

## SECURING THE FINAL FRONTIER: URGENT NEED FOR ARMS CONTROL IN OUTER SPACE

By  
**Ghazala Yasmin Jalil**  
*Research Fellow*

*Arms Control & Disarmament Centre, ISSI*

Edited by  
**Malik Qasim Mustafa**

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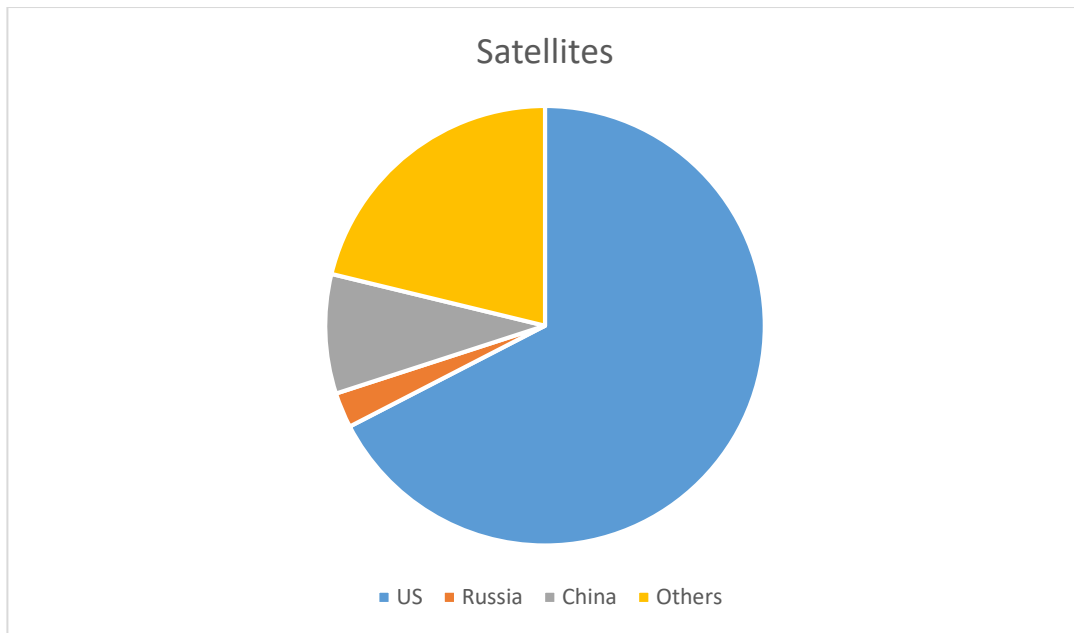
*(Views expressed in the brief are those of the author, and do not represent those of ISSI)*



Outer space has become one of the most important arenas in the world today. There are thousands of operational satellites – both for military and civilian use. Every facet of modern life relies on satellites – from space capabilities in the fields of health, agriculture, water management, disaster management, telecommunication, navigation, communication, and observation to Intelligence, Surveillance, and Reconnaissance (ISR) for military purposes. An estimated 6,718 active satellites were orbiting the Earth by December 2022; out of these 4,529 belonged to the U.S.; 174 to Russia; 590 to China; and the remaining 1,425 to the rest of the world. Of these, the U.S. has 247 military satellites.<sup>1</sup> At the same time, outer space is being militarized. Major powers are entering into an arms race for both offensive and defensive space weapons. So far, four countries have conducted Anti-Satellite (ASAT) tests – the U.S., Russia, China, and India. This not only produces space debris that poses serious hazards for satellites but also makes satellites vulnerable to potential strikes. This has militarized and weaponized the outer space in an unprecedented way. This means that threats and the likelihood of conflicts in outer space have increased tremendously. This means that space is

