

General Assembly 1

The demilitarization of outer space



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Introduction

In 1957 the first actions relating to space exploration were taken with the launch of the first artificial satellite, Sputnik 1, by the Soviet Union. This triggered a period of nationwide fear in the US and rapid development in aeronautical technologies. This period of competitive scientific research between the United States and the Soviet Union is commonly referred to as the space race. With the creation of the National Aeronautics and Space Administration (NASA) and the Soviet space program, these two parties developed a large technological advantage in outer space.

This polarisation in power over outer space is shifting with many countries researching and developing technology to militarise and conduct research in outer space. These relatively new agencies include JAXA, ESA, CSA and IRSO to name a few. The tipping point for this rise of militarisation was back in 2007 when the People's Republic of China, whose space program falls under the wing of the People's Liberation Army (PLA), destroyed a Chinese weather satellite using kinetic kill vehicles. This anti-satellite missile test (ASAT) posed a great danger to global security and produced around 3,000 pieces of debris which can further contribute to other security issues. This test also opposed all the principles of the current 'five United Nations treaties on outer space consisting of the "Outer Space Treaty", the "Rescue Agreement", the "Liability Convention", the "Registration Convention" and the "Moon Agreement".

In 2018, 320 dual-use satellites were registered, 160 belonged to the U.S. the rest, were owned by: Russia, China and India. These satellites often gather mission information and provide for military grade communication whilst subsequently providing information for civilians. Many nations are currently taking part in this global militarization of outer space which urges us even more to find a binding solution or legal framework that enhances cooperation, surveillance and international law in outer space. Because militarisation of outer space is forever driven by new forms of secret



technology current legal frameworks, such as the Prevention of Arms Race in Outer Space (PAROS), often lack clear legislative grounds.

Definition of Key Terms

Outer space

The vacuous region that exists beyond the atmosphere of the earth. It is important to note that outer space does not begin at a precise altitude from the Earth's surface. However, international frameworks uphold the Kármán line as a starting point located 100 km (62 mi) above sea level.

Kinetic Kill Vehicles

A Kinetic Kill Vehicle (KKV) is a lightweight space weapon ranging from 30 to 400 pounds. These vehicles are specially designed for exo-atmospheric operations and have their own guidance and propulsion systems. This means that a KKV is different than other space weaponry due to the use of kinetic energy upon impact. That's why most KKV's don't utilize warheads.

Militarization of outer space

Militarization refers to the usage of military-grade satellites in order to support the military on the ground, sea or air in forms of communication, Position Navigation and Timing (PNT) or National Technical Means (NTM). The U.S., Russia, China and India all use military satellites. The militarization of space is often labeled as having a peaceful purpose and has been around since the earliest forms of satellites. These military satellites can be categorised into passive and active: passive meaning satellites means supporting military action, and it is divided in communications, geodetic information, meteorology, navigation and positioning. The active use of satellites converts them into weapons and it is divided into ASAT weapons and ballistic missiles (BM).



Weaponization of outer space

The instalment and usage of devices with destructive power in outer space, in this case, infrastructures that target outer space from the ground are also considered weaponization of outer space. Anti-Satellite Tests (ASATs) are an example of the weaponization of outer space.

Low Earth Orbit (LEO)

The Low Earth Orbit (LEO) is defined as an orbit around the earth at a height of 2,000 km (1,200 mi) from sea level. A LEO needs to consist of 11.25 orbits in one day and an eccentricity of fewer than 0.25. Around 70% of all artificial mechanisms in space are currently in the LEO region.

The International Atomic Energy Agency (IAEA)

An international organisation seeking to promote global cooperation and the peaceful usage of atomic energy. It was established in Vienna on the 29th of July 1957. The IAEA is a separate organisation from the UN and reports to both the General Assembly and the Security Council. It has 175 current member states.

Anti-Ballistic Missiles (ABM)

A weapon system made for the sole purpose of intercepting ballistic missiles. These missiles are often used to counter intercontinental ballistic missiles (ICBM). There are only a few systems that can intercept ICBM's such as the Russian A-135 anti-ballistic missile system, the American Ground-Based Midcourse Defense System (GMD) or the Indian Prithvi Defence Vehicle Mark-II .

