.com/a-trillion-dollar-space-industry-will-require-new-markets/>.

5 Caleb Henry, "Space Startup Investments Continued to Rise in 2018," *Spacenews*, February 4, 2019, <https://spacenews.com/space-startup-investments-continued-to-rise-in-2018>.

technologies as part of the “New Space” industry—including cyber and artificial intelligence—have heightened concern over the development of a space arms race.

Today there are two different processes taking place in space: The *militarization of space* refers to the use of space-based technology (communication, remote sensing and navigation) to support military operations, and the *weaponization of space* refers to the introduction of weapons into space, such as anti-satellite weapons, satellites capable of damaging other satellites, and weapons operating from space aimed at Earth. Nowadays, the militarization of space is seen as a fait accompli, but that space has yet to become weaponized and therefore the process is reversible.⁶ Indeed, in recent years, the superpowers have intensified the process of weaponizing space. Senior US administration and military officials have voiced concern about China and Russia’s offensive use of space,⁷ leading to widespread reforms in US space security, the establishment of the US space command at the directive of President Donald Trump,⁸ and a surge in tensions with China and Russia.⁹

At the same time, initiatives in the international arena to find diplomatic solutions to the question of the space arms race have intensified in recent years, among them a Russian-Chinese proposal in 2008 to restrict the introduction of weapons into space and the European Union’s proposal in 2014 for an international space code of conduct.¹⁰ In addition, non-governmental initiatives have been undertaken to strengthen the transparency of space warfare laws

6 For more on the differences and a review of uncertainty and consensus on the term “space weaponization,” see Columba Peoples, “The Securitization of Outer Space: Challenges for Arms Control,” *Contemporary Security Policy* 32, no. 1 (2011): 2–5.

7 Sandra Erwin, “DNI Coats: Enemies are Developing Advanced Technology, Space Weapons,” *Spacenews*, April 4, 2018, <http://spacenews.com/dni-coats-enemies-are-developing-advanced-technology-space-weapons-we-have-to-up-our-game>; Colin Clark, “CSAF Predicts War in Space ‘In a Matter of Years,’” *Breaking Defense*, February 26, 2018, <https://breakingdefense.com/2018/02/csaf-predicts-war-in-space-in-a-matter-of-years>.

8 Mike Wall, “Trump Signs Directive to Create Military Space Force,” *Space*, February 21, 2019, <https://www.space.com/president-trump-space-force-directive.html>.

9 Joel Gehrke, “China Warns Trump about Dangers of New Space Force,” *Washington Examiner*, June 19, 2018, <https://www.washingtonexaminer.com/policy/defense-national-security/china-warns-trump-about-dangers-of-new-space-force>; “Russia Warns against Trump’s ‘Alarming’ Plans for US Space Force,” *Military*, June 20, 2018, <https://www.military.com/daily-news/2018/06/20/russia-warns-against-trumps-alarming-plans-us-space-domination.html>.

10 David C. DeFrieze, “Defining and Regulating the Weaponization of Space,” *Joint Force Quarterly* 74, no. 1 (2014).

and to examine the adaption of international law to military use of space. For example, the MILAMOS Project,¹¹ launched at McGill University in Canada in 2016, has experts from various countries working to formulate a guide that defines international law that is applicable for military use in space during peace times. Another example is the Woomera Manual initiative, launched in 2018 at the University of Adelaide in Australia, in collaboration with other universities, which seeks to examine the applicability of existing international law to military space operations.¹²

In recent years, professionals and academics have issued many publications about various countries' military activities in space, including the weaponization of space. Despite the growing discourse on the subject, most of the research deals with the space powers (the United States, China, and Russia), which may limit the scope of the debate on the weaponization of space and present only a partial perspective of the processes occurring in this sphere.

In this article, we illustrate the complexity that exists today in the different approaches to weaponization of space and propose to categorize countries according to their technological capabilities in space. We suggest dividing states that are active in space according to their technological status: (1) space superpowers: the United States, Russia, and China; (2) the medium space powers: the European Union, India, and Japan; (3) the emerging space powers.¹³ This division reflects a broader range of interests and different approaches to the weaponization of space among the various countries, unlike the current and widely accepted conceptualization of the weaponization of space.

In the first part of the article, we present the existing approaches to the weaponization of space and discuss the challenges in understanding the current weaponization processes in various countries. In the second part, we propose a different categorization—based on the technological strength of the countries—and discuss the security, national, and diplomatic processes implemented by each country regarding this issue. Finally, we briefly

11 MILAMOS refers to “Manual on International Law Applicable to Military Uses of Outer Space.”

12 For further reading on these initiatives see the official websites of MILAMOS at <https://www.mcgill.ca/milamos> and the Woomera Manual initiative at <https://law.adelaide.edu.au/woomera>.