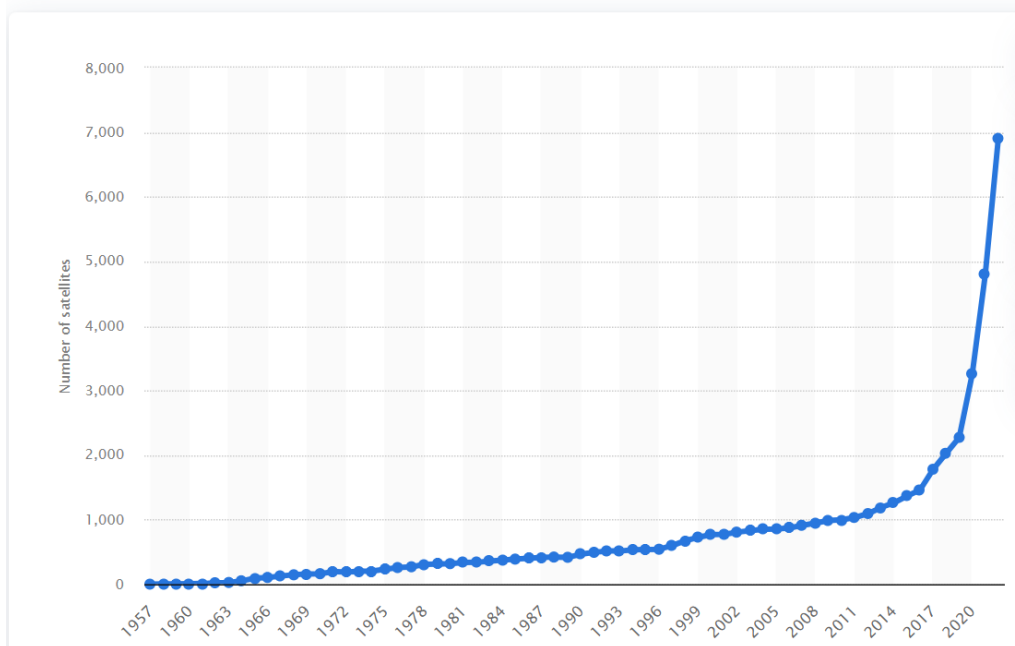
<sup>1</sup> “Satellite Database,” Union of Concerned Scientists, Updated December 31, 2022, <https://www.ucsusa.org/resources/satellite-database>.

no longer the global commons. This makes it imperative to assess the state of outer space regulation and arms control.



Source: Compiled by the author using data from "Satellite Database," *Union of Concerned Scientists*, Updated December 31, 2022, <https://www.ucsusa.org/resources/satellite-database>.

### Number of active satellites from 1957 to 2022



Source: <https://www.statista.com/statistics/897719/number-of-active-satellites-by-year/>.

## Principal Threats in Outer Space

There are several growing threats in the outer space. The most urgent of these threats is the unstoppable arms race and placement of weapons in space. This is being led by the U.S., and followed by Russia and China. Broadly speaking, there are three kinds of weapons being pursued. First, Space Strike Weapons include directed energy weapons, such as lasers and kinetic energy weapons, which are capable of destroying targets on land, air, and sea or in space. Second, there are ASAT weapons – ASAT weapons that can damage or destroy satellites and can be based in space, ground, air, or sea. The U.S., China, Russia, and India<sup>2</sup> have conducted ASAT tests over the years and thus have the capability to destroy other satellites and objects in space.

Third, Ballistic Missile Defence (BMD) systems and hypersonic missiles also have space-based components. The U.S. is pursuing BMD systems with interceptors to destroy incoming missiles, which are equally effective in destroying targets in space, air, or ground. The U.S. has also been pursuing the deployment of missile defence interceptors in space to enhance their ability to protect against long-range missile threats.<sup>3</sup> However, this has been met with opposition from other nations, particularly Russia and China, who fear that such systems could be used to neutralize their nuclear deterrent capabilities. Pakistan has also reiterated its concerns: “mutually reinforcing nature of defensive and offensive capabilities such as the deployment of missile defence systems and their amalgamation with outer space systems is adversely impacting strategic stability at the global and regional levels.”<sup>4</sup> Since India is also pursuing ballistic missile defence capabilities and hypersonic missiles, it directly affects Pakistan’s security. Pakistan has further expressed concern that: “We are also now witnessing space policies, doctrines and establishment of structures that envisage space dominance, war-fighting and aim to extend deterrence in outer space.”<sup>5</sup> Russia has also expressed concerns that the U.S. has “stated openly that the purpose of their space policy is achieving military supremacy. Washington and its allies are making space a new arena for confrontation.”<sup>6</sup> China has repeatedly reiterated that the “weaponization of outer space and the rising risk of an arms race

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<sup>2</sup> Ghazala Yasmin Jalil, “Recent Threats to Strategic Stability in South Asia” Institute of Strategic Studies, Islamabad, Issue Brief, April 11, 2019, <https://issi.org.pk/issue-brief-on-recent-threats-to-strategic-stability-in-south-asia/>.