Kessler Syndrome

This phenomenon is described as the possible tipping point of collisions, where if orbital collisions keep happening, space might even become unusable at some point. This theory was first introduced in 1978 by chief NASA researcher Donald J. Kessler who stated that the rise of space



militarization leading to space junk and space debris could harm humanity in the future. When these uncontrollable pieces of space debris would fill space abysmal things could happen: entire economic systems would collapse, military services would blackout and entire communication networks would be destroyed. This doomsday scenario would eventually seal humanity off from ever endeavouring to exploit space again. We now know the Kessler Syndrome by terms like “the Ablation Cascade” or “the butterfly effect”.

Here are some abbreviations useful for the debate on demilitarization in outer space:

ASAT	Anti-Satellite Test
ASI	Italian Space Agency
BNSC	British National Space Center
CNES	Center National d'Etudes Spatiales
CNSA	China National Space Administration
CSA	Canadian Space Agency
DLR	Deutsches Zentrum fuer Luft-und Raumfahrt e.V.
DoD	Department of Defense (U.S.)
ESA	European Space Agency
ISRO	Indian Space Research Organization
JAXA	Japan Aerospace Exploration Agency
LEO	Low-Earth Orbiting
NASA	National Aeronautics and Space Administration
NSAU	National Space Agency of Ukraine
Rosaviakosmos	Russian Aviation also, Space Agency
SSN	Space Surveillance Network
UNOOSA	United Nations Office of Outer Space Affairs



General Overview

To fully understand the situation, one should overlook all aspects of militarization in outer space, to start with a brief overview of the history of militarization:

History of militarization in outer space

Starting this entire subject was the 1957 launch of the first artificial satellite Sputnik 1 by the Soviet Union. This pressured the U.S. to prematurely launch the Vanguard TV-3 rocket (commonly known as the Kaputnik), which would have been America's first orbiting satellite. Eventually, this would pave the way for the space race. A year later U.S. president Dwight D. Eisenhower established the National Aeronautics and Space Administration (NASA) which would serve as the premises of the first U.S. orbiting satellite Explorer 1. After that, the ground-to-space militarization took off with both the U.S. space program as well as the soviet space program developing effective ASATs. Only the Soviet Union and the U.S. could develop this kind of technology because ASATs involve converted ballistic missiles and long-range radar structures. The first U.S. ASAT technology was tested in October 1959 and is referred to as 'bold iron'. After that U.S. technology developed even further leading to the Nike-Zeus missile (150-mile range) and the Thor missile (400-mile range). The Soviet Union also started its development in ASAT technology but used a 'co-orbital' method, where a 'killer satellite' would be launched in the same orbit in order to take down other satellites.

As of 1967, the first clear international legal framework countering weaponization and militarization in outer space was put in action, the outer space treaty (formally the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies). Later other relevant treaties were also accepted to clarify the outer space treaty like the 1968 'Rescue Agreement' in order to protect astronauts, the 1972 'Liability Convention' in order to make countries aware of potential damage their projects may have or will cost, the 1976 'Registration Convention' where every UN nation needs to registrate their activities in space creating one of the first databases on outer space activity and lastly the 1984 'Moon Agreement' pushing for the international benefit of the moon and cellular bodies. The Prevention on an Arms Race in Outer Space treaty (PAROS) countering weaponization of outer space used to be discussed in the Ad Hoc PAROS Committee (Cttee) under the Committee on Disarmant. On December



4th, 2014, the PAROS treaty passed as a resolution in the GA with 178 votes in favor and two abstentions (Israel and the United States).

Diplomatic situation

At the moment demilitarization is being discussed in certain UN bodies like the UNCOPUOS and the DC, it's most notably being discussed in the first and fourth General Assembly. The current international treaties ban the use of destructive weapons but due to the scarcity of information being shared by governments and subsequently the rapid development in new technology, nations have the liberty of still making many ASATs and weaponization acts.

