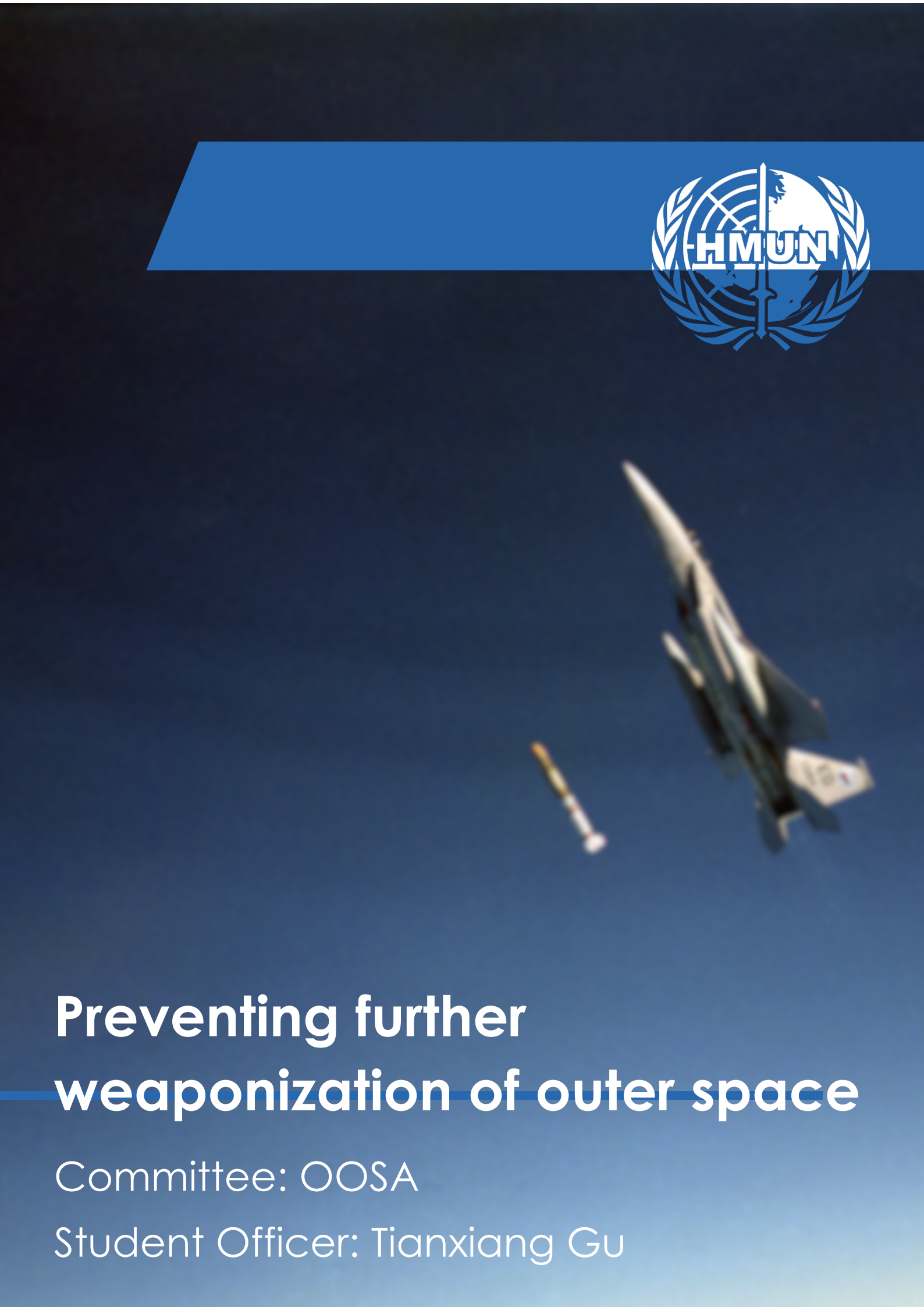

Preventing further weaponization of outer space

Committee: OOSA

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Issue: Preventing further weaponization of outer space

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Introduction

Space is a contested, congested, and competitive domain. Since the very beginning of space exploration, the potential weaponization of space has been a topic of concern for the international community. Today, we heavily rely on space-based technology for civil, defence and commercial purposes and this concern has only grown stronger. Attempts were made to regulate the placement of weapons in space, but only with partial success.

