UNSC

Managing and preventing the militarization and weaponization of sky and space

Background Paper

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Table of contents

Introduction

The rapid advancement of space technology has brought both opportunities and challenges for global security. While space has historically been a domain for scientific exploration and international cooperation, its increasing militarization raises concerns about the potential for conflict beyond Earth's atmosphere. Many nations now rely on space-based assets for communication, navigation, surveillance, and defense, making space an essential yet contested strategic domain.

The key issue is distinguishing between the militarization and weaponization of space. While the use of satellites for military operations is well established, the deployment of actual weapons in space remains a major concern. The international community faces the urgent task of preventing an arms race in space while ensuring its peaceful use for future generations.

Key terms

- **Militarization of Space** – The use of space-based assets for military purposes such as surveillance, communication, and navigation. It does not necessarily involve deploying weapons in space but includes military reliance on space-based technologies.
- **Weaponization of Space** – The deployment of weapons in outer space or the use of space-based systems for offensive or defensive military purposes. This includes space-to-space, space-to-Earth, or Earth-to-space weapons.
- **Outer Space Treaty (OST) (1967)** – A cornerstone international treaty that prohibits the placement of weapons of mass destruction (WMDs) in space and limits the use of celestial bodies to peaceful purposes.
- **Anti-Satellite Weapons (ASATs)** – Weapons designed to disable or destroy satellites, which can have serious implications for global security and communications.
- **Dual-Use Technologies** – Technologies that have both civilian and military applications, such as satellite imaging, which can be used for both weather monitoring and reconnaissance.
- **Space Debris** – Remnants of defunct satellites, spent rocket stages, and other artificial objects in orbit, which pose a hazard to both civilian and military space operations.
- **Arms Race in Space** – The competitive buildup of military capabilities in space by multiple nations, potentially leading to conflicts or strategic instability.
- **Kinetic and Non-Kinetic Weapons** – Kinetic weapons in space involve physical destruction (e.g., missiles, ASATs), whereas non-kinetic methods include cyberattacks, jamming, or directed energy weapons like lasers.

General Overview

Space has long been considered the "final frontier" for exploration and innovation, with early uses centered around scientific discovery and satellite-based communication. However, as nations increasingly rely on space-based assets for military and strategic purposes, concerns have emerged regarding the potential for conflict beyond Earth's atmosphere.

The Cold War era saw the initial militarization of space, with both the United States and the Soviet Union utilizing space for intelligence gathering and satellite communications. The Outer Space Treaty of 1967 aimed to prevent an arms race in space by prohibiting the placement of nuclear weapons in orbit. Despite this, technological advancements have blurred the lines between peaceful and military applications of space technologies.

In recent years, several countries have demonstrated anti-satellite capabilities, raising concerns about the vulnerability of space infrastructure. The potential for space-based weapons, including directed energy weapons and cyber warfare tactics, has further complicated discussions on space security. With the establishment of military space forces by major powers, such as the U.S. Space Force, the debate over the regulation of space militarization has intensified.

The challenge for the international community is to develop effective policies and legal frameworks that prevent an arms race in space while allowing for the peaceful use of space technologies. Efforts such as the Prevention of an Arms Race in Outer Space (PAROS) initiative and diplomatic negotiations at the United Nations continue to play a crucial role in addressing these issues.

Major Parties Involved

States (National Governments):

- **United States of America :** The U.S. is a leading space power with an extensive network of military satellites and a dedicated military branch, the U.S. Space Force. It has conducted anti-satellite (ASAT) tests and continues to develop missile defense and space-based surveillance systems. The U.S. emphasizes maintaining space dominance while advocating for responsible behavior in space security.
- **Russian Fed. :** Russia has a long history of space exploration and military space programs, dating back to the Soviet era. It has developed ASAT capabilities, space-based electronic warfare systems, and missile defense initiatives. Russia has called for international agreements to prevent an arms race in space but remains active in counter-space technologies.
- **Dem. Rep. of China :** China is rapidly expanding its space capabilities, including the development of ASAT weapons, satellite jamming, and space-based reconnaissance. In 2007, it conducted a controversial ASAT test, raising concerns about space debris. China advocates for a ban on space-based weapons but continues to enhance its military space infrastructure.

