COMMITTEE GUIDE

UNOOSA

UNITED NATIONS OFFICE OF OUTER SPACE AFFAIRS

Lia Alvares & Sofía Brenes

2023

Contents

Presidents' Letter

Dear Delegates,

First and foremost, we would like to say how extremely excited we are to be your presidents in the 21st version of CCBMUN, and we can't wait to see you all in this very special committee. We are Sofía Brenes and Lía Álvarez, currently 9th grade students at Colegio Bolivar, and we will be your presidents for UNOOSA. This will be the first time for us to preside over a committee and so it will be a very new experience for all of us, and we are anxious for the start of the model to be able to watch everyone's hard work come to fruition.

This is the first time for the United Nations Office of Outer Space Affairs to be included as a committee in the CCB model. For this reason, we have worked extremely hard to bring this committee to life, and to make sure it provides an enjoyable experience for everyone involved. As space exploration becomes more frequent and extensive, it is important that we start to debate issues that will likely define the future of humanity. For this reason, we are thrilled to be able to bring this committee to you.

As stated previously, this will be our very first time as presidents, so have a little patience with us. However, we have both been in MUN since sixth grade, therefore we have a lot of experience and can relate to what you all might be going through as delegates. Just as we have been the experienced delegates, we have also been rookies. We know what it's like to be intimidated and confused. This being a middle school committee, we understand this will probably be a new experience for most of you, so just know we are here to help you with anything you might need; therefore, never hesitate to ask.

We look forward to seeing the way the debate will flow and the solutions you will come up with. As presidents, we want to make sure that you have a great time in the model. We also hope you are able to put yourself into the role of your country and learn more about the current issues related to something as ambiguous as space. We suggest that you thoroughly research your country and our topics to make sure that everything mentioned previously is possible. We are anxiously waiting to be able to introduce this new committee to the model and to all of you. Hopefully everything ahead of us will be nothing but positive, and everyone involved in the development of this committee will be able to enjoy the experience!See you soon delegates!

Yours sincerely,
Lia Alvarez & Sofia Brenes (UNOOSA Chair)
unoosa@ccbcali.edu.co

Committee Information

I. History

The United Nations Office on Outer Space Affairs is an office of the UN Secretariat which works to promote international cooperation in the peaceful use and exploration of outer space. It seeks to foment the utilisation of space science and technology for sustainable economic and social development. Initially, the office was created as an expert unit within the UN Secretariat to service the Committee on the Peaceful Uses of Outer Space. Later on, it was transformed into the Office for Outer Space Affairs within the Department for Political Affairs and was relocated to the United Nations Office at Vienna, where it remains to this day. UNOOSA is essential to maintain collaboration between nations in regard to space, as technology is rapidly advancing, it is vital to prevent outer space from becoming a domain of war and maintain peace for our future in space. Other prominent responsibilities of the Office are to assist any UN Member State to establish legal and regulatory frameworks to govern space activities. It also strengthens the capacity and involvement of developing countries in the use of space science, technology, and applications for development.

II. Structure

UNOOSA manages and implements the programme on the peaceful use of outer space, which, as stated previously, is aimed at promoting international cooperation and the use of space science and technology for sustainable development. To achieve this, the Office is led by a Director, currently Ms. Aarti Holla-Maini, and is divided into five sections.

These are the Office of the Director (OD), which oversees and coordinates the strategic direction and operational priorities of the Office. The Committee, Policy and Legal Affairs Section (CPLA), provides support to COPUOS, STSC, and LSC, assists UN member states in the adoption of legal instruments, and services the sessions of UN-Space. The Space Applications Section (SAS), plans and implements the UN Programme on Space Applications for all nations to build national capability in the areas of basic sciences and space technology to achieve the SDGs. The United Nations Platform for Space-Based Information for Disaster Management and Emergency Response (UN-SPIDER), leverages space data and applications for disaster risk reduction.

Finally, the Executive Secretariat of the International Committee on GNSS (ICG), brings together all global navigation satellite system (GNSS) providers to improve their uses for sustainable development. UNOOSA also has a Senior Advisor on Space Science and Education to support the Director by providing expert advice and research relating to the activities and programmes of the Office. The Senior Advisor cooperates with the Regional Centres for Space Science and Technology Education, which is affiliated to the UN, to carry

out its responsibilities. It is also important to mention that UN-SPIDER has offices in Beijing and Bonn, aside from Vienna where UNOOSA is located.