13 To create the division, we borrowed the definition “medium space powers” from John J. Klein, “Space Strategy Considerations for Medium Space Powers,” *Astropolitics* 10, no. 2 (2012): 3.

discuss Israel and the conclusions that emerge from the categorization we have proposed here and its implications for understanding countries' current space operations.

Approaches to Weaponization of Space

The literature on the weaponization of space is divided into two main camps of “for” and “against” the weaponization of space. In recent years, however, a more complex discourse has emerged, offering a broad range of outlooks and modes of action. Karl Mueller distinguishes six different approaches to the space weaponization process, which include three opposing weaponization (Idealists, Internationalists, Nationalists) and three supporting weaponization (Space Racers, Space Controllers, Space Hegemonists). These approaches represent different stages in the space weaponization spectrum, with the “idealists” at one end and the “space hegemonists” at the other.¹⁴ Mueller’s analysis, however, is limited to the American context only and does not provide practical examples of these perspectives. Similarly, Peter Hays also focuses only on the American context and suggests a division into four approaches: two supporting space weaponization (Space Hawks and Inevitable Weaponizers) and two opposing space weaponization (Space Doves and Militarization Realists).¹⁵ Other divisions in the literature reflect a similar tendency,¹⁶ and even though there are variations, all share the same common denominator of two camps—opponents and supporters—with a strong focus on the activities and policies of the United States in this field.

Evidently, researchers who represent different camps in their approach to space weaponization also tend to focus on the United States.¹⁷ Researchers who advocate space weaponization, whether to protect critical space assets,¹⁸

14 Karl P. Mueller, “Totem and Taboo: Depolarizing the Space Weaponization Debate,” *Astropolitics* 1, no. 1 (2003): 5–12.

15 Peter L. Hays, *United States Military Space: Into the Twenty-First Century* (DIANE Publishing, 2002), pp. 96–100.

16 Sterling Michael Pavelec, “The Inevitability of the Weaponization of Space: Technological Constructivism versus Determinism,” *Astropolitics* 10, no. 1 (2012): 2–3; Mike Moore, *Twilight War: The Folly of US Space Dominance* (Oakland: The Independent Institute, 2008), p. 16.

17 Bruce M. DeBlois, “Space Sanctuary. A Viable National Strategy,” *Airpower Journal*, (Winter 1998); James Clay Moltz, “Preventing Conflict in Space: Cooperative Engagement as a Possible US Strategy,” *Astropolitics* 4, no. 2 (2006).

18 Alan Steinberg, “Weapons in Space: The Need to Protect Space Assets,” *Astropolitics* 10, no. 3 (2012): 6–7.

or to win the race for operational space weapons,¹⁹ tend to describe China and Russia more extensively, albeit mostly from an American perspective.

The focus on the United States is understandable, given that it is the greatest space power today, publishes detailed space policy documents, and operates with a relatively high level of transparency.²⁰ This focus, however, presents two limitations. First, approaches to space weaponization are tested according to American activities and are thus often framed as “for or against” weaponization, without examining a broader range of options. Second, relegating other countries in the space weaponization sphere to the margins of the discourse provides only a partial picture of reality and limits the ability to analyze alternative approaches to space weaponization.

In the next section, we propose a new categorization of approaches to space weaponization, based upon a country’s degree of technological maturity. This division will help identify similar patterns of operation in the processes of space weaponization among countries that are in the same technological class, thus providing a different perspective from the traditional approach to space weaponization.

The Importance of Technological Status

As mentioned above, the division proposed here consists of three groups: space superpowers, medium space powers, and emerging space powers.²¹ The United States, Russia, and China constitute the three space superpowers and have independent satellite development, launch, and control capabilities for all space orbits, and manned space programs. The medium space powers considered here are the European Union, India, and Japan, which possess the capabilities to develop, launch, and control advanced satellites independently but do not have a manned space program (India plans to carry out a manned launch in 2022).²² Emerging space powers are those countries that do not have the above capabilities, or are in their initial stages of development.

19 Pavelec, “The Inevitability of the Weaponization of Space,” 5–6.

20 Rebecca Johnson, “Security without Weapons in Space: Challenges and Options,” *Disarmament Forum* 1 (2003): 2–3; Todd Harrison, Kaitlyn Johnson and Thomas G. Roberts, “Introduction,” in *Space Threat Assessment 2018* (Center for Strategic and International Studies, April, 2019).