Outer Space is often regarded as a resource that will be used for 'peaceful purposes' in the global community. However, as the technology surrounding the utilisation of outer space advances, it is almost certain that countries may be tempted to use outer space as a tactical advantage during conflict by weaponizing it. This could be in the form of equipping spacecraft with weapons or deploying weapons on other celestial bodies. Despite strict regulations around placing Weapons of Mass Destruction (WMD) in outer space as outlined by Article IV of the Outer Space Treaty, there are still little to no international laws restricting the use of conventional weapons in outer space. Today, the possibility of an arms race developing in outer space threatening global peace is constantly increasing. The weaponization of space could be the start of a destructive conflict with humanity, therefore it must be avoided as much as possible.

No weapons are currently known to be deployed in space – only the Soviet Union had previously deployed an armed space station. Despite this, countries still see the potential of the technology's existence as a threat. As a result of the increased risk of foreign-possessed satellite weapons, countries began experimenting with the idea of anti-satellite (ASAT) weaponry. The People's Republic of China and the United States both successfully tested their respective anti-satellite missiles in response to the threat of weaponised satellites.

ASATs and theorised weapons placed in outer space escalate further tension within already fragile international relations and threaten the lives of many people around the world. Long-term

solutions in the form of adequate laws and regulations are essential in guaranteeing the peaceful use of modern technology. Finally, transparency between space countries is also critical in the prevention of the potential weaponization of outer space.

Definition of Key Terms

Militarisation of outer space vs weaponization of outer space

Despite the similarities between the two terms, there is still a fine difference between the two. The militarisation of outer space refers to the use of assets such as satellites placed in space to assist the military that is on the ground, whereas the weaponization of outer space is the definition of placing weapons of a destructive capacity in space. Since there are currently no known vehicles in outer space with a destructive payload, space is not weaponized. On the contrary, reconnaissance satellites have been providing intel to militaries since the dawn of the space age, therefore space has been weaponised essentially as soon as space exploration began.

Anti-Satellite Weaponry (ASAT)

Fundamentally, anti-satellite weapons are designed to eliminate or incapacitate satellites for strategic purposes. During testing, they were also used to remove defunct satellites from orbit. ASATs can exist in a few different forms. Firstly, there are kinetic energy ASATs, which would neutralise satellites with a collision at high speeds. Devices such as missiles or drones all act as kinetic energy ASATs. Using such types of ASATs have rather severe consequences, as the collision would generate significant space debris and potentially even damage other vehicles in orbit. The People's Republic of China, the United States, India and the Russian Federation have all successfully tested their own ASATs. On the contrary, there are also non-kinetic ASATs that utilise non-contact methods to disable satellites, including cyber-attacks on satellites or blinding satellites with lasers.

However, definition issues arise when describing technology that serves the same purpose as ASATs. Active Debris Removal (ADR) technology, which is designed to remove defunct satellites, is also able to eliminate active satellites. As a result, this type of technology is classified as 'dual use'.

Celestial Bodies

The term 'celestial bodies' refers to any naturally occurring physical entity that exists in the observable universe, such as asteroids or natural satellites including the moon. Any celestial bodies other than Earth fall under the umbrella term of outer space. To limit the usage of weaponry in outer space, celestial bodies were included in numerous treaties to prevent weapon testing and military use of said celestial bodies.

Within the Outer Space Treaty, it is stated that weapons of mass destruction are prohibited from being used on any celestial bodies. Furthermore, it explicitly prohibits the use of the Moon and other celestial bodies for military exercises, creating military bases, facilities, and fortifications, and specifically restricts their use to peaceful purposes. Similarly, the Moon Treaty also includes similar terms which further ratify the ban on the use of weapons on celestial bodies. However, both treaties support the use of the military in order to protect the 'peaceful use' of space.

General Overview

International Law in Space

Soon after the launch of the first ever satellite, Sputnik 1 in 1957, it was realised by many that a structured legal framework would be necessary to limit countries from utilising space with non-peaceful means. As a direct result of this launch, the UNCOPOUS was formed, and its main goal was to ensure the peaceful use of outer space and international cooperation on the matter. It has overseen the creation of multiple multilateral agreements on outer space, the Outer Space Treaty being the most important that has been drafted. The creation of the Outer Space Treaty was especially significant as it established the first basic legal framework for outer space, whilst halting a space race between the United States and the ex-Soviet Union, initiated by the Sputnik launch.