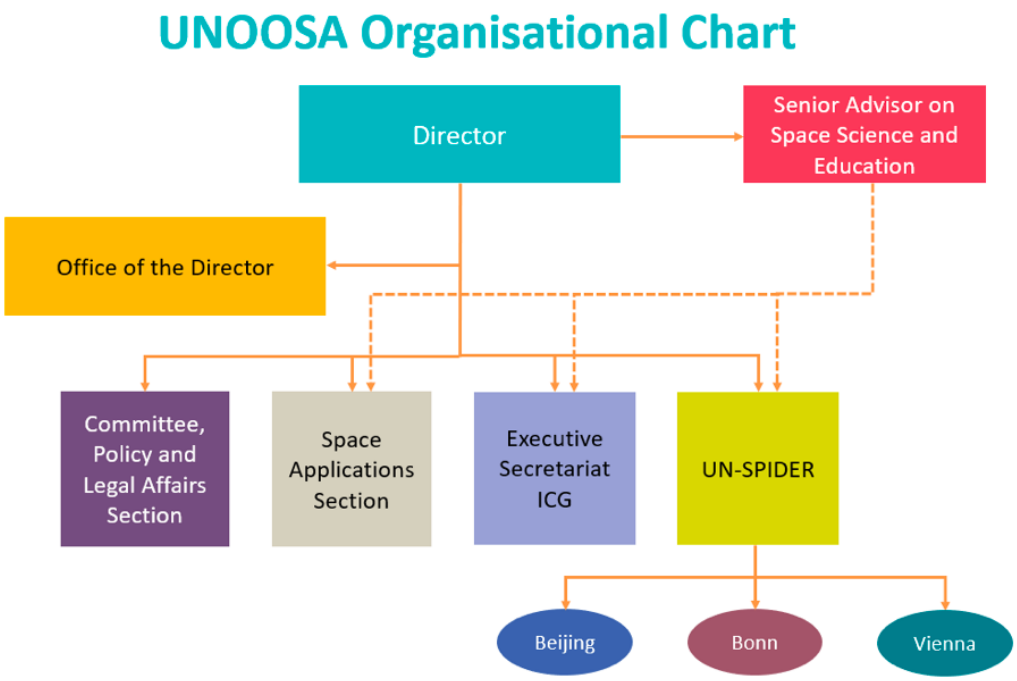

Figure 1. This figure visually demonstrates the organization and importance of each section within UNOOSA.

III. Bibliography

Figure 1:
Structure. (n.d.). UNOOSA. https://www.unoosa.org/oosa/en/aboutus/structure.html

About UNOOSA | UN-SPIDER Knowledge Portal. (n.d.). Www.un-Spider.org. Retrieved August 23, 2023, from https://www.un-spider.org/about/about-unoosa

History. (n.d.). Www.unoosa.org. https://www.unoosa.org/oosa/en/aboutus/history/index.html

Topic 1: *Updating the Outer Space Treaty*

I. History/Context

The "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," more commonly known as the "Outer Space Treaty" (OST), is a multilateral treaty that forms the basis of international space law. It sets the entirety of the legal framework on the way space should be utilised, and therefore how space exploration should be executed. The primary objective of the OST is the implementation of international law governing space exploration, weapons testing, and territorial claims. The treaty legally binds signatory parties to use outer space solely for peaceful purposes.

Figure 1. Signing of the Outer Space Treaty on January 27, 1967.

The Outer Space Treaty was originally drafted by the UNOOSA Legal Subcommittee in 1966, nearly 10 years after the space race began and space exploration was at a boom. The United Nations Office of Outer Space Affairs had been created in 1958, yet there was no framework or international law by which to regulate space exploration. It is important to note space exploration began in 1957 when the Soviet Union (present-day Russia) launched the world's first intercontinental ballistic missile, which is launched into outer space and travels through it to reach its target. Shortly after that, it launched Sputnik 1, the first artificial satellite.

These events developed into the space race, where the United States and the Soviet Union sought to achieve superior spaceflight and aerospace capabilities. Intercontinental ballistic missiles are considered weapons of mass destruction (WMD), and their development, which drew so much attention to space, raised an alarm for the international community. There was already sufficient concern about a nuclear war on Earth to have to be worrying about a nuclear war in space.

For this reason, in 1963, the UN General Assembly unanimously adopted the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space in resolution 1962. This declaration prohibited the introduction of weapons of mass destruction into space. The Outer Space Treaty was largely based on this declaration, only it added several new provisions. It was then agreed upon in the General Assembly in 1966, the same year it was drafted, and the treaty was open for signature by the three depository governments (Russian Federation, United States, and United Kingdom) in January 1967 to enter into force in October 1967.

The treaty is divided into 17 articles, which mainly highlight the following principles:

1. The exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind;
2. Outer space shall be free for exploration and use by all States;
3. Outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means;
4. States shall not place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space in any other manner;
5. The Moon and other celestial bodies shall be used exclusively for peaceful purposes;
6. Astronauts shall be regarded as the envoys of mankind;
7. States shall be responsible for national space activities whether carried out by governmental or non-governmental entities;
8. States shall be liable for damage caused by their space objects; and
9. States shall avoid harmful contamination of space and celestial bodies.

(You may use this link to access the complete treaty: https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html)

It is important to note, however, that the provisions of the OST, despite defining the entirety of law in space, are extremely broad, whilst lacking specifics. This is particularly problematic considering the fact that, by principle, the OST cannot be practically enforced. There is no governing body or law-enforcing entity in space, and, therefore, the only information we have of any activity is that provided by nations and those who represent those nations, for example, the astronauts of the ISS.

The only implication for not complying with the treaty is sanctions, which have never been instituted upon a nation, despite the fact that they have participated in activities that are not particularly in compliance with the OST, such as ASAT (anti-satellite) testing. This means a nation, and perhaps even individuals and private companies, might simply ignore the treaty if they so wished.

Also, within the OST there is no definition of the term “weapons of mass destruction.” It is commonly understood that these include nuclear, biological, and chemical weapons. However, while the treaty prohibits nations from deploying or stationing WMDs in outer space, there is legally no way to determine whether a country is doing so, since there is no definition of weapon of mass destruction in the treaty. The OST also does not prohibit the launching of missiles, which could be armed with WMD warheads, through outer space. Yet, due to the fact the treaty emphasises the peaceful use of outer space, some analysts have concluded that the treaty could broadly be interpreted as prohibiting all types of weapons systems in outer space. There are simply so many legal loopholes within the treaty that it is subject to interpretation for most activities in outer space, for which reason it is necessary to update the treaty.