21 To create the division, we borrowed the definition “medium space powers” from John J. Klein, “Space Strategy Considerations for Medium Space Powers,” *Astropolitics* 10, no. 2 (2012): 3.

22 Some researchers identify additional countries in this group, such as Israel, North Korea, and Iran.

Despite the large number of countries in this group, we only examine three of them—Pakistan, Brazil, and Australia—upon which we will formulate an assessment of the different interests within this group.

Space Superpowers

United States

The United States is the leading country in space activity today. As a result of its global dominance, the United States has incorporated space-based systems into its national security infrastructure, gaining significant advantage over its rivals. These advantages were highlighted in the Gulf War, the Balkan conflict, and the invasion of Iraq.

During the Cold War, the United States focused on countering the Soviet threat in space and even developed advanced initiatives in the 1980s, such as the Strategic Defense Initiative (also dubbed “Star Wars”) to provide protection against intercontinental ballistic missiles. As the Soviet Union declined and collapsed, these initiatives faded.²³ At the beginning of the twenty-first century, the question of space security returned to the fore,²⁴ but economic and political constraints have prevented the development of a comprehensive strategy on this issue.²⁵ The United States, however, has continued to maintain an offensive position in space that was reflected in the publication of policy documents calling for the strengthening of its control of space²⁶ and for withdrawal from the Anti-Ballistic Missile (ABM) Treaty in 2002.²⁷ Over the past decade, tensions have increased between the United States, China, and Russia, reflected, in part, in changes to policy and rhetoric regarding space warfare and in President Trump’s directive in 2018 to establish an independent space force.²⁸

Diplomatically, the United States consistently opposes treaty proposals such as the Prevention of the Placement of Weapons in Outer Space and of

23 Brian Weeden and Victoria Samson, eds., *Global Counterspace Capabilities: An Open Source Assessment* (Secure World Foundation, April, 2019), pp. 3.1, 3.16.

24 Then US Secretary of Defense Donald Rumsfeld even warned of a “Space Pearl Harbor.”

25 Weeden and Samson, *Global Counterspace Capabilities*, p. 3.1.

26 Johnson, “Security without Weapons in Space,” 2–3.

27 The ABM Treaty restricted the United States and Russia in developing ballistic missile systems that could also be used against satellites.

28 Weeden and Samson, *Global Counterspace Capabilities*, p. 3.18.

the Threat or Use of Force against Outer Space Objects (PPWT)²⁹ citing concern for its ambiguity in defining space weapons and its lack of confidence in Russia and China's intentions.³⁰ The European initiative for a code of conduct for outer space activities, which is non-binding, received reserved support from the United States during President Barack Obama's term,³¹ which only weakened since President Trump took office.³²

The United States has extensive capabilities to damage, neutralize, and prevent its rivals from exercising their capabilities in space. As far back as 1985, the United States conducted a successful satellite destruction experiment with an air-launched missile (ASM-135), designed to counterbalance the anti-satellite weapons developed by the Soviet Union. The United States does not currently have a program to develop a dedicated direct ascent anti-satellite weapon, but its accumulated knowledge, combined with its proven ability to target satellites, reflects a real operational capability to destroy enemy satellites. Given the current technical capabilities of its anti-intercontinental ballistic missile (ICBM), the assumption is that these capabilities are currently limited to Low Earth Orbit (LEO),³³ but it is possible that their range will be increased in the future and will be able to hit higher orbits in space.

In the field of anti-satellite weapons, the United States is developing measures designed for various non-offensive needs, such as on orbit servicing, and has even conducted experiments over the years in rendezvous and proximity operations (RPO). Although the United States has not announced any plans to use these capabilities for offensive purposes, it could utilize the

29 "Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects" is a proposal that China and Russia have advanced at the United Nations since 2008. The proposal has been the subject of continued criticism over its ambiguity when it comes to the definition of space weapons.

30 Stephanie Nebehay, "U.S. Warns on Russia's New Space Weapons," *Reuters*, August 14, 2018, <https://www.reuters.com/article/us-russia-usa-space/u-s-warns-on-russias-new-space-weapons-idUSKBN1KZ0T1>; Jeff Foust, "U.S. Dismisses Space Weapons Treaty Proposal as 'Fundamentally Flawed,'" *Spacenews*, September 11, 2014, <https://spacenews.com/41842us-dismisses-space-weapons-treaty-proposal-as-fundamentally-flawed/>.

31 Marcus Weisgerber, "U.S. Wants Changes to EU Space Code of Conduct," *Spacenews*, January 12, 2012, <https://spacenews.com/18667us-wants-changes-to-eu-space-code-of-conduct/>.

