ISSUE BRIEF

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THE WEAPONIZATION OF SPACE: GLOBAL TRENDS, NATIONAL PERSPECTIVES, AND LEGAL IMPLICATIONS

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The deployment of devices with destructive capabilities in orbit is known as spatial weaponization. Spatial weaponization refers to the deployment of weapons, whether space-based or on Earth, that pose a threat to space security, interfere with peaceful uses of space, or produce destructive effects in space, whether kinetic or non-kinetic[1]. Once considered the ultimate frontier for scientific advancement and peaceful exploration, space is now increasingly perceived through the lens of military competition. The susceptibility of satellites to potential attacks has become a critical concern as countries develop and utilize these assets for communication, reconnaissance, and navigation. The offensive capabilities of space weaponization could potentially add a new layer of complexity to global security dynamics.[2] It involves a state installing a weapon in outer space to gain an advantage over the enemy, thereby giving the state the capability to damage the enemy's territory and assets while also protecting its own space assets from the enemy. When assessing the legal status of outer space, it is critical to distinguish between space weaponization and space militarization. The militarization of space

1 David C DeFrieze, "Defining and Regulating the Weaponization of Space," 2014,https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-74/jfq-74_110-115_DeFrieze.pdf

2 Kenneth S. Blazejewski, "Space Weaponization and US-China Relations," 2008, https://www.semanticscholar.org/paper/Space-Weaponization-and-US-China-Relations-Blazejewski/024b615482ef93f18c6fb23dd0e580619b3b29c2.

is fundamentally a form of space utilization by military spacecraft for military use; however, space weaponization is not always a component of this endeavor. It involves sending weapons into space for any length of time to attack targets in space or on Earth. The Weaponization of Space can be classified into three distinct categories[3]:

- **Earth to Space Weapons** are launched from Earth to target objects in space. These include anti-satellite (ASAT) missiles, ground-based lasers, projectile-based systems, electromagnetic railguns, and particle beam weapons.[4]

- **Space to Space Weapons** are deployed in space to target other space objects. These include kinetic energy weapons, directed energy weapons and missiles deployed in space.

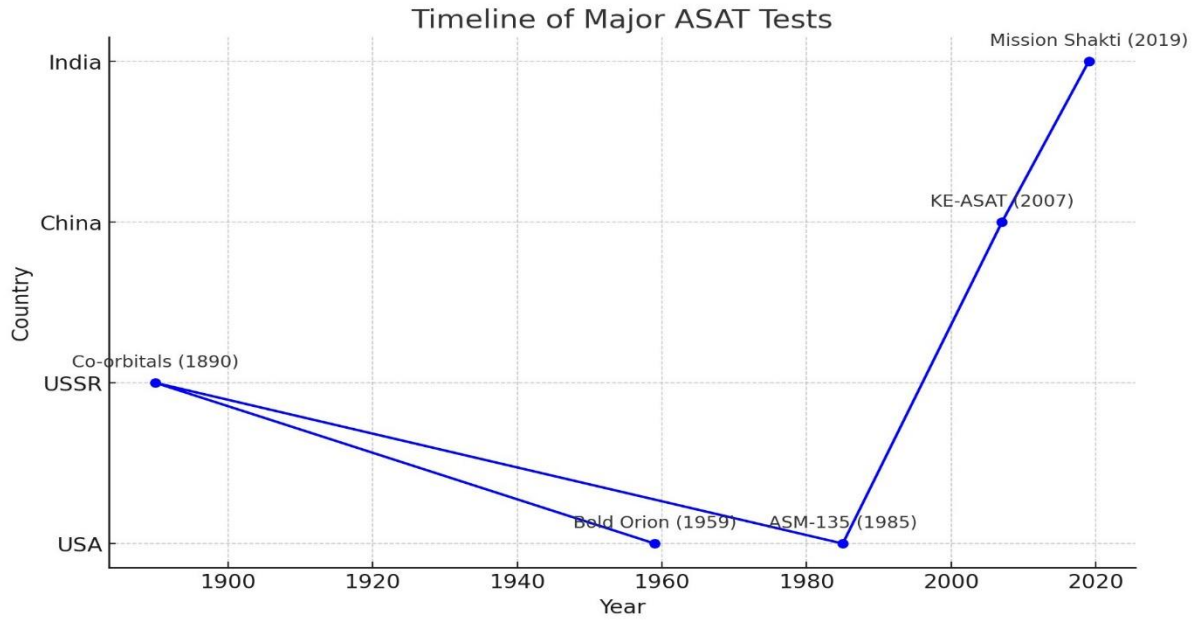
- **Space to Earth Weapons** are stationed in space to attack targets on Earth. These include kinetic energy weapons, directed energy weapons, orbital bombardment systems, and space-based lasers.[5]

ASAT tests were first conducted in the Cold War era in response to the Soviet Union launched an artificial satellite successfully named "Sputnik I" in space in October 1957. This event raised concerns in the U.S. about the possibility of the Soviet Union developing satellites armed with nuclear capabilities.