- **UAE :** The UAE is emerging as a significant space player, focusing on peaceful space exploration and satellite development. While not a military space power, it collaborates with global agencies and invests in space technology for economic and strategic purposes.
- **Rep. of France :** France is a key player in space security, with a strong aerospace industry and advanced military satellite capabilities. In 2019, it established its Space Command (Commandement de l'Espace) to strengthen national defense in space. France has invested in satellite surveillance, electronic warfare capabilities, and space-based defense systems to protect its interests. It is an active participant in NATO's space security initiatives and has called for stronger international regulations to prevent the weaponization of space. While supporting peaceful space exploration through the European Space Agency (ESA), France also emphasizes the need for strategic autonomy in space defense.
- **The UK :** The UK is a key space actor, leveraging advanced satellite technology for military and intelligence purposes. It is part of the Five Eyes intelligence alliance and supports NATO's space security initiatives. The UK government promotes responsible space governance while strengthening its defense space capabilities.
- **Rep. of India :** India demonstrated its ASAT capabilities in 2019 with "Mission Shakti" and continues to develop military space technology. It supports space diplomacy through international cooperation while maintaining strategic defense capabilities in space.
- **Fed. Rep. of Germany :** Germany plays a crucial role in European space policy, emphasizing peaceful space exploration and satellite technology. It contributes to NATO's space defense efforts while advocating against space weaponization.
- **Rep. of Korea :** South Korea has a growing space program, focused on satellite technology and missile defense. It cooperates with the U.S. and other allies on space security while expanding its own capabilities in satellite-based defense systems.
- **DPR Korea :** North Korea has attempted to develop satellite technology and ballistic missile capabilities, raising concerns about the potential militarization of its space program. It faces heavy international sanctions due to its missile and nuclear programs.
- **Co. of Australia :** Australia is strengthening its defense space sector and has established the Australian Space Agency. It collaborates with allies, particularly the U.S., on space security initiatives while promoting peaceful space development.
- **Islamic Emirate of Afghanistan :** Afghanistan currently has no significant space program or military space capabilities. However, regional security dynamics and potential satellite-based surveillance by global powers impact its strategic considerations.
- **Brazil :** The Brazilian Space Agency (AEB) oversees the country's space programs, which include Earth observation, environmental monitoring, and telecommunications. While Brazil does not have a strong military space presence, it plays a role in international discussions on space governance and non-proliferation.
- **Egypt :** Egypt has been expanding its space capabilities in recent years, primarily for civilian and strategic purposes. The Egyptian Space Agency (EgSA) was established in 2019 to advance space research, satellite technology, and regional cooperation. Egypt has launched several satellites for

telecommunications and surveillance, some of which serve security and defense purposes. As a leading power in the Middle East, Egypt is increasingly interested in space security, particularly in monitoring regional threats and border control. It cooperates with international partners, including China and Russia, on satellite technology and aims to strengthen its role in African and Arab space diplomacy.

International Organizations:

- **United Nations (UN)** – Oversees space governance through treaties like the Outer Space Treaty (OST) and the Prevention of an Arms Race in Outer Space (PAROS) initiative.
- **North Atlantic Treaty Organization (NATO)** – Recognizes space as a key operational domain and works on military space strategy among its member states.
- **European Space Agency (ESA)** – Primarily focuses on peaceful space exploration but contributes to European security initiatives.
- **Conference on Disarmament (CD)** – Engages in discussions on preventing space weaponization and promoting arms control treaties.
- **BRICS (Brazil, Russia, India, China, South Africa)** – Discusses space cooperation and alternative governance models outside Western-led initiatives.

Technological Developers (Private Sector and Research Institutions):

- **SpaceX, Blue Origin, Boeing, Lockheed Martin (USA)** – Develop commercial and military space technologies, including satellite networks and space transportation.
- **Roscosmos and Russian Defense Firms (Russia)** – Work on military satellites, missile defense, and counter-space technologies.
- **China National Space Administration (CNSA) and State-Owned Enterprises** – Develop advanced space technology, including dual-use satellites and ASAT capabilities.
- **European Aerospace Companies (Airbus, Thales, ArianeGroup)** – Provide satellite and defense technology for European and NATO military operations.
- **Indian Space Research Organisation (ISRO)** – Primarily focused on peaceful space missions but also supports India's defense initiatives.