32 John Yoo, "Military Use of Space is Coming, Trump can Help America Prepare," *The Hill*, December 28, 2017, <https://thehill.com/opinion/national-security/366663-military-use-of-space-is-coming-trump-can-help-america-prepare>.

33 This refers to an orbit with an altitude of up to 2,000 km above the Earth.

knowledge it has accumulated to develop such capabilities within a short time.³⁴ The United States has a system called the Counter Communications System (CCS), which, while secretive, is believed to be capable of disrupting satellite signals should the need arise. In addition, over the years the United States has developed a number of programs in the field of directed-energy weapons, some of which have the potential to damage space assets.³⁵

Russia

During the Cold War, the Soviet Union developed a range of capabilities against the space assets of its rival, the United States. With the end of the Cold War and the breakup of the Soviet Union, the Russian space industry lost most of its budget, and many of its military programs were shut down.³⁶ Over the past decade, Russia seems to have begun to modernize its military and civil space systems in an attempt to restore its status and avoid lagging behind China and the United States. Under President Putin, Russia is working more aggressively to consolidate its regional and international status and, in doing so, has marked space as a significant arena in any future conflict.

Since 2004, Russia has been working in the diplomatic arena together with China to advance limitations on the weaponization of space and has tabled proposals in the United Nations, such as the resolution entitled “No First Placement of Weapons in Outer Space.”³⁷ However, the US administration notes that Russia’s diplomatic efforts are incompatible with its offensive actions in space, which, it claims are evidence of Russia’s true intentions.³⁸

Russia possesses several means of damaging satellite systems, based partly on modernized Cold War-era programs and new developments. In the field of direct ascent weapons, Russia has several ground-to-air anti-satellite programs based on the A-235 and Kontakt systems, which were developed in the 1970s and 1980s. At the same time, it is currently developing the S-500 Anti Ballistic Missile System, which is also believed to have anti-satellite capabilities. Although Russia has not carried out a full-blown satellite interception, as the United States and China have, it can be concluded that the technical experience accumulated during the Cold War will give Russia

34 Weeden and Samson, *Global Counterspace Capabilities*, pp. 3.1–3.6.

35 Ibid, pp. 3.9–3.15.

36 Harrison et al., *Space Threat Assessment 2018*, pp. 17–18.

37 UN General Assembly, Draft resolution, No First Placement of Weapons in Outer Space, 2016.

38 Harrison et al., *Space Threat Assessment 2018*, p. 19.

the ability to deploy weapons against satellites within a few years, despite any technical limitations.

In the 1960s, Russia developed an interception system for satellites in LEO, which was declared operational in 1973. It also aspired to develop a more advanced system called Naryad, designed to damage satellites in Geostationary Orbit (GEO),³⁹ although the testing on this system ceased in 1991. Over the past decade, Russia has been developing rendezvous and proximity capabilities with secretive satellites that it uses to maneuver suspiciously near foreign satellites—an operation that could in the future be used to physically harm or disrupt those satellites.⁴⁰ Russia is also investing in additional anti-satellite weapons, such as means to disrupt signals from navigation, communications and even observation satellites. Furthermore, Russia has extensive technical knowledge based on its development of laser weapons during the Cold War and has even reinstated a plan to develop aircraft-borne laser to directly target observation satellites, but it is unclear if these plans have reached operational maturity.⁴¹

China

During the Cold War period, China's space program was given a low priority, and China remained a secondary player in this arena. However, in recent decades China has invested considerable efforts in developing its capabilities in space and has assumed a significant role, as it possesses advanced civil and military programs, such as a space exploration program and independent navigation systems. These programs have enabled China to compete with the United States for regional and global influence.

As part of its growing rivalry with the United States over the past decade, China has developed a strategy based, in part, on denying American capabilities in space. In addition, China has begun to operate more aggressively in the space arena, as seen in published policy documents, which have called for its dominance of space and the development of advanced space weapons. However, it is unknown whether China is currently employing its space

39 GEO refers to an orbit of some 35,000 km above Earth and is used mostly for communications satellites.

40 Weeden and Samson, *Global Counterspace Capabilities*, pp. 2.1–2.14.

41 *Ibid.*, pp. 2.15–2.22.

capabilities for military operations, and it is possible that these capabilities were constructed primarily for deterrence purposes.⁴²

In the diplomatic arena, China supports Russia's efforts to promote international legislation to limit the weaponization of space. However, China's refusal to support initiatives such as the code of conduct for space, while encouraging legislation that does not have any enforcement mechanisms and does not preclude anti-satellite tests suggests, at least according to the United States, that China merely seeks to restrict US space activities without adversely affecting its own development programs, while presenting itself as purportedly supporting peace initiatives.⁴³

In recent decades, China has developed a number of capabilities in the field of direct ascent weapons for targeting satellites, some having dedicated use and others having the capability to intercept missiles. While China began developing these weapons as early as the 1960s, only the experiments of the last two decades—and especially the satellite interception carried out in 2007—indicate that it has made progress in this field. One can conclude that China is now able to achieve operational capabilities to hit satellites in LEO by using a mobile ground system.