<sup>3</sup> “Space-based Missile Defense,” August 30, 2018, <https://www.ucsusa.org/resources/space-based-missile-defense-0#:~:text=In%20a%20space%2Dbased%20system,while%20they%20wait%20in%20orbit.>

<sup>4</sup> Permanent Mission of Pakistan to the UN Geneva, *Statement by Ambassador Khalil Hashmi at the Plenary Meeting of the Conference on Disarmament*, March 30, 2023, <https://pakungeneva.pk/TopicDetail.aspx?ID=1051>.

<sup>5</sup> Ibid.

<sup>6</sup> United Nations, Fourth Committees Joint Meeting, *Speakers Renew Calls for Treaty to Prevent Arms Race in Space as First*, United Nations, GA/SPD/761-GA/DIS/3699, October 27, 2022, <https://press.un.org/en/2022/gaspd761.doc.htm>.

remains the greatest threat. If outer space becomes a battlefield, its sustainable use will not be possible.”<sup>7</sup>

The race for space dominance is not limited to military applications. There is also a growing competition among countries to establish a presence on the Moon and Mars. Countries like the U.S., China, Russia, and now India are working to send manned missions to these celestial bodies, sparking a race to claim resources and establish scientific outposts.

Another threat is the increasing space debris, which is problematic because it travels at tremendous speed and is harmful to space stations and satellites.<sup>8</sup> Human activities, ASATs, and the increasing placement of offensive systems are creating ever more space debris. According to the European Space Agency, the near-Earth space is cluttered with approximately 36,500 pieces of space debris larger than 4 inches, a million objects 0.4 to 4 inches in size, and 130 million fragments smaller than 0.4 inches.<sup>9</sup> The U.S. Department of Defense’s Global Space Surveillance Network (SSN) sensors track more than 27,000 pieces of orbital debris.<sup>10</sup> While the larger objects are tracked the smaller ones are not but are still capable of harming space activities.

Another concern is the increasing congestion of space due to the proliferation of satellites. Thousands of satellites are being launched for communication, navigation, and observation purposes, leading to overcrowding in certain orbital regions. This creates the risk of collisions and debris generation, posing a threat to both existing satellites and future space activities. International cooperation is crucial to developing rules and mechanisms for managing space traffic and debris mitigation.

The increasing number of satellites in outer space, the trends toward a space arms race, and the growing space debris make it imperative that arms control regulations be negotiated on an urgent basis.

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<sup>7</sup> Ibid.

<sup>8</sup> For details see Ghazala Yasmin Jalil, “Space Debris: A Challenge to Space Assets” ISSI, Issue Brief, February 19, 2022, [https://issii.org.pk/wp-content/uploads/2022/02/IB\\_Ghazala\\_Feb\\_19\\_2022.pdf](https://issii.org.pk/wp-content/uploads/2022/02/IB_Ghazala_Feb_19_2022.pdf).

<sup>9</sup> Tereza Pultarova, “How many Satellites can we safely fit in Earth Orbit?” N2YO, February 27, 2023, <https://www.n2yo.com/satellite-article/How-many-satellites-can-we-safely-fit-in-Earth-orbit/86>.

<sup>10</sup> “Space Debris and Human Spacecraft,” NASA, May 26, 2021, [https://www.nasa.gov/mission\\_pages/station/news/orbital\\_debris.html](https://www.nasa.gov/mission_pages/station/news/orbital_debris.html).

## Existing Arms Control in Outer Space

### *Outer Space Treaty (OST)*

At present, the 1967 Outer Space Treaty is the principal framework for governing space activities. It prohibits the placement of nuclear weapons and other Weapons of Mass Destruction (WMDs) in orbit but it does not explicitly prohibit the use of other types of weapons in space. Article IV of the Treaty states 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.”<sup>11</sup> It also prohibits the establishment of military bases and installations in outer space. Currently, it has 89 Signatories and 114 parties to the Treaty.