Militarization acts

As of September 2021, there are 4,450 satellites in orbit, 2,804 of that are U.S. satellites with SpaceX being the biggest controller. Many nations along with China, Russia and India have working satellites in outer space mainly functioning as dual-use satellites both used for civilian and military purposes. At the moment there is not a lot of information available about the quantity of militarization acts but we can for sure say that in China's, Russia's and the U.S.'s combat strategies military satellites play a major part and when looking at the future it is predictable that more nations will use such methods for varying advantages.

When talking about ASATs one should also see that this is not the largest operational threat to satellite systems: cyber-attacks are. Space systems used to be independent from networks on Earth, however in the last couple of years these systems tend to become more and more interdependent. This is due to the rise in satellite assistance in the military, aviation, emergency communications and banking systems which makes satellite systems more involved in geopolitical conflicts on Earth. In 2021 the World Economic Forum has warned stakeholders for the rise in cyber attacks following incidents like the Estonia cyber attacks and the NASA cyber attacks. This asks for the parties involved to enhance their cyber security in order to protect these fundamental systems.

Possible consequences



To fully comprehend the issue at hand one should understand the possible outcomes if the rising militarization and weaponization of outer space does not come to a stop. The most logical consequence of further militarization in outer space and testing of ASATs are the possible clouds of debris that will form, potentially harming other satellites and space stations. In a dystopia, this could even evolve into a "Kessler Syndrome" where outer space is filled with debris and unusable for future generations, completely stopping

communication methods and research acts.

Another great risk and possible outcome are a

new form of weakness in a nation's military.

Since the rise of militarization armies heavily

rely on the support of military satellites and

with the rapid development of ASATs, a

nation's communication center could more

easily be wiped out leading to obvious consequences. It is, as was anticipated, an issue of great

noteworthiness that needs to be handled swiftly.



Fig 1. Kessler Syndrome being depicted by ESA, ESA

Major Parties Involved

The United States of America

For a long time, the U.S. has been the leading nation in outer space and outer space militarization. However, they have not complied with solutions toward a legal framework regulating the militarisation in the outer space area and they have certainly been absent in the UNGA's discussions on militarization (we can see this in the U.S.'s stand on the PAROS treaty). At the same time, the United States Government has been rapidly developing new governmental bodies in order to create enough technology to keep up with its 'competitors'. Most memorable would be the sixth military branch created by President Donald Trump back in 2019, the United States Space Force. This new military branch has the main aims of space security, space combat, information mobility and space domain awareness. The United States has a highly developed outer space arsenal including Directed-Energy Weapons (DEW), the usage of 'spoofing' and Anti-Satellite Tests (ASAT). Secondly, the U.S. sets a décor for new private space organisations to normalise special travel and strongly enhance their technology (SpaceX's Starship project or the Falcon Heavy). At the time it seemed to



be the U.S.’s priority to prepare for a potential “space war” rather than trying to prevent it. However, the Biden administration has a more hopeful position on the current situation. On 22th of March U.S. advisor Michael Aho stated: “Together, we can come together and agree on norms, rules, and principles of behaviour in outer space which, if realised, will help us move closer to addressing issues related to the prevention of an arms race in outer space.”



Fig 2. United States Space Force emblem, USSF

The Russian Federation

The Russian Federation used to be the superior force in outer space. Nowadays Russia has lost that position but the Russian government, most notably the Russian state cooperation Roscosmos responsible for all outer space missions, has been enhancing its space program. The current Russian space budget sits at 210 billion Rubles (\$2.9 billion) which is a slight cut from previous years due to Russia’s involvements in the Ukrainian war. Nonetheless, Russia is also developing new space technology like more efficient communication systems, more ASATs and attack approaches to international field-based space infrastructure. There are even U.S. speculations about a so-called ‘Kamikaze satellite’ referring to the orbiting Kosmos 2499. Retired Gen. William Shelton claimed that this satellite has the sole premise of maneuvering close to other satellites in order to defect or even permanently destroy them, Moscow has denied these accusations. It goes without saying that Russia, with around 100 military or dual-use satellites, is a key partner in space militarization and if a new legally binding framework is going to be established the Russian Federation must therefore be involved.