Over the past decade, China has carried out a large number of rendezvous and proximity maneuvers, raising concerns about the development of Chinese offensive capabilities against orbiting satellites. Prominent among China's activities is the launch of the Aolong-1 orbital debris cleanup satellite in 2016, which raised fears about its possible use to target satellites. As with Russia, there is concern that China could, should the need arise, also use its satellite capabilities to physically harm foreign satellites.⁴⁴ In addition, China is developing other means of targeting satellites and is believed to have capabilities to disrupt both communication and navigation satellites' signals. Furthermore, China has shown interest in developing counterspace laser devices and may have attempted to blind satellites using this method in 2005 and 2006.⁴⁵

Overall, the three space superpowers have extensive space capabilities, both civilian and military, which enable them to prevent and impair their

42 Ibid, p. 1.1.

43 For extensive discussion of the matter, see "China's Position on a Code of Conduct in Space," *U.S.-China Economic and Security Review Commission*, September 8, 2017, <https://bit.ly/2ow9N6V>.

44 Weeden and Samson, *Global Counterspace Capabilities*, pp. 1.1–1.4.

45 Ibid, pp. 1.15–1.18.

rivals' space capabilities during a conflict. Although the United States seems to take the most offensive approach in space with the aim of gaining dominance and maintaining freedom of action, Russia and China also see space as a significant arena where the outcome of any future war will be determined. Thus, they also emphasize developing counterspace capabilities and preventing their rivals' achievements.

In the diplomatic arena, Russia and China operate differently from the United States, although seemingly for the same offensive ends. While the United States continues to thwart international legislation that would limit the weaponization of space and favors softer proposals, such as the code of conduct in outer space, Russia and China are pushing for initiatives that would advance limitations on the weaponization of space. In fact, the three superpowers use diplomacy primarily to limit their rivals, while they themselves work to empower their own capabilities with the aim of gaining supremacy in the space arms race.

The three superpowers operate according to an offensive approach, whether to protect their space assets and their international standing or to avoid being at a strategic disadvantage. While some differences exist between them—the United States seeks space hegemony, China aims to achieve equality, and Russia wants to reduce its relative weakness—the shared common denominator is that they all support the weaponization of space.

Medium Powers

Europe

Germany, the United Kingdom, France, and Italy possess extensive military space infrastructure, including observation satellites and other systems. However, none of these countries, other EU countries, nor the European Union itself is known to have a space weaponization plan. In fact, a strategy paper of the European Commission released in 2016 emphasized the space defense component, which includes improving situational awareness of space and analysis of threats, such as space weather and cyberattacks.⁴⁶ The European Space Agency is developing a number of initiatives to clean up space debris

46 European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions—Space Strategy for Europe," October 26, 2016, pp. 8–10, <https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/COM-2016-705-F1-EN-MAIN.PDF>.

and for space exploration. Although these initiatives are seemingly designed for civilian goals, they are believed to have the technical potential to damage space assets if required.⁴⁷

In the international arena, the European Union has opposed China and Russia's proposals to restrict the weaponization of space, on the claim that these proposals are neither clear nor sufficiently comprehensive.⁴⁸ Since 2008, however, the European Union has led an initiative to write a code of conduct for activities in space with the goal of breaking the deadlock in the debate over the weaponization of space.⁴⁹ Although the European Union's actions are intended to limit the weaponization of space, they also constitute its attempt to emerge as a central player that sets the normative agenda in this arena,⁵⁰ as part of a broader approach to the importance of protecting space assets.⁵¹

India

Although India began developing a space program in the 1960s, it did not make any significant achievements until the 1990s. Although the goal of India's space program was to improve the country's economic status through technological innovation, it was greatly influenced by the growth of China's military power. Thus, India tested primary military uses in space as early as the 1980s with the Integrated Guided Missile Development Program (IGDMP), which was the foundation for the development of its ballistic missile defense systems in the 1990s.⁵²

India's rivalry with China and Pakistan continued to influence its military space program and led to the development of its missile defense capabilities and strengthening of its ties with the United States, which has included technology transfers. Although India has repeatedly hinted at the development

47 Harrison et al., *Space Threat Assessment 2018*, pp. 36–37.

48 Statements on behalf of the EU, "EU Explanation of Vote—United Nations 1st Committee: No First Placement of Weapons in Outer Space," Delegation of the European Union to the United Nations – New York, November 2, 2018, https://eeas.europa.eu/delegations/un-new-york/53334/eu-explanation-vote-%E2%80%93-united-nations-1st-committee-no-first-placement-weapons-outer-space_en.