In response, on October 13, 1959, Martin Aircraft developed the Bold Orion,[6] a prototype air-launched ballistic missile, which became the United States' first ASAT. The U.S. based company, Glenn L. Martin aircraft manufacturer, developed the Bold Orion, equipped with a kinetic hit-to-kill system that was designed specifically to destroy satellites in low-earth orbit. The Bold Orion was capable of transporting nuclear-based warheads and could launch from modernized aircraft jets.[7] The Soviet Union responded by starting its own program in 1960s and 1970s, which was based on research and development of ASAT weapons specifically co-orbitals.[8] These ASAT weapons explode as soon as they got in contact with their target satellite. In response to the Soviet Union's

3 Anna Schumann, "Fact Sheet: Space Weapons," Center for Arms Control and Non-Proliferation, November 15, 2023, https://armscontrolcenter.org/fact-sheet-space-weapons/.
4 Ibid.
5 Ibid.
6 J. Terry White, "Bold Orion's ASAT Mission," White Eagle Aerospace, October 7, 2015, https://www.whiteeagleaerospace.com/bold-orions-asat-mission/.
7 Ibid.
8 Talia M. Blatt, "Anti-Satellite Weapons and the Emerging Space Arms Race," Harvard International Review, May 26, 2020, https://hir.harvard.edu/anti-satellite-weapons-and-the-emerging-space-arms-race/.

development, the U.S. developed an air-to-surface 135 weapon (ASM-135), a kinetic energy anti-satellite (KE-ASAT), which was also launched from the air and meant to destroy satellites by direct hitting; however, its delivery was more precise because it utilized the energy that was produced after collision between satellites and aircraft.[9] In 1985, the U.S. made a demonstration under the orders of then President Ronald Reagan in which a dysfunction satellite was shot down by an ASM-135.



Source: Data compiled by the author

China also entered the competition almost thirty years later; in 2007, Beijing successfully tested the KE-ASAT weapon by destroying an old weather satellite with the use of a ballistic missile.[10] China later in 2013 has greatly expanded its ASAT weaponry capability by conducting a high altitude missile test which can reach the geostationary orbit.[11] On 24 January 2019, India launched target satellite, Microsat-R at a height of 282 kilometres, into a sun-synchronous orbit. After this, India carried out its first ASAT test on 27 March 2019 which involved use of KE-ASAT weapons to destroy a live satellite in low orbit by using a ballistic missile vehicle under “mission Shakti”. The Indian Defence Research and Development Organization (DRDO) has also approved a "project code named XSV-1"

9 Ibid.

10 “China’s Anti-Satellite Test | Council on Foreign Relations,” accessed July 26, 2024, https://www.cfr.org/backgrounder/chinas-anti-satellite-test.

11 Franz-Stefan Gady, “Revealed: China Tests Secret Missile Capable of Hitting US Satellites,” accessed July 26, 2024, https://thediplomat.com/2015/11/revealed-china-tests-secret-missile-capable-of-hitting-us-satellites/.

for the development of lighter and more advanced ASAT weapons.[12] With the development of ASAT weapons, radar, Machine Learning, optical tracking systems and integrating AI in their systems, India has been advancing in the process of space weaponization.[13]

Despite continuous endeavours, such as the establishment of the Committee on the Peaceful Uses of Outer Space (COPUOS) in 1959 and the formulation of treaties like the Outer Space Treaty (1967) and the Moon Agreement (1979), which seek to prohibit the deployment of weapons of mass destruction in space, these measures remain inadequate. The U.S. has strongly opposed multilateral space arms control discussions, such as Preventing an Arms Race in Outer Space (PAROS) and has shown resistance to calls for further negotiations.[14] This position has impeded the development of comprehensive global regulations for the control of weapons in space.

Pakistan strongly supported the Preventing an Arms Race in Outer Space (PAROS) initiative, which was introduced to the Conference on Disarmament's agenda in 1982. This has made little progress over the last four decades. Pakistan is a signatory to all five key UN treaties on international space law, including the Outer Space Treaty, Rescue Agreement, Liability Convention, Registration Convention, and Moon Agreement, demonstrating its commitment to the peaceful use of outer space and active participation in relevant international forums. Pakistan has consistently expressed concern over the phenomenon of space militarization, emphasizing the potential threats it poses to global and regional security by undermining critical satellite infrastructure.

12 "Mission Shakti | Defence Research and Development Organisation - DRDO, Ministry of Defence, Government of India," accessed July 26, 2024, https://drdo.gov.in/drdo/mission-shakti.

13 Syed Zulfiqar Ali IMINT PAK-, "India's Early Warning Radar and Ballistic Missile Defence Network: An Open-Source Study," *Centre for Strategic and Contemporary Research* (blog), December 19, 2023, https://cscr.pk/explore/publications/articles/indias-early-warning-radar-and-ballistic-missile-defence-network-an-open-source-study/.

14 U. S. Mission Geneva, "Prevention of an Arms Race in Outer Space Statement by Ambassador Turner," U.S. Mission to International Organizations in Geneva, March 30, 2023, https://geneva.usmission.gov/2023/03/30/remarks-arms-race-in-outer-space-paros/.