Despite these fallacies within the treaty, historically, it has only been subject to challenge once. In 1976 eight nations traversed by the equator convened in the Colombian capital, Bogota, to draft the Bogota Declaration. These were Colombia, Ecuador, Congo, Indonesia, Kenya, Uganda, and Zaire, with Brazil present as an observer. Under General Assembly resolution 1803, every nation has the right to permanent sovereignty over their natural wealth and resources within their territory. These nations believed that Article II of the Outer Space Treaty, which states “outer space, including the moon and other celestial bodies, is not subject to national appropriation,” abridged their right to control natural resources.

As it turns out, circling the Earth’s equator at an altitude of around 36,000 kilometres, there is the geostationary orbit (GEO). Satellites stationed in this orbit revolve at speeds which match the rotation of the Earth, so they seem stationary. This allows them to observe and collect data continuously over specific areas. The declaration stated the unique properties of GEO are created by the Earth itself, therefore it is a natural resource. Since these nations are located at the equator, they consider GEO a natural resource, which they should have control over. This is because if the borders of these nations were projected into outer space, satellites located within these borders would never leave those boundaries, hence making them a "natural resource."

Geostationary orbit is actually scarce, as only a few satellites can be stationed upon it, so equatorial nations considered they should control sections of GEO to station their satellites. Doing so, technically, would not go against the OST as they would not be appropriating outer space but rather exercising sovereignty over their natural resources. Eventually this declaration was dismissed by the international community, and meanwhile it was not seen as an attempt to undermine the treaty, it did highlight how the treaty could be subject to interpretation.

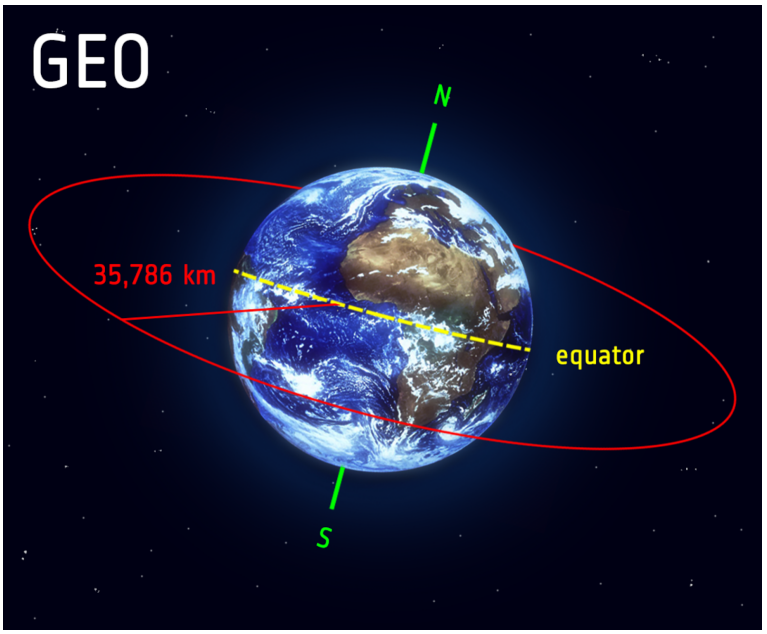

Figure 2. Image created by the European Space Agency to label the geostationary orbit (GEO) in relation to Earth.

Aside from the Outer Space Treaty, international space law is underpinned by four other international treaties overseen and enforced by UNOOSA and UNCOPUOS. These are the Rescue Agreement, the Moon Agreement, the Liability Convention, and the Registration Convention. Historically, the Outer Space Treaty has been the most prominent of the five existing treaties governing space, for it set the foundation of international space law.

However, as it lacked numerous details, the other treaties could fill in the loopholes found within the OST. The problem is that, for example, the Moon Treaty, which attempted to prevent commercial exploitation of outer space resources, has not been ratified by China, Russia or the U.S. In fact, only 18 nations are parties to the treaty, only 5 have ratified it, and another 4 are signatories. It has not been ratified by any state that engages in self-launched human spaceflight. This has only demonstrated how states would rather remain merely within the boundaries of the vague Outer Space Treaty, rather than to be further limited by more detailed treaties such as the Moon Treaty. This leads to the question of how effective the OST really is.

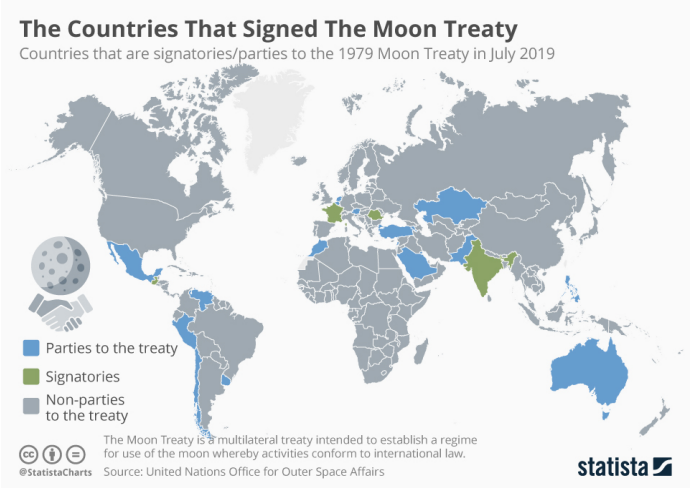

Figure 3. This chart shows the countries that are signatories (highlighted in green) and parties (highlighted in blue) to the 1979 Moon Agreement in August 2023.