49 Peoples, "The Securitization of Outer Space," 11–14.

50 Max M. Mutschler and Christophe Venet, "The European Union as an Emerging Actor in Space Security?," *Space Policy* 28, no. 2 (2012): 4–6.

51 Phillip A. Slann, "Anticipating Uncertainty: The Security of European Critical Outer Space Infrastructures," *Space Policy* 35 (2016): 8.

52 Zulfiqar Khan and Ahmad Khan, "Chinese Capabilities as a Global Space Power," *Astropolitics* 13, no. 2–3 (2015): 12–13.

of satellite interception capabilities, its plans to develop these weapons were not made public, until March 2019, when it conducted a successful anti-satellite missile experiment and destroyed one of its own satellites. This raised concerns that India intends to continue developing space weapons so as not to be left out of any future agreement restricting space weaponization.⁵³

In the diplomatic arena, India continues to support global and regional efforts to use space for peaceful purposes and to advance norms for safety and sustainability in space. As part of its efforts, India has proposed launching a satellite for the South Asian Association for Regional Cooperation (SAARC),⁵⁴ and in 2017, it launched a communications satellite to assist countries in the region.⁵⁵ India also supports Chinese and Russian initiatives to limit the weaponization of space and recently reiterated this support following its test of an anti-satellite weapon.⁵⁶ Furthermore, India also supports the drafting of a code of conduct for activities in space but has retained reservations regarding some of its language, given that it was not a full partner in its formulation.⁵⁷

Japan

At its inception, Japan's space program focused mainly on its civilian component. However, mounting pressure from the United States in the past decade and growing concern over its neighbors have led Japan to adopt a more active approach to space defense and to reorganize its military space infrastructure to increase its independence in this arena.⁵⁸ As part of these efforts, Japan has launched communication and observation satellites, has

53 Doris Elin Urrutia, "India's Anti-Satellite Missile Test is a Big Deal. Here's Why," *Space*, March 30, 2019, <https://www.space.com/india-anti-satellite-test-significance.html>.

54 The organization includes Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

55 "India Launches 'Invaluable' South Asia Satellite," *BBC*, May 5, 2017, <https://www.bbc.com/news/world-asia-india-39814455>.

56 Sachin Parashar, "Not Entering into Outer Space Arms Race, India Tells P-5 Countries," *Times of India*, March 28, 2019, <https://timesofindia.indiatimes.com/india/not-entering-into-outer-space-arms-race-india-tells-p-5/articleshow/68604921.cms>.

57 Rajeswari Pillai Rajagopalan, "The Space Code of Conduct Debate: A View from Delhi," *Strategic Studies Quarterly* 6, no. 1 (2012): 7–12.

58 Paul Kallender and Christopher W. Hughes, "Hiding in Plain Sight? Japan's Militarization of Space and Challenges to the Yoshida Doctrine," *Asian Security* (2018): 8–9.

set up a new headquarters to monitor space threats,⁵⁹ and approved its largest defense budget (some \$46 billion) at the end of 2017.⁶⁰

Japan currently does not have a development program for the weaponization of space, but it has the potential to damage satellites through the US Aegis missile system deployed in its territory and through future rendezvous and proximity systems capabilities that it is currently developing.⁶¹ Moreover, Japan's military advances in space in recent years indicate that it is abandoning its traditional defensive norms and shifting to a strategy with more offensive characteristics.⁶²

In the diplomatic arena, Japan supports both Chinese and Russian initiatives to limit the weaponization of space and the European initiative to develop a code of conduct for activities in space.⁶³ However, Japan's strategic alliance with the United States seems to continue to be of paramount importance, as prior to the United States giving its support to the code of conduct initiative, Japan refrained from supporting it fully as well.⁶⁴

In conclusion, the medium powers possess extensive civil space infrastructures, including many dual-use satellites, designed to support military operations should they be needed. So far, however, these countries appear to have been operating with a certain restraint, by not developing any offensive programs in space and continuing to support international initiatives to prevent weaponization of space. Nonetheless, and given the significant technological progress of these countries in recent years and their considerable budgetary investments in this area, it can be assumed that they will be able to develop operational space weapons within a short time.