Fig 3. The unidentified Kosmos 2499, Getty Images

The People’s Republic of China

The People’s Republic of China is often seen as a relatively ‘new’ party to the outer space talks, but should definitely not be underestimated. With a whopping 8.9 billion dollars in space development budget in 2020 China has the resources to enhance and develop more sufficient space



technology than almost any other nation. Attention in the global community first rose in 2007 when China successfully shot down an unresponsive weather satellite causing 3,000 pieces of space debris to land from orbit. Since then, China has continued its ASATs and now has multiple state-of-the-art ground-based ASAT infrastructures. China also purportedly launched a 'kidnapper satellite' in 2013. This satellite, officially named Shiyang, has a robotic arm that could in theory pull other satellites out of orbit. When putting aside China's rapid growth in space tech it is also to be noted that China has indeed made several actions working towards the global demilitarisation of outer space. They have been a key partner in the PAROS discussions and are still extremely crucial in the Committee on Disarmament (CoD).

The United Nations Office of Disarmament Affairs (UNODA)

The UNODA is a department established in 1998 as an office of the United Nations Secretariat. It was created to promote nuclear disarmament and set a stage for nuclear proliferation talks.

European Space Association (ESA)

The European Space Association (ESA) is a large collective for European nations in order to partake in space exploration. With the combined knowledge and funds from the 22 members, the ESA is able to achieve striking results far beyond what any European nation could perform standing alone. The ESA mainly focuses on researching celestial bodies and astronomical phenomena as well as the development of satellites and other outer space technology systems. In these proceedings, the ESA works closely with other international space organizations such as JAXA, NASA and Roscosmos. The following European states are members of the ESA: Austria, Denmark, Estonia, France, Germany, Hungary, Ireland, Italy, Luxembourg, Belgium, the Netherlands, Norway, Finland, Poland, Switzerland, Portugal, Romania, Spain, Sweden, Greece, the United Kingdom and lastly the Czech Republic.

The United Nations Committee on the Peaceful Usage of Outer Space (UNCOPUOS)

The UNCOPUOS is a committee in the United Nations established in 1959 to promote global cooperation and set a stage to start the discussion on the legal complexities of the exploration of space. The UNCOPUOS also oversees the upholding of the 5 United Nations space-related treaties.



Timeline of Key Events

A brief summary of important events in militarization and weaponization of outer space.

Datary	Description of event
October 4 th , 1957	The first artificial satellite (Sputnik) is launched into orbit by the USSR.
November 7 th , 1958	The USSR proposes outer space be UN-controlled and militarization and weaponization of space be permanently banned.
August 5 th , 1963	The Partial Test Ban Treaty was signed aiming to prohibit the testing of nuclear weapons in the atmosphere and outer space.
January 27 th , 1967	The Outer Space Treaty was adopted by General Assembly in the form of resolution 2222 (XXI), opened for signature on 27 January, entered into force on 10 October.
July 15 th , 1975	The U.S. and the USSR join forces by launching a cooperative Apollo-Suyaz mission with the two-spacecraft docking in orbit. This historical event can be seen as the end of the space race and will soon after paving the way for more cooperation leading to projects like the International Space Station.
January 11 th , 2007	China launched an ASAT towards an old weather satellite causing international attention and leading to 3,000 pieces of space debris.
February 28 th , 2008	The United States Navy successfully destroys U.S. spy satellite USA-193.
November 15 th , 2021	Kosmos 1408(satellite) is destroyed by a Russian ASAT weapon producing major space debris.
April 18 th , 2022	The U.S. pentagon has committed to ending the practice of anti-satellite missile tests, Vice President Kamala Harris announced.