In Article IV of the Outer Space Treaty, it has been explicitly stated that no parties of to the treaty can place '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', prohibiting the use of any weapons of mass destruction in outer space. However, there are certain loopholes to the Outer Space Treaty. For example, there are no mentions of prohibiting the use of armaments that are not considered weapons of mass destruction in the treaty. Additionally, the use of the term 'peaceful purposes' within the treaty can be exploited, as countries could justify their use of weapons in space with the argument of self-defence. As of now, the legal borders regarding the weaponization of space established by the Outer Space Treaty are certainly blunt and up to interpretations, which may threaten the intended peaceful use of outer space.

Reliance on Space

Much of the world relies on space for a wide range of civil uses, such as communications, navigation, climate observation and analysis. These are all critical in ensuring the smooth running of essential daily procedures on Earth and even playing a role in saving human lives. Currently, the

commercial sector has an even greater presence in space than the military and global economic development is closely intertwined with the peaceful state that outer space is currently in.

Global military power also has a strong presence in space. Comparably, military satellites are generally used for reconnaissance and communications purposes. In modern militaries, the tasks carried out by such military satellites are essential, thus developing a strong dependency on the satellites. The importance of the satellites mainly lies in the reconnaissance of other countries. Surveillance from space improves self-defence against military build-up, invasion, or missile assault. By giving targeted nations time to react and voice their concerns in international forums, such awareness of hostile military measures can operate as a deterrent to aggression. Additionally, by preventing the weaponization of space, a potentially devastating space arms race could also be prevented. As a contested yet critical domain, the order must be achieved in outer space to prevent any earth-bound conflicts.

Importance of ASATs

With the presence of foreign military assets in orbit, numerous military powers around the world have developed their threat to these critical military infrastructures to potentially deter any hostility from space. Even though successful ASAT tests do not cause any damage to foreign assets, it is proof to other countries that a country will be capable of inflicting damage on space assets if it wishes to do so.

For example, China has developed and successfully tested its ASAT-capable systems and it has made progress in both kinetic and non-kinetic energy technology. In 2007, it was able to destroy a defunct weather satellite with the use of a kinetic kill vehicle. Despite the test proving the system's viability, it was the largest creation of space debris in history, with up to 2000 pieces with a trackable size. Notably, this test alarmed the United States due to their aforementioned vulnerability and it potentially led to the US' successful test of an ASAT the following year. Despite this, China has maintained its stance against the use of weapons in space and it submitted a joint proposal with Russia to the UN Conference on Disarmament, in which the two countries supplied definitions of prohibited weapons and made an effort to define and forbid the proliferation of weapons in space.

In 2021, Russia also launched its direct ascent anti-satellite missile to destroy one of its defunct satellites. This test led to a similar outcome as the Chinese test, resulting in the production of a dangerous amount of debris. It also caused a severe backlash in the international community, as the debris field almost immediately put both the International Space Station and the Chinese Tiangong Space Station at risk of damage. Countries including the United States and France both criticised the Russian test for putting human lives in jeopardy.

From these two tests, it is evident that the use of direct ascent ASATs can be extremely dangerous due to the large amount of debris generated by the collision. In order to preserve human life and protect aspects of space, the use of this technology should also be limited as a part of preventing the weaponization of space. Additionally, the Chinese test in particular had potentially posed a threat to the US, as they successfully destroyed one of their own malfunctioned satellites one year later. This type of arms race must be avoided to prevent any outer space-related conflict.

Space-based missile defences

As its name suggests, these defences use satellite-based technology to identify and destroy incoming hostile missiles. The United States announced the programme of the Strategic Defence Initiative (SDI) during the cold war, which would utilise space-based ballistic missile defences to deter and defend itself from the Soviet Union. However, the programme never materialised.

In recent years, research has shown that it would require thousands of satellite interceptors to neutralise a ballistic missile. Although theoretically viable, the system would be expensive to operate and would act more as a show of technological capability. As a result, rival nations could see the start of such a programme as a threat and develop their system, leading to a costly arms race. If nations claim that such defences would be for deterrence, but they are potentially in the process of starting an arms race that could come with the cost of human lives, should these defences be allowed in orbit?