59 Shinichi Fujiwara, "Japan to Set Up Space Command Center to Track Debris, Threats," *Asahi Shimbun*, November 20, 2018, <http://www.asahi.com/ajw/articles/AJ201811200034.html>.

60 Mari Yamaguchi, "Japan Cabinet Approves Record 46B\$ Defense Budget," *Defense News*, December 27, 2017, <https://www.defensenews.com/global/asia-pacific/2017/12/27/japan-cabinet-approves-record-46b-defense-budget/>.

61 Laura Grego, "A History of Anti-Satellite Programs," *Union of Concerned Scientists* (January 2012): 10–12.

62 Kallender and Hughes, "Hiding in Plain Sight," 17–18.

63 Ministry of Foreign Affairs of Japan, "Japan's Disarmament and Non-Proliferation Policy (Fifth Edition)," March 2011, pp. 26–27, <https://www.mofa.go.jp/policy/un/disarmament/policy/pdfs/pamph1103.pdf>.

64 Kazuto Suzuki, "Japan, Space Security and the Code of Conduct," in *Decoding the International Code of Conduct for Outer Space Activities*, ed. Ajey Lele (New Delhi: Institute for Defence Studies & Analyses: Pentagon Security International, 2012), pp. 94–96.

Contrary to the space superpowers, which seek to gain supremacy through an offensive military strategy and limited support for international initiatives, the medium powers seek to limit the proliferation of space weapons through international initiatives and the establishment of defensive space infrastructures, such as observation and interception systems. Their motives differ, however. The European Union, which initiated the space code of conduct, seeks to position itself as a central actor in preventing the proliferation of space weapons and thereby strengthen its international standing. India, which seeks to consolidate its regional strategic standing, has signaled its offensive capabilities in space on the one hand, while it continues to support international initiatives against the weaponization of space, as well as regional collaborations on the other hand. Japan may have the most narrow motives, as it seeks to safeguard its national security through strengthening its capabilities in space, its alliance with the United States, and its continued cooperation with the international community regarding restrictions on the weaponization of space.

While the space superpowers have the most offensive approach to space weaponization, the second-tier states presented above operate on a number of levels that represent different, and sometimes contradictory, approaches to the weaponization of space. The presence of these countries in the “middle” of the space technological hierarchy⁶⁵ seems to lead to a “middle road” to the weaponization of space: on the one hand, they operate at the diplomatic level to limit the weaponization of space and do not advance offensive space programs (with the exception of India’s test of an anti-satellite weapon), but on the other hand, they do not fully commit to all international initiatives and continue to develop space capabilities that may be used for combat should the need arise.

Emerging Space Powers

The third group comprises the emerging space powers, which do not have independent satellite development, launch, and control capabilities. This group includes in practice all countries not included in the previous two groups, and it is divided into two subgroups: one that possesses basic infrastructure and space agencies, such as Pakistan, Brazil, and Australia, and the other that does not possess basic space infrastructure, such as most

65 Klein, “Space Strategy Considerations for Medium Space Powers,” 3.

African countries. Due to the large scope of this group, it is impossible to review all the members, but rather their common and unique characteristics will be discussed.

From a military perspective, some of the emerging space powers possess space systems for security or dual use, such as communications and observation satellites, but due to their lack of technological maturity, are forced to seek the assistance from the more advanced space players to launch these systems and sometimes also to develop and operate them. Therefore, it can be assumed that these countries do not have more advanced military capabilities in space.

The emerging space powers operate more strongly in the diplomatic arena, either by expressing almost complete support for China and Russia's initiatives to restrict weaponization of space, or by actively participating in international initiatives, such as the code of conduct in space.⁶⁶ Despite the clear support of the emerging space powers for restrictions on the proliferation of space weapons, these countries have different interests for expressing this support.

Pakistan, which is in a decades-long conflict with India, has the more advanced space capabilities among the emerging space powers. Pakistan has expressed support for various international initiatives in the space arena but has expressed its unwillingness to bear the consequences of anti-weapons proliferation treaties or sanctions that may limit its efforts in space.⁶⁷ In contrast, Brazil, which is located in a region with less geopolitical tensions, supported and even participated in China and Russia's No First Placement of Weapons in Outer Space resolution,⁶⁸ but expressed dissatisfaction with the process of drafting the code of conduct for activities in space as well as

66 For example, in 2017, no developing country voted against "Further practical measures for the prevention of arms race in outer space," and only two (Ukraine and Georgia) voted against the proposal of "No first placement of weapons in outer space." See "First Committee Submits Six Drafts to General Assembly, One Calling for Immediate Start of Negotiations on Treaty Preventing Outer Space Arms Race," United Nations, October 30, 2017, <https://www.un.org/press/en/2017/gadis3591.doc.htm>.