II. Current Situation

On October 13, 2020, the U.S. Department of State and NASA established the Artemis Accords alongside Australia, Canada, Italy, Japan, Luxembourg, the United Arab Emirates, and the United Kingdom. The Artemis Accords are a set of guidelines surrounding the Artemis Program in its efforts to return humans to the moon by 2024, and establish a lunar base by 2030. The Artemis Program also aims to land the first woman and person of colour on the moon. Due to this, the Artemis Accords would seem like progress in settling this issue, however several key nations such as Russia and China refuse to sign the accords. Russia stated the Artemis Program is too "U.S.-centric" to participate in it in its current form. It has also expressed concerns that this program and the accords are a power grab from part of the U.S. and its allies, considering the lack of any African or South American founding partner states.

Moreover, the accords have become controversial due to the fact the U.S. has promoted these outside the normal channels of international space law, such as the UNCOPUOS. Therefore, the signing of the accords represents a significant political attempt to codify key principles of space law and apply them to the program. As a result, they could have significant influence on any subsequent governance framework for human settlement on any celestial body, for example, Mars. For this reason, many nations with prominent space programs have refused to participate in the Artemis Program, as it would entail signing the Artemis Accords and thus having the quasi-legal American rules imposed upon them. This may not only affect the development of the program, but it may also be considered a challenge to the Outer Space Treaty, as the accords aim to impose their own principles with major importance, rather than enforcing the already established international space law.

Figure 4. Image provided by the Artemis Program highlighting the nations part of the program and signatories to the Artemics Accords.

Furthermore, there is the issue regarding the legality of ICBM and ASAT testing. On one side, there are intercontinental ballistic missiles (ICBM). These have ranges between 6,000 and 9,300 miles, making virtually any target in the world vulnerable; a nuclear weapon can be launched from a rocket into outer space before gliding down to its target with pinpoint accuracy through these missiles. So far only 7 nations possess ICBMs, the United States, China, Russia, and North Korea with both land-based and submarine-launched ICBMs, India with only land-based, and France and Britain with only submarine-launched. It is speculated that Israel may also possess ICBMs, however this has not yet been confirmed.

The New START Treaty ensured the reduction of both the American and Russian nuclear arsenals as well as of the missiles and bombers capable of delivering such weapons, such as ICBMs. Therefore, these were never much of a concern. However, since Russia suspended the New START on February 21 of this year, there has been an exponential increase in ICBM testing from part of both Russia and the United States as never seen before. In the midst of this, North Korea has been testing ICBMs non-stop since its first test back in 2017. The U.S., alongside Japan and South Korea, condemned North Korean ICBM tests in a joint statement on July 15, 2023, despite the fact the U.S.U.S. has tested multiple ICBMs, particularly throughout this year.

The Outer Space Treaty prohibits the stationing and/or deployment of weapons of mass destruction in outer space; however, it does not prohibit the launching of ballistic missiles, even though these could be armed with WMD warheads, through space. This means international law could be condoning ICBM testing as there are no regulations against it in

place, and the provisions of the OST do not prevent it despite the fact these missiles armed with weapons of mass destruction travel through space constantly during ICBM tests.

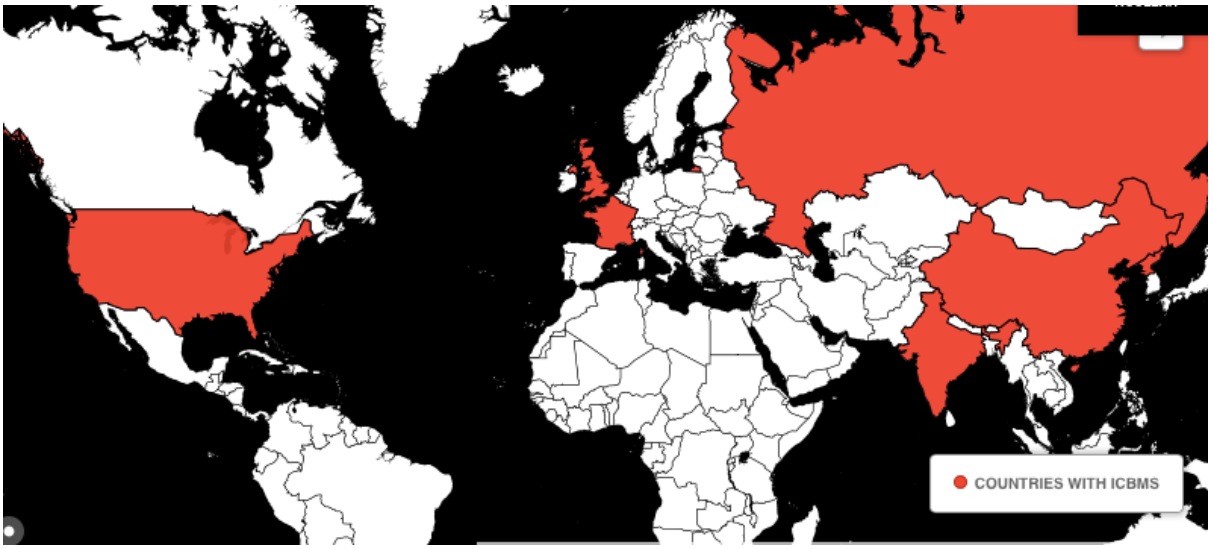

Figure 5. Map of the countries (highlighted in red) that have ICBMs.

Additionally, ASAT testing is another major concern in regards to the effectiveness of the Outer Space Treaty. As nations such as Russia and China have stated their interest in the militarisation of space, anti-satellite weapons (ASAT), have become a major concern to the international community. Since 2007, when China conducted its first ASAT test after several decades of ASAT technology being dormant, Russia, the U.S.U.S., India, and, of course, China, have exponentially increased their activity in ASAT testing.