Military Establishments and Armed Forces:

- **U.S. Space Force** – Established in 2019, responsible for military space operations, satellite defense, and space-based intelligence.
- **Russian Aerospace Forces** – Operates military satellites, ASAT capabilities, and electronic warfare systems.
- **China's People's Liberation Army Strategic Support Force (PLASSF)** – Manages China's space warfare and cyber operations.

- **France's Space Command** – Oversees military satellite operations and defense strategy in space.
- **NATO's Space Centre** – Focuses on joint space security initiatives among member states.

Non-State Actors:

- **Hacktivist Groups** – Cyberattacks on satellites and space-based infrastructure pose growing security threats.
- **Terrorist Organizations** – While not directly engaged in space militarization, some groups may attempt to disrupt satellite communications.
- **Commercial Satellite Operators** – Companies like Starlink and OneWeb provide essential communications infrastructure, which may be targeted in conflicts.

Possible solutions

Addressing the militarization and weaponization of sky and space requires a combination of diplomatic, legal, and technological approaches to ensure space remains a domain for peaceful cooperation. Below are some possible solutions that the international community can explore:

Strengthening International Legal Frameworks

- **Expanding the Outer Space Treaty (OST, 1967)**: The OST currently prohibits nuclear weapons in space but does not ban conventional weapons or anti-satellite (ASAT) weapons. Expanding its provisions to explicitly prohibit the deployment of all types of weapons in space could prevent future militarization.
- **Enforcing the Prevention of an Arms Race in Outer Space (PAROS) Initiative**: The UN has long debated this initiative, but stronger commitments and binding agreements among major spacefaring nations could be useful.
- **Developing a New Space Security Treaty**: A legally binding treaty with clearer definitions of militarization and weaponization, along with verification mechanisms, could serve as a modern solution.

Establishing Transparency and Confidence-Building Measures

- **Information Sharing on Space Activities**: Countries could be required to report military space activities to the UN Office for Outer Space Affairs (UNOOSA) to build trust and reduce misunderstandings.
- **Regular Multilateral Dialogues**: Establishing dedicated forums for space security discussions among major spacefaring nations, regional organizations, and international institutions can help build consensus on responsible behavior in space.

- **Military-to-Military Communication Channels**: Direct lines of communication between space commands of different countries (e.g., U.S. Space Force, Russian Aerospace Forces, China's Strategic Support Force) can reduce risks of accidental conflicts.

Preventing the Use of Space for Aggressive Military Purposes

- **Prohibiting the Development and Testing of ASAT Weapons**: ASAT tests create space debris and escalate tensions. A global ban on ASAT weapons, similar to nuclear test bans, could be enforced through monitoring systems.
- **Defining 'Peaceful Use of Space'**: Nations could agree on clearer guidelines distinguishing between defensive space operations (such as satellite protection) and offensive militarization.

Enhancing Space Traffic Management and Debris Reduction

- **Stronger Regulations on Space Debris Mitigation**: ASAT tests and military satellite destruction create dangerous debris that threatens all space assets. An international agreement on space debris reduction, including penalties for violations, is possible.
- **Developing an International Space Traffic Management (STM) System**: A UN-led or international body could monitor space activities, track military satellites, and prevent collisions, similar to air traffic control for aviation.

Promoting Peaceful Space Cooperation

- **Expanding International Space Collaboration**: Encouraging joint space missions between nations, such as satellite-sharing programs or cooperative security initiatives, can reduce geopolitical tensions.
- **Supporting Non-Military Space Development**: Encouraging countries to focus on space exploration, environmental monitoring, and disaster response rather than military applications can shift the focus away from weaponization.
- **Incentivizing Private Sector Compliance**: Space technology companies could be encouraged to follow ethical guidelines and refrain from participating in weaponization projects.

Strengthening the Role of the United Nations and International Organizations

- **Empowering the UN Office for Outer Space Affairs (UNOOSA)**: Providing UNOOSA with more authority to monitor and regulate military activities in space could strengthen global oversight.
- **Creating a Specialized UN Space Security Council Mechanism**: A dedicated task force within the Security Council could oversee compliance with space security agreements and mediate conflicts related to space activities.