Timeline of Key Events

Date	Event
4 October 1957	Launch of Sputnik 1
13 December 1958	*ad hoc* Committee on the Peaceful Uses of Outer Space created by UNGA
28 February 1959	Launch of the first military reconnaissance satellite, Discoverer 1 by the US
12 December 1959	COPUOS committee permanently established
27 January 1967	The signing of the Outer Space Treaty
August 1968	First Conference on Exploration and Peaceful Uses of Space (UNISPACE I)
1981	Prevention of an Arms Race in Outer Space resolution drafted
23 March 1983	Strategic Defence Initiative (SDI) announced by President Reagan
24 April 1990	Hubble Space Telescope launched from the Kennedy Space Centre
11 January 2007	Successful test of an ASAT by the People's Republic of China

14 February 2008	Successful destruction of a failing recon satellite by the US navy
4 December 2014	Two resolutions passed in the UN General Assembly on preventing an arms race in outer space

Major Parties Involved

United States of America

The United States has been at the forefront of space exploration and the development of technology surrounding activities in outer space. Its military was one of the first to transition into using satellite technology to assist ground troops and provide intelligence. Nowadays, the US maintains its position as a front-runner in space exploration, having recently launched the Artemis I in hopes of restarting the exploration of the Moon and Mars. It is also the country with the largest space expenditure in the world, at $54.6 billion in 2021. Throughout the US' development of space technology, it gradually became reliant on space-based systems with an increasing number of military satellites. As satellites make extremely predictable tracks in space, they are easy to target and the US may find itself under threat by foreign ASATs. Using anti-satellite weapons to disable one of its satellites would be considered warfare due to the satellite's importance for its national interests.

Additionally, the US has also previously proposed programmes that would see it place satellite-based weapons in space to protect itself from intercontinental ballistic missiles under the Strategic Defence Initiative (SDI) proposed by President Reagan during the height of the cold war. Although heavily criticised and relatively unrealistic at the time, the proposals made in this programme may give an insight into a potentially weaponised space.

People's Republic of China

China's space programme can be traced back to the 1950s when it began the development of ballistic missiles and rocket technology with the help of its newly formed ally, the Soviet Union. By 1970, China had launched its first-ever satellite. Today, it has become one of the largest contributors to space exploration after being the third country to independently send humans into space and it is now carrying out multiple different space exploration programmes, including lunar and deep space exploration programmes. Similar to the United States, it also relies on satellite technology for its military, scientific development and economic growth. China runs its space station, the Tiangong, alongside a large number of other satellites, which can be implied that it would be in its best interest to maintain peace in space to ensure economic growth and scientific advancements brought by these infrastructures.

Russian Federation

The Russian Space Programme “Roscosmos” succeeded the legacy of the Soviet space programme, which included the world’s first satellite Sputnik 1, the first spaceflight by a human and the first ever space station. During the Soviet Union era, Russian space flight saw significant development in the setting of the Soviet-US space race. It was during this space race that the Soviet Union launched the only armed spacecraft ever made – the Almaz military space laboratory. It was first disguised as a civilian project due to the secrecy of the project, but it was revealed that the station was armed after the cold war. The space station was equipped with a 23mm cannon originally mounted in a Tupolev Tu-22 bomber aircraft, and the weaponized station was successfully tested with no cosmonauts on board. Ultimately, this proves the viability of placing weapons on a spacecraft if a country wishes to do so.

Committee on the Peaceful Use of Outer Space

After the launch of the Soviet satellite Sputnik, the United Nations expressed its interest in the peaceful use of outer space in 1957. The United Nations conveyed that as a resource, space should be used for peaceful purposes and the benefits of space exploration should be shared by all countries. As a result, the General Assembly established the Committee on the Peaceful Uses of Outer Space composed of 18 nations to report to UN bodies about international cooperation in the peaceful uses of outer space. The following year, the committee was established as a permanent UN body to continue its mission of tackling the issue.

The Committee on the Peaceful Use of Outer Space oversaw five UN treaties and agreements relating to activities in outer space since its establishment, the most significant of which is the Outer Space Treaty. The multilateral treaty formed the basic structure of space law, in which it established numerous regulations restricting weapon usage in outer space. However, it does not prohibit the use of conventional weapons in space as mentioned previously and openly supports the use of military power in order to guarantee that space is used ‘peacefully’.

United Nations Office for Disarmament Affairs

The UNODA was established in 1998 as a component of former Secretary Universal Kofi Annan's UN reform strategy with the goal of promoting nuclear disarmament and non-proliferation alongside the disarmament of conventional weapons. Its authority stems from the General Assembly's 10th Special Session, which was the first GA session to have a disarmament focus. Along with other UN organisations, the UNODA collaborates with the Disarmament Commission and the First General Assembly.