Arms control experts have long foreseen an arms race in outer space as an imminent threat, and with the increase of ASAT technologies and testing, they believe this could incite an inevitable conflict in outer space. As stated by the fourth article of the OST, “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.” As ASAT weapons are not weapons of mass destruction, under the treaty they would be considered conventional weapons and so, in all technicality, they would be allowed in space. However, since the Outer Space Treaty foments the peaceful usage of outer space and prohibits any military activities on celestial bodies, the usage of ASAT weapons and the testing of these are frowned upon by the international community. This, nonetheless, does not stop the usage of ASATs, and if it escalates any further it could lead to conflict in outer space, as many analysts have already concluded. Therefore, it is of vital importance to update the OST, not only to prevent the further development of ASAT weapons, but also of ICBMs.

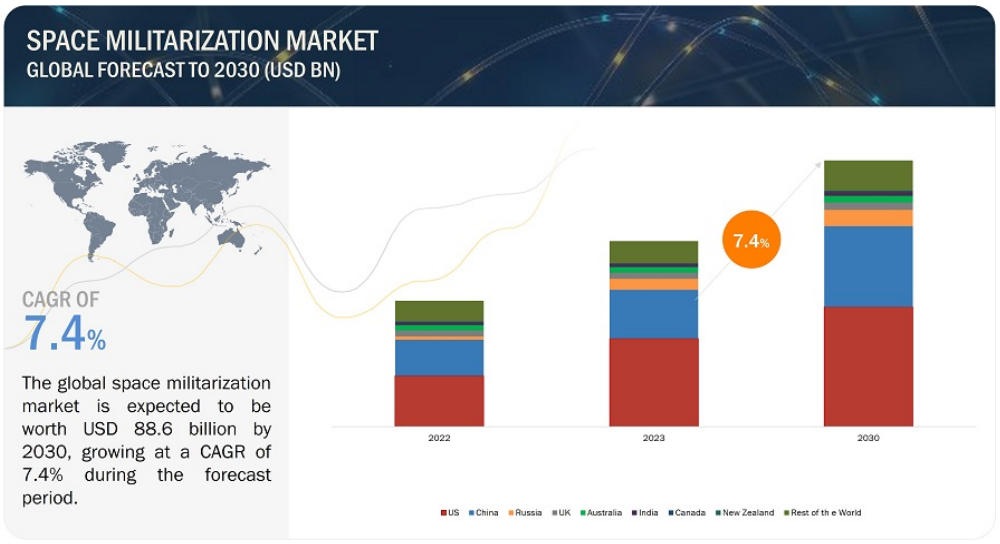

Figure 6. This image demonstrates the current and potential economic growth of the space militarization market, thus highlighting the increasing military intervention in space with ASAT weapons and ICBMs.

It is also important to note the seemingly lack of regulation of the Outer Space Treaty with respect to private companies and organisations. The provisions of the treaty mainly focus on nations and their activities, whilst being deficient in any sort of guidelines as to what private companies can do in outer space. For this reason, organisations such as Lunarland and the International Lunar Lands Registry have exploited this omission and have been offering the sale of plots of land on a celestial body, therefore appropriating the moon and its resources as their own.

These organisations justify their activity by stating that celestial bodies are not subject to national appropriation, so technically private companies and individuals could make claims on celestial territories as they are not nations, nor are they affiliated to a government. Despite this, the private ownership of land on the moon is absurd given that, even if an individual owns territory on the moon, how can this individual access their territory, and what function do they serve if there are no settlements on the moon?

These organisations may not seem like a cause for concern for they are rather preposterous at the moment. Nonetheless, they do highlight the lack of control the OST has over private institutions if they have reached such an extent where anyone can both buy and sell useless territories on the moon. By analysing these sorts of activities, it is clear that there is a necessity to update the OST. Regardless of its legal loopholes, challenges, and omissions, it is still the basis for international space law, so if humanity wants to ensure even the slightest success in outer space, it is necessary to make the OST functional.

I. Key points of the debate

- Omissions within the OST that do not allow for weapons to be regulated in outer space
- The unregulated liberties of private companies in space
- The development of ASAT weapons as a threat to international security
- Establishing repercussions for not complying with the OST
- Maintaining outer space as a peaceful domain for free exploration and use
- National appropriation of outer space and its resources
- Addressing legal gaps within the OST

II. Guiding questions

1. Is your country a signatory of the Outer Space Treaty?
2. Does your country have any ambitions in militarising space? If so, how has your country taken part in this?
3. Is your country a signatory of all five space treaties? If not, does it have any particular motives for not being as such?
4. How relevant is your country's space program on the international spectrum? Describe the program.
5. Does your country believe the Outer Space Treaty should be updated? If so, how? If not, why?
6. What would incite a conflict in space in the eyes of your country? How can the updating, or not updating, of the treaty help prevent this?
7. Are there any particular articles in the OST that your nation considers should be altered?