By combining diplomatic efforts, legal measures, and technical cooperation, the international community can work toward managing and preventing the militarization and weaponization of space while ensuring its peaceful and sustainable use.

Figures

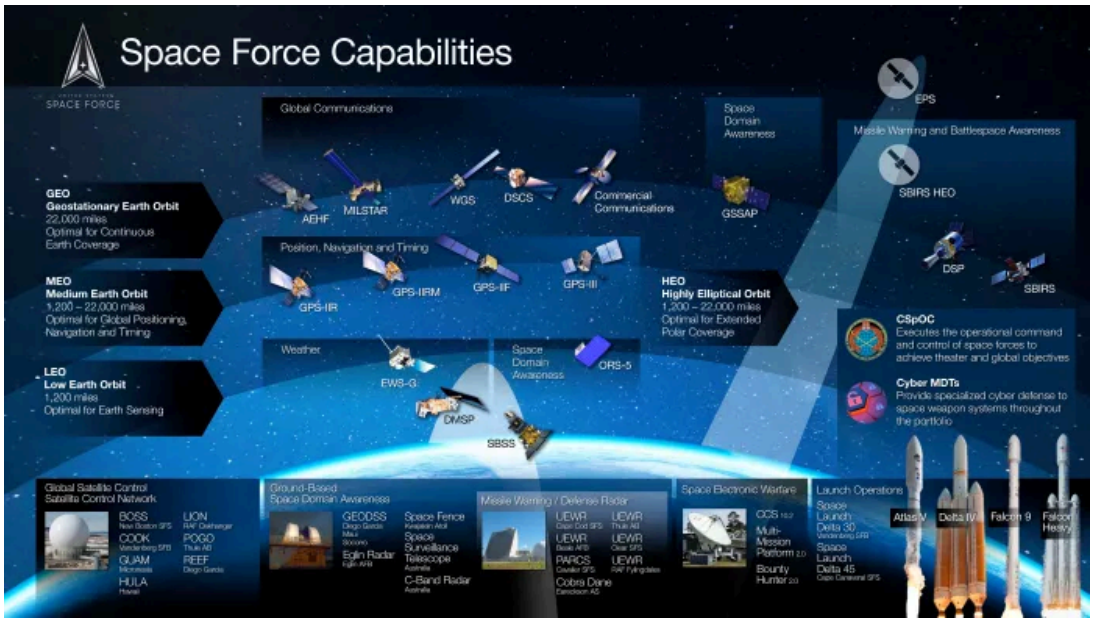

Figure 1 : US Space Force Capabilities

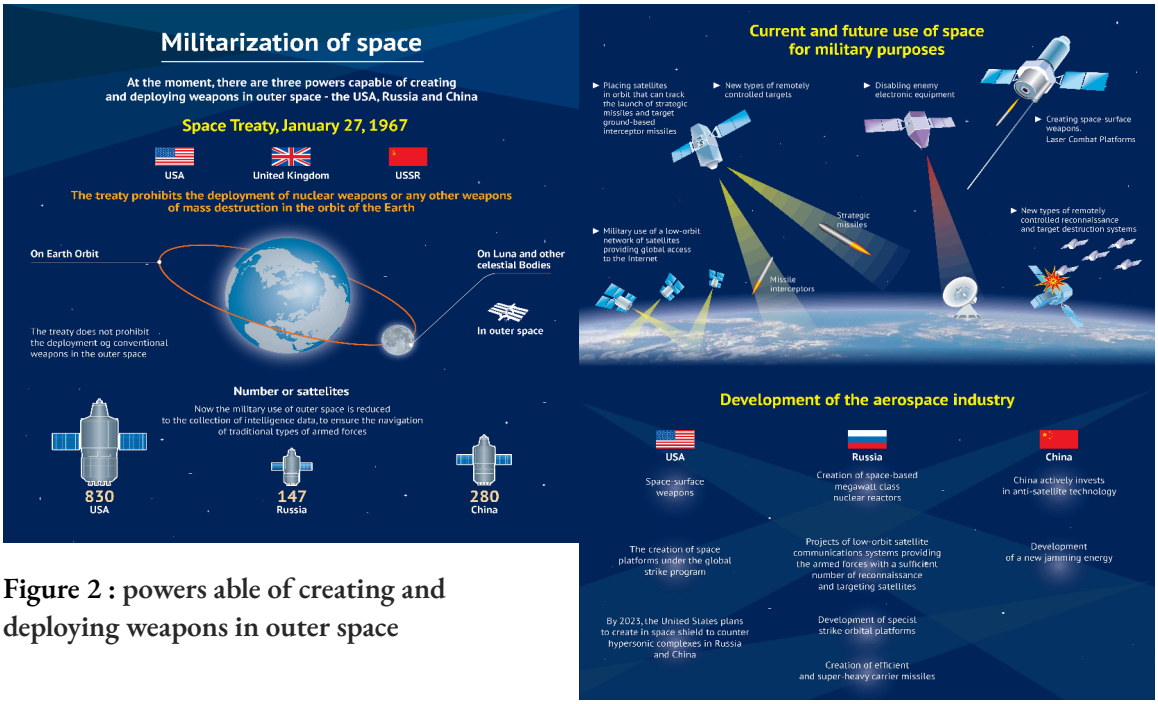