### *Limited Test Ban Treaty*

The 1963 Limited Test Ban Treaty (LTBT) in Article 1 prohibits “any nuclear weapons test explosion or any other nuclear explosion from being carried out in the atmosphere; beyond its limits, including outer space.” Thus, the LTBT bans the testing of nuclear weapons in outer space.

### *Anti-Ballistic Missile Treaty*

The 1972 Anti-Ballistic Missile (ABM) treaty between the U.S. and the Soviet Union, restricted ground, sea, air, and space-based anti-ballistic missile systems and prohibited the placement of BMD systems in space. However, the ABM was abrogated by the U.S. in 2002; it then went on to develop extensive BMD systems and is working on space-based ABM systems as well.

### *The Moon Agreement*

The 1979 Moon Agreement is a supplement to the OST and restricts military activities on the Moon and its orbit. It prohibits the test and use of any kind of weapons, including WMDs, on the Moon, as well as the use of such weapons from the Moon against the Earth, spacecraft, and personnel. However, it does not have wide adherence as only 19 countries including Pakistan have ratified it, while 6 have signed, including India, but not ratified.<sup>12</sup>

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<sup>11</sup> “Outer Space Treaty,” United Nations Office for Outer Space Affairs, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>.

<sup>12</sup> “Moon Agreement,” Nuclear Threat Initiative, <https://www.nti.org/education-center/treaties-and-regimes/agreement-governing-activities-states-moon-and-other-celestial-bodies-moon-agreement/>.

### *Anti-Satellite Testing Ban Efforts*

The U.S. declared a voluntary self-imposed ban on destructive direct-ascent, kinetic-energy ASAT weapons testing in April 2022. Seven countries have committed formally to the U.S.-led initiative including Canada, New Zealand, Japan, Germany, the UK, and South Korea. While countries, such as France and Ireland, have expressed support for the ban but have not committed formally.<sup>13</sup> India is one of the countries to have conducted tests against satellites and has not joined the ASAT ban. In October 2022, the U.S. introduced a resolution on ASAT test ban in the UN General Assembly. However, Belarus, China, Nicaragua, North Korea, Syria, Venezuela, and Russia denounced the resolution as “insufficient.”<sup>14</sup> Primarily because while China and Russia have for decades advocated a treaty that prohibits weapons in outer space, the U.S. has been blocking negotiations. In a speech to a United Nations conference on outer space in May 2022, China’s ambassador for disarmament affairs stated that the origin of the arms race in outer space, a “Sword of Damocles,” lies in the attempts of superpowers to dominate outer space.<sup>15</sup>

### *Prevention of an Arms Race in Outer Space*

Russia and China have been ardent supporters of the objective of PAROS to achieve a legally binding treaty that prohibits any kind of weapons in space. They presented the first draft treaty to the UN Secretary-General in 1981 and to the Conference on Disarmament (CD) in 1983 by the Soviet Union. Subsequently, a draft treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT) was presented to the Conference on Disarmament (CD) in 2008 and 2014. However, there has not been much progress on it because U.S.-led countries oppose the negotiation of a legally binding treaty that prohibits weapons in outer space. Thus, negotiations have been deadlocked for decades.

In terms of effectiveness, the current regulatory framework has limitations. The OST lacks mechanisms for enforcement and has no provisions for sanctions in case of non-compliance. This undermines its effectiveness in deterring harmful activities or resolving disputes. Additionally, the treaty mainly focuses on state activities, leaving gaps in regulating private sector involvement. This requires a more comprehensive approach that involves both states and commercial entities.

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<sup>13</sup> “Seven Countries Join ASAT Test,” November 2022, Arms Control Association, <https://www.armscontrol.org/act/2022-11/news-briefs/seven-countries-join-asat-test-ban>.

<sup>14</sup> Ibid.

<sup>15</sup> “China warns US against attempts to Dominate Outer Space,” *South China Morning Post*, May 11, 2022, <https://www.scmp.com/news/china/diplomacy/article/3177355/china-warns-us-against-attempts-dominate-outer-space>.