V. Bibliography

Eijk, C. van. (2020, November 5). *Sorry, Elon: Mars is not a legal vacuum – and it's not yours, either*. Voelkerrechtsblog.org. https://voelkerrechtsblog.org/sorry-elon-mars-is-not-a-legal-vacuum-and-its-not-yours-either/

Fukazawa, J. (2020, April 28). *Does the U.S. Space Force Violate the Outer Space Treaty? – Denver Journal of International Law & Policy*. Djilp.org. https://djilp.org/does-the-u-s-space-force-violate-the-outer-space-treaty/

Kimball, D. (2020, October). *The Outer Space Treaty at a Glance | Arms Control Association*. Armscontrol.org. https://www.armscontrol.org/factsheets/outerspace

Newman, C. (2020, October 19). *Artemis Accords: why many countries are refusing to sign Moon exploration agreement*. The Conversation. https://theconversation.com/artemis-accords-why-many-countries-are-refusing-to-sign-moon-exploration-agreement-148134

Roberts, T. G. (2017, December 15). *Why We Should Be Worried about a War in Space*. The Atlantic. https://www.theatlantic.com/science/archive/2017/12/why-we-should-be-worried-about-a-war-in-space/548507/

Royal Museums Greenwich. (n.d.). *Space Race Timeline*. Www.rmg.co.uk; Royal Museums Greenwich. https://www.rmg.co.uk/stories/topics/space-race-timeline

Stuart, J. (2017, January 27). *The Outer Space Treaty has been remarkably successful – but is it fit for the modern age?* The Conversation. https://theconversation.com/the-outer-space-treaty-has-been-remarkably-successful-but-is-it-fit-for-the-modern-age-71381

The Bogotá Declaration and the Curious Case of Geostationary Orbit – Denver Journal of International Law & Policy. (2013, January 31). Denver Journal of International Law & Policy. https://djilp.org/the-bogota-declaration-and-the-curious-case-of-geostationary-orbit/

The Editors of Encyclopedia Britannica. (2018). Outer Space Treaty | 1967. In *Encyclopædia Britannica*. https://www.britannica.com/event/Outer-Space-Treaty

United Nations Office for Outer Space Affairs. (2023). *The Outer Space Treaty*. Unoosa.org. https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html

Figure 1:
Chang, K. (2017, November 26). If No One Owns the Moon, Can Anyone Make Money Up There? (Published 2017). *The New York Times*. https://www.nytimes.com/2017/11/26/science/moon-express-outer-space-treaty.html

Figure 2:
ESA. (2020, March 2). *Geostationary orbit*. Www.esa.int. https://www.esa.int/ESA_Multimedia/Images/2020/03/Geostationary_orbit

Figure 3:
Buchholz , K. (2023, August 23). *Infographic: The Countries That Signed The Moon Treaty*. Statista Infographics. https://www.statista.com/chart/18738/countries-that-are-signatories-or-parties-to-the-1979-moon-treaty/

Figure 4:
BUREAU OF OCEANS AND INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC AFFAIRS, & Littlejohn, J. R. (2022, October 21). *Celebrating Two Years of the Artemis Accords - United States Department of State*. United States Department of State. https://www.state.gov/artemis_at_two

Figure 5:
Allen-Ebrahimian, B. (2017, July 5). *Mapped: The Countries With the World's Most Dangerous Missiles*. Foreign Policy. https://foreignpolicy.com/2017/07/05/mapped-the-countries-with-the-worlds-most-dangerous-missiles-north-korea-icbm-nukes/

Figure 6:
Space Militarization Market Size, Share, Industry Report, Revenue Trends and Growth Drivers. (n.d.). MarketsandMarkets. https://www.marketsandmarkets.com/Market-Reports/space-militarization-market-145370586.html

Topic 2: *Space Debris*

I. History/Context

Space Debris, better known as space junk, is regarded to be any object in orbit that is human-made and no longer serves a useful purpose. We can date the beginning of this dilemma to Sputnik 1, which was the first satellite ever launched into space; it was launched by the Soviet Union in 1957, making it the first ever human space debris.

This satellite prompted the interest of space exploration throughout the world, especially in the United States. This led to the U.S. Air Force launching Project Space Track, a system which noted artificial space objects belonging to foreign countries as well as those launched domestically. From the launch of Sputnik, human-caused debris started accumulating in low earth orbit (LEO), the same space in which satellites are held. Since this moment in the history of space exploration, space debris started to become a growing issue. It posed a threat to every satellite being launched, because if the satellites crashed, even more space debris would be caused, leading to a never ending cycle of this issue.

In the 1960s more satellites were launched, anti-satellite testing began, old spacecrafts were exploded, and more debris was produced in space. Additionally, on June 29, 1961, the Thor-Ablestar rocket upper stage exploded. This was the first ever satellite break-up, and it left over 200 catalogued portions of space debris. The increase of space activity led to the creation of programs whose purpose was to track objects in space. Programs such as the North American Air Defence's (NORAD) now known as the North American Aerospace Defence Command, and the Space Object Catalogue, sought to improve upon the foundation that Project Space Track set.

Though satellite exploration is a leading cause for this issue, kinetic anti-satellites are also a leading proponent to this issue. These weapons physically crash into satellites, and this impact causes large amounts of debris. Moreover, with the launch of Sputnik, the U.S. developed an air-launched ballistic missile called Bold Orion, in the fear that Russia would develop an orbital network of nuclear-armed satellites. This caused the Soviet Union to respond with the same kind of weapons. Since these events, ASAT weapon technology has continued to evolve and, along with development, continuous testing has occurred, which has led to the large amount of space debris we now have to deal with.

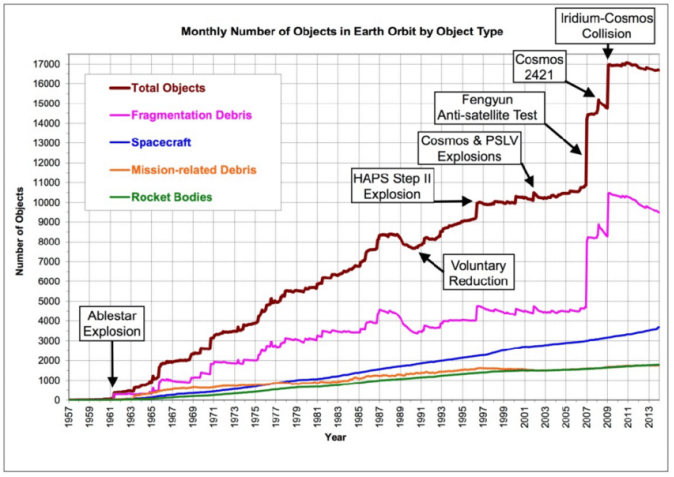

Figure 1: This figure is presented with the purpose of showing the cause of debris and its growth throughout several years.