Figure 2 : powers able of creating and deploying weapons in outer space

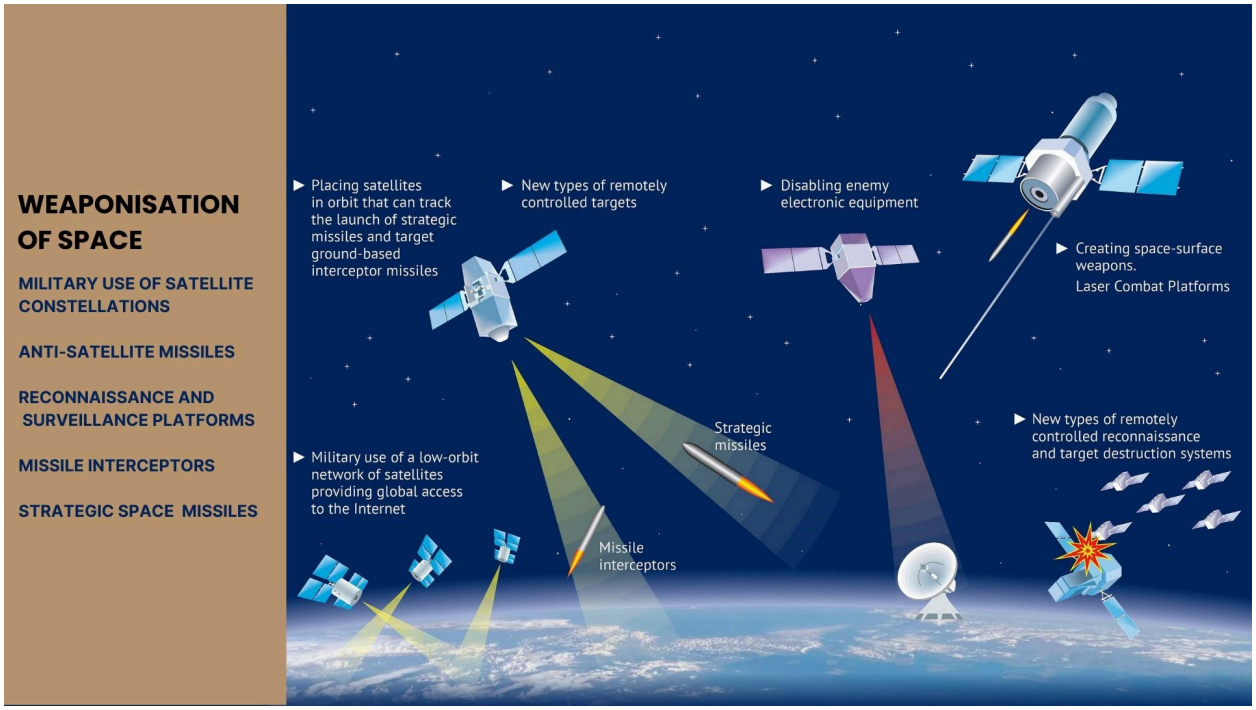

Figure 3 : Differents uses of space weaponization

Sources and useful links

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Secure World Foundation (Global Space Security Policy) – https://swfound.org
FONMUN – bit.ly/fonmun