UN involvement, Relevant Resolutions, Treaties and Events



The following UN or UN-related, treaties and resolutions are all fundamental parts in preventing and stopping militarization in outer space. The legal acts are sorted in chronological order:

- Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, adopted in 1963 (resolution 1962 (XVIII)), is the foundation for the outer space treaty laying a basis for international space law as a whole.
- The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (“Outer Space Treaty”), in 1967. This could be seen as the basic framework for international space law, it mainly bans the positioning of nuclear weapons or other weapons of mass destruction in outer space and the placing of such weapons on celestial bodies. It also promotes the peaceful usage of outer space.
- The Prevention of an Arms Race in Outer Space (PAROS), UN resolution formed in 1981. This Resolution outlines the basic principles of the Outer Space Treaty and urges for the ban of militarization in outer space. PAROS was discussed in the Committee on Disarmament (CoD).
- Principles Relevant to the Use of Nuclear Power Sources in Outer Space (NPS Principles), resolution adopted by the General Assembly in 1992, (RES/47/68)
- Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT), 12 February 2008. This draft resolution submitted by China and Russia in the DC aimed on preventing an armed militarization of space whilst keeping outer space peaceful. The U.S. rebuffed the PPWT.
- Prevention of an arms race in outer space, resolution passed in the General Assembly in 2009, (A/C.1/64/L.25)
- Transparency and confidence-building measures in outer space activities, resolution adopted by the General Assembly in 2011, (A/RES/65/68)
- Further practical measures for the prevention of an arms race in outer space, resolution adopted by the General Assembly in 2017, (A/RES/72/250)
- Reducing space threats through norms, rules and principles of responsible behaviours, resolution adopted by the General Assembly in 2020, (A/RES/75/36)



Possible Solutions

In order to effectively disarm outer space, the international community searches for a long-lasting solution that can be adopted by every space-contributing nation there is. Before looking forward nations need to enhance other relevant treaties so upcoming frameworks have a strong legal base. Whilst there are numerous UN-related treaties that are incomplete or outdated and most of all lacking the support of the international community, the most prominent ones are the 5 UN space treaties and the PAROS.

As previously stated in this report, the issue of building a binding legal framework in outer space is extremely complex at its premise already. Therefore we have to sort out certain definitions regarding the legal scope of outer space. When involving the definitions of for example “outer space territories” and “self-defence” nations can more easily separate true justifications from simple deceit. Another major concern is the potential breaching of a solution. Therefore nations should find a way of transparency and cooperation to condone and implement their solution. A good example would be establishing an unbiased surveillance group or protocol to ensure cooperation with the solution. This group, proving annual or quarterly status reports on for example ASAT technology developments, would lead the way in sharing more information about outer space globally and encourage international cooperation in research or educational providence.

Naturally, there are many ways to create trust and cooperation within outer space and these can take any form. However, some points need to be discussed in a binding resolution in order to keep it relevant and long-lasting. The new resolution should close the gap between the current UN Charter/Humanitarian Laws and therefore make it more compatible with future relevant legal frameworks. It should also include procedures for the breaching of the resolution so that global cooperation and negotiations can be ensured, this would subsequently function as a safety precaution for possible space conflicts that could escalate. Thirdly, actions such as the deployment, use or testing of non-conventional weapons should be limited or banned. This would positively



diminish the risk of a new space race. The difficulty with old treaties was the short life span due to the ever-changing technology in this sector. Therefore the development of such technology should be under better surveillance, even if it would interfere with internal governmental affairs.

It goes without saying that outer space isn't as legally structured as earth, but a good delegate can use that blank canvas to its advantage and be creative as well as diplomatically correct. Therefore all delegates should fight for cooperation and creativity in order to make a binding resolution be successful.



Bibliography

- "Sputnik, 1957." *U.S. Department of State*, U.S. Department of State, <https://history.state.gov/milestones/1953-1960/sputnik>.
- Bender, Brayen. "Moon Battle: New Space Force Plans Raise Fears over Militarizing the Lunar Surface." *POLITICO*, POLITICO, 12 Mar. 2022, <https://www.politico.com/news/2022/03/12/space-force-moon-pentagon-00016818>.
- Berger, Eric. "Putin Slashes Russia's Space Budget and