In 1978, NASA scientists, Don Kessler and Cour-Palais, published their research on what we now know as the Kessler Syndrome. This phenomenon establishes the point in which space debris is purely based on the collisions and no longer relies on the launching of new objects. In their paper "Collision Frequency of Artificial Satellites: The Creation of a Debris Belt," they wrote "Satellite collisions would produce orbiting fragments, each of which would increase the probability of further collisions, leading to the growth of a belt of debris around the Earth. The debris flux in such an Earth-orbiting belt could exceed the natural meteoroid flux, affecting future spacecraft designs." The study predicted what was stated in the quote, they also hypothesised that this phenomenon could develop to the point in which Earth's orbit would be inaccessible, making space exploration impossible.

Through the increasing realisation of the danger of space debris, multiple programs were created. For example, NASA's creation of what is now the Orbital Debris Program (OPDO) in 1979, in which, according to NASA, "The ODPO has taken the international lead in conducting measurements of the orbital environment and in developing the technical consensus for adopting mitigation measures to protect the users within it." Alongside these programs, guidelines were implemented by countries and corporations such as NASA.

II. Current Situation

As we know, due to space exploration, crashes between satellites, spaceships, rockets, and more can happen, which ends up leaving debris in space. Space debris can be defined as pieces of machinery left behind in spaces due to human exploration. According to Aerospace "Currently, about 25,000 space debris objects are large enough to be tracked and catalogued, but when accounting for the miniscule pieces—lens covers, peeling insulation, or the fragments and shards produced from "breakup events" like colliding objects or explosions—that number rises to the millions. When factoring the velocity of orbit, almost

all debris within the space environment can pose a threat to currently healthy and operating space systems." Currently, the biggest contributors to space debris are the U.S., China, and Russia. The countries previously mentioned alongside Japan, France and the ESA have space debris guidelines.

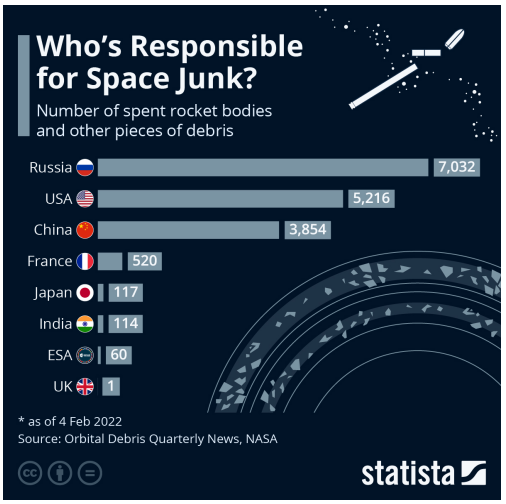

Figure 2: This figure is shown with the purpose of demonstrating the main countries responsible for space debris

As this issue grows, many countries seek new ways to combat the threat debris imposes. Countries like Japan have taken large initiatives for the removal of space debris. Japan's Aerospace Exploration Agency recently joined Astroscale, a company said to complete the world's first debris-removal mission and offer routine removal services by 2030. Japan's intentions through this is not only to help the conflict, but it also seeks to encourage countries and companies to follow steps like these.

Other countries such as China are exploring more alternatives. Origin Space, a company based in Shenzhen which focuses on space-mining, created a robot prototype that can capture space debris using a large net. Organisations such as the European Space Agency (ESA) have taken a similar approach. The ESA has developed a "space claw," known as ClearSpace-1, which is designed to capture and dispose of space junk by bringing it down into Earth where it will burn up; however, it has yet to be launched.

To combat this issue, global cooperation is necessary. The main power concerning space debris is the Inter-Agency Space Debris Coordination Committee, of which NASA and the European Space Agency are a part. The Inter-Agency Space Debris Coordination Committee, is another organisation, which states on the website, "The primary purposes of the IADC are to exchange information on space debris research activities between member space agencies, to facilitate opportunities for cooperation in space debris research, to review the progress of ongoing cooperative activities, and to identify debris mitigation options."

A total of 11 countries are participants of IADC - Russia, China, UK, Italy, France, Canada, Germany, India, Japan, Ukraine, and South Korea. Furthermore, countries such as the United States have opted for a different route toward this issue, this route being through the renewal of policies regarding defunct satellites. The U.S.'s Federal Communications Commission voted on a guideline that requires post-mission disposal of low-Earth orbit satellites within five years, updating this from the prior rule being 25 years. FCC Commissioner, Geoffrey Starks, noted, "will bend the curve of debris proliferation. It also will reduce collisions and free up resources that would otherwise go toward trying to avoid them."

Meanwhile, there are multiple solutions implemented for one of the main causes of space debris, this being space activity and the break-up of satellites; it is also necessary that we consider how anti satellite weapons affect this issue as well. Currently, the USA, China, Russia, and India have used ASAT weapons to shoot down their own satellites. In 2022, the U.S. was the first nation to take action against this issue by starting an initiative to ban anti satellite testing. It was shortly joined by Canada, New Zealand, Japan, Germany, United Kingdom, and South Korea. "At the UN General Assembly in October, the United States tried to make the ban fully multilateral by introducing a resolution calling on all countries to commit not to conduct ASAT tests. Belarus, China, Nicaragua, North Korea, Syria, Venezuela, and Russia denounced the resolution as "insufficient" in an Oct. 26 statement." This stated in an article by the Arms Control Association.