67 Urooj Tarar, "Pakistan Opposes the Weaponization of the Final Frontier, Outer Space," *Daily Pakistan*, October 19, 2017, <https://en.dailypakistan.com.pk/pakistan/pakistan-opposes-the-weaponization-of-the-final-frontier-the-outer-space/>.

68 "UN Adopts Russian 'No First Placement of Weapons in Outer Space' Resolution," *Russia Beyond*, December 8, 2015, https://www.rbth.com/news/2015/12/08/un-adopts-russian-no-first-placement-of-weapons-in-outer-space-resolution_548679.

the content of some of its language.⁶⁹ In doing so, Brazil has positioned itself as an activist and advocate for the promotion of more powerful measures to restrict space weapons. Australia, which has a strategic alliance with the United States and relies on its capabilities in space,⁷⁰ supports the creation of a code of conduct for activities in space, inter alia with the aim of reducing the danger to the space environment and the accumulation of space debris.⁷¹

As we have seen, despite their support for diplomatic measures to restrict space weapons, emerging space countries operate according to various motives, due to their geopolitical situation, technological aspirations, or different security concepts. Although it is impossible to state that these countries want to discourage a space arms race out of idealistic motives, there is a need to map their different interests, which do not align with the relatively limited approach of “for or against” the weaponization of space.

Like the other groups, the standing of emerging space powers in the technological hierarchy is congruent with their activities in space. As the emerging space powers possess the most basic space capabilities, they support initiatives that restrict space weapons, either because they refuse to bear the burden of future harsher sanctions (in the case of Pakistan) or to maintain the security and safety of space which they aspire to join in the coming decades (as indicated by Brazil and Australia).

Israel

Israel has advanced space capabilities and is now capable of independently developing, launching, and operating advanced satellites (as illustrated by the “Ofeq” satellite series) and could be considered one of the medium superpowers. However, Israel does not have a formal national space strategy and relies on other countries to launch satellites into geostationary orbit. In the field of space weapons, Israel does not have a declared plan to develop anti-satellite means, but it has the technical ability to destroy satellites using the Arrow 3 missile intercept system.⁷² In the diplomatic arena, Israel votes

69 Zahid Imroz, “Space Code of Conduct: Need to Re-analyse,” in *Decoding the International Code of Conduct for Outer Space Activities*, p. 134.

70 Connie Agius, “Australia’s Reliance on US Space Capabilities could Put Security at Risk, Defense Expert Says,” *ABCnews*, February 23, 2018, <https://www.abc.net.au/news/2018-02-23/australias-reliance-on-us-in-space-a-national-security-risk/9474122>.

71 Dylan Welch, “Australia Joins Race to Defend Space,” *Sydney Morning Herald*, January 19, 2012, <https://www.smh.com.au/technology/australia-joins-race-to-defend-space-20120118-1q6k2.html>.

72 Harrison et al., *Space Threat Assessment 2018*, p. 38.

with the United States against Chinese and Russian initiatives to limit the weaponization of space.

Israel operates in a manner that is consistent with its hierarchical position among the countries active in space. Although it does not operate aggressively in space, it continues to oppose initiatives to restrict the weaponization of space, as part of its strategic alliance with the United States, and tends to support the preservation of the existing balance of power in space.

Conclusion

Despite the growing discourse on the weaponization of space in recent years, the academic debate has remained limited and focuses on a relatively simplistic division between its proponents and opponents. For the purpose of reassessing this approach, this article presented a new division of the countries involved according to their technological standing in space. This division enabled the identification of different interests and approaches, which are inconsistent with the existing divisions in academic scholarship.

The space superpowers, which are positioned at the top of the technological hierarchy, express the most aggressive approaches to space weaponization in pursuit of supremacy (United States and China) or strategic parity (Russia). The medium powers have different interests, ranging from a desire to lead a new normative and security discourse (European Union), establishing regional power (India), to maintaining national security through strengthening the alliance with the United States (Japan). The emerging space powers also have differing approaches. Although the members of this group support restrictions on the weaponization of space, their motives are not directly compatible with the idealist perception of opposition to weaponization, as expressed in the current research literature.

Based on an analysis of the activities of countries that are peripheral to the dominant discourse, they appear to have a wide range of interests and approaches regarding the weaponization of space, which challenge the existing debate on this issue. Despite their differences, it is possible to identify a correlation between technological achievement and their determination on the issue of the weaponization of space. These differences should be taken into account in future research regarding the space arms race.