The UNODA continually sets the benchmark for regional and global disarmament initiatives via diplomacy and openness. It promotes disarmament while also acting as a neutral source of information on related topics. Furthermore, the office conveys accurate and current information to UN Member States, governmental organisations, the general public/media, and non-governmental organisations (NGOs).

Aside from tackling global disarmament issues, the UNODA is also an active body in the prevention of weaponization of outer space. It acts as an important vehicle for multilateral cooperation and discussions on this topic and it is currently hosting an Open-Ended Working Group consisting of member states to address the issue through utilising rules and principles.

Possible Solutions

Currently, few regulations restrict the general use of weapons in space. The Outer Space Treaty only offers limited guidelines for prohibiting deploying weapons in space and this only limits to weapons of mass destruction. This issue certainly needs to be tackled to address the bigger problem of weaponizing space and the revision of the Outer Space Treaty could also be encouraged.

A wide variety of new regulations could be imposed to ensure the peaceful use of outer space. Once established, the COPUOS and the UNODA could act in assistance to oversee how nations are following said regulations.

Finally, international cooperation and transparency are vital to avoid any arms race or significant tension in space. For example, the testing of ASAT-capable technology should be fully transparent to avoid the endangerment of other space traffic.

Bibliography

Cover image: https://stock.adobe.com/nl/contributor/203922485/3dsculptor

Ortega, Almudena Azcárate. "Placement of Weapons in Outer Space: The Dichotomy between Word and Deed." *Lawfare*, 6 Feb. 2021, https://www.lawfareblog.com/placement-weapons-outer-space-dichotomy-between-word-and-deed.

Kuplic, Blair Stevenson. "The Weaponization of Outer Space: Preventing an Extraterrestrial Arms Race." *North Carolina Journal of International Law*, 2014, https://scholarship.law.unc.edu/cgi/viewcontent.cgi?httpsredir=1&article=2011&context=ncilj.

Boothby, Bill. "Space Weapons and the Law." *U.S. Naval War College Digital Commons*, Stockton Center for the Study of International Law , 2017, https://digital-commons.usnwc.edu/ils/vol93/iss1/6/.

Blatt, Talia M. "Anti-Satellite Weapons and the Emerging Space Arms Race." *Harvard International Review*, Harvard International Review, 31 Aug. 2020, https://hir.harvard.edu/anti-satellite-weapons-and-the-emerging-space-arms-race/.

DeFrieze, David. "Defining and Regulating the Weaponization of Space." *National Defense University Press*, 1 July 2014, https://ndupress.ndu.edu/Media/News/Article/577537/defining-and-regulating-the-weaponization-of-space/.

Roberts, Thomas G. "Space-Based Missile Defense: How Much Is Enough?" *Aerospace Security*, 4 Aug. 2022, https://aerospace.csis.org/data/space-based-missile-militari-interceptors/.

"United Nations Office for Outer Space Affairs." *Outer Space Treaty*, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html.

"Outer Space – Unoda." *United Nations*, United Nations, https://www.un.org/disarmament/topics/outerspace/#:~:text=The%20Treaty%20provides%20the%20basic%20framework%20for%20international%20space%20law.&text=In%20particular%2C%20it%20prohibits%20the,such%20weapons%20on%20celestial%20bodies.

"Paros Treaty." *The Nuclear Threat Initiative*, 2 June 2022, https://www.nti.org/education-center/treaties-and-regimes/proposed-prevention-arms-race-space-paros-treaty/.

"China's Anti-Satellite Test." *Council on Foreign Relations*, Council on Foreign Relations, 22 Feb. 2007, https://www.cfr.org/backgrounder/chinas-anti-satellite-test.

Weeden, Brian. "2007 Chinese Anti Satellite Test Fact Sheet." *Secure World Foundation*, https://swfound-staging.azurewebsites.net/media/9550/chinese_asat_fact_sheet_updated_2012.pdf.

Borgen, Christopher J. "Russia's ASAT Test and the Development of Space Law." *Lieber Institute West Point*, 21 Nov. 2021, https://lieber.westpoint.edu/russia-asat-test-development-space-law/.

Bendett, Samuel, et al. "Russian Space Systems and the Risk of Weaponizing Space." *Chatham House – International Affairs Think Tank*, 23 Sept. 2021,

https://www.chathamhouse.org/2021/09/advanced-military-technology-russia/04-russian-space-systems-and-risk-weaponizing-space.

"Salyut-3 (Almaz OPS-2) Space Station." *RussianSpaceWeb*, https://www.russianspaceweb.com/almaz_ops2.html.