It is also necessary to keep in mind that space debris doesn't currently pose any threat to explorations, making it an issue that isn't being prioritised. Space debris poses a threat only to the *future* of space exploration, which is why some nations have decided to take action. Yet, as it currently only affects satellites, nations may also opt for abstaining from implementing solutions.

According to NASA "The higher the altitude, the longer the orbital debris will typically remain in Earth orbit. Debris left in orbits below 600 km normally fall back to Earth within several years. At altitudes of 800 km, the time for orbital decay is often measured in centuries. Above 1,000 km, orbital debris will normally continue circling the Earth for a thousand years or more." Although it is estimated that 1 piece of space debris falls to Earth every day, there have been no reports of serious harm to people by this, as most of the debris gets burned up as it enters the Earth's atmosphere, or it falls in remote areas or into the oceans.

Figure 3: This figure is shown with the purpose of demonstrating how ASAT weapons work.

“The second space age is here. For it to continue to grow, we need to do more to clean up after ourselves so space innovation can continue to respond,” Rosenworcel said. Space debris is a threat to all nations and organisations. It puts at risk the ability of further exploring space. The Earth is already polluted and, as we move into space, the same effect is occurring.

III. Key points of the debate

- The danger space debris poses in regard to the future of space exploration and the impact it could have on mankind
- How nations are currently dealing with space debris and how they plan to combat it in the future
- How kinetic anti-satellite missiles affect the issue and how they should be dealt with
- The cleanup of space debris and other technologies that could be used for it
- The role of organisations and private institutions in tackling space debris
- Countries that aren’t taking action and their role in space debris
- Should space debris be considered a priority threat to mankind
- Condemning nations that contribute to space debris

IV. Guiding questions

1. Does your country have any satellites? Have they contributed to space debris?
2. Does your country currently have any plans in action against space debris? Explain them.
3. Does your country have any guidelines on mitigation for space debris? What are they?
4. Does your country have any involvement in space debris organisations? What is their role, or what have they done?
5. How is your country affected by space debris? Has it had any major impacts?
6. Has your country participated in the removal of space debris and/or do they plan on it?

V. Bibliography

A Brief History of Space Debris | The Aerospace Corporation. (2022, November 2). Aerospace Corporaion. https://aerospace.org/article/brief-history-space-debris

ARES | Orbital Debris Program Office. (2019). Nasa.gov. https://orbitaldebris.jsc.nasa.gov/

ARES | Orbital Debris Program Office | Frequently Asked Questions. (2020). Nasa.gov. https://orbitaldebris.jsc.nasa.gov/faq/

European Space Agency. (n.d.). *About space debris*. Www.esa.int. https://www.esa.int/Space_Safety/Space_Debris/About_space_debris

For rivals Japan and China, the new space race is about removing junk. (n.d.). *Washington Post*. https://www.washingtonpost.com/world/2022/11/20/japan-china-space-junk-removal-competе/

Garcia, M. (2021, May 26). *Space Debris and Human Spacecraft*. NASA. https://www.nasa.gov/mission_pages/station/news/orbital_debris.html

Kimball, D. (2020, October). *The Outer Space Treaty at a Glance | Arms Control Association*. Armscontrol.org. https://www.armscontrol.org/factsheets/outerspace

O'Callaghan, J. (2019). *What is Space Junk and why is it a problem?* Natural History Museum. https://www.nhm.ac.uk/discover/what-is-space-junk-and-why-is-it-a-problem.html

Seven Countries Join ASAT Test Ban | Arms Control Association. (n.d.). Www.armscontrol.org. https://www.armscontrol.org/act/2022-11/news-briefs/seven-countries-join-asat-test-ban

Shepardson, D. (2022, September 29). U.S. agency adopts new space junk rules to reduce exploration risks. *Reuters*. https://www.reuters.com/lifestyle/science/us-agency-adopts-new-space-junk-rules-reduce-exploration-risks-2022-09-29/

Smith, M. (2022, August 10). *Anti-satellite weapons: History, types and purpose*. Space.com. https://www.space.com/anti-satellite-weapons-asats

The current state of space debris. (n.d.). Www.esa.int. https://www.esa.int/Space_Safety/Space_Debris/The_current_state_of_space_debris

Wall, M. (2022, July 14). *Kessler Syndrome and the space debris problem*. Space.com. https://www.space.com/kessler-syndrome-space-debris

What is "space junk" and what are we doing about it? (n.d.). What Is "Space Junk" and What Are We Doing about It?. https://www.trtworld.com/magazine/what-is-space-junk-and-what-are-we-doing-about-it-51777

Figure 1:
Committee on the Peaceful Uses of Outer Space Space debris National research on space debris, safety of space objects with nuclear power sources on board and problems relating to their collision with space debris. (2017). https://www.unoosa.org/res/oosadoc/data/documents/2017/aac_105c_12017crp/aac_105c_12017crp_12_0_html/AC105_C1_2017_CRP12E.pdf

Figure 2:
Fleck, A. (2022, September 22). Infographic: Who's Responsible for Space Junk? Statista Infographics. https://www.statista.com/chart/28309/countries-creating-the-most-space-debris/

Figure 3:
Smith, M. (2022, August 10). Anti-satellite weapons: History, types and purpose. Space.com. https://www.space.com/anti-satellite-weapons-asats