## Primary Challenges to Arms Control in Outer Space

There are several challenges in negotiating effective regulations to plug gaps in the international regulation of outer space. The challenges to arms control range from disagreement on definitions of space weapons, and the desire of states to dominate the space, to the kind of offensive systems that should be prohibited.

The U.S. and its allies have consistently prioritized the ASAT threat and the use of force against space-based objects. Russia and its like-minded countries, on the other hand, are concerned about BMD and their ability to maintain a nuclear deterrent. Thus, they have been more concerned with the elimination of orbiting weapons in outer space, as well as those that could strike objects on Earth. The U.S.-led bloc has advocated voluntary – non-legally binding rules to govern activities and control behavior in outer space. They accord priority to rules that prevent miscommunication and misperception. They contend that existing international laws such as OST, the UN Charter, and International Humanitarian Law are adequate to regulate outer space.

The lack of a clear definition of what entails a ‘space weapon’ is one of the challenges to negotiating outer space regulation. Another is the blurred boundary between dual military and civilian uses of assets in outer space. The absence of clarity makes verification challenging.

The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) provides a forum for discussion and cooperation on space-related issues. However, attempts to negotiate on issues related to military activities in outer space in this forum have been blocked by a strict interpretation of the Committee’s mandate and requirement of consensus. To break out of deadlocks on the UN forums and CD, the EU sought to negotiate its international code of conduct for space activities outside these UN bodies. However, that too failed. Currently, the Open-Ended Working Group on norms, rules and principles of responsible behavior falls under the mandate of the UN General Assembly First Committee on Disarmament and International Security. However, the present picture of outer space regulation is bleak. What is ultimately needed is the political will to make outer space safe for all humanity.

### Pakistan’s Perspective

Pakistan has long supported the efforts to keep space free of weapons. Pakistan was an ardent advocate of the PAROS initiative that was first added to CD’s agenda in 1982 but there has been no progress under this item for over four decades. Pakistan’s most recent statement outlined the urgency of the threat: “[it] is the unstoppable arms race and placement of weapons in this space....

Even more worryingly, such threats are magnified by the growing integration of weapons, technologies, platforms and dedicated force structures in the nuclear, cyber, conventional and outer space domains.”<sup>16</sup> Further, Pakistan stated: “the evolution in Space Law has neither kept pace with rapid technological advancements nor with growing risks in and from outer space.”<sup>17</sup>

Pakistan is also party to all five UN treaties/conventions on international space law governing the peaceful uses of outer space:

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space (Outer Space Treaty – 1967)
- Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space (Rescue Agreement – 1968)
- Convention on International Liability for Damage Caused by Space Objects (Liability Convention – 1972)
- Convention on Registration of Objects Launched into Outer Space (Registration Convention – 1976)
- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement – 1979)<sup>18</sup>

## Conclusion

While the existing regulatory framework for outer space provides some protection against weaponization, it falls short in addressing the complexities of modern space activities as well as the accelerating arms race in outer space. To effectively regulate outer space, there is a need for comprehensive rules and mechanisms that cover commercial activities, resource utilization, and dispute resolution. However, most of all, there is a need to negotiate treaties that prohibit the placement of weapons and offensive systems in outer space. While efforts to establish norms of responsible behavior in space can be a starting point, they are not enough to ensure peaceful and sustainable use of outer space. Extending war fighting and arms race into outer space is counterproductive and does not increase security for anyone. The states with the largest number of

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<sup>16</sup> Permanent Mission of Pakistan to the UN Geneva, Statement by Ambassador Khalil Hashmi at the Plenary Meeting of the Conference on Disarmament, March 30, 2023, <https://pakungeneva.pk/TopicDetail.aspx?ID=1051>.

<sup>17</sup> Ibid.

<sup>18</sup> International Cooperation, SUPARCO, <https://suparco.gov.pk/international-cooperation/>.



satellites in space are the most vulnerable. In light of the increasing complexity of threats in and from outer space, international cooperation is crucial in developing regulations to ensure the peaceful and sustainable use of outer space for future generations. Nations of the world need to come together to negotiate effective, legally binding, enforceable arms control regulations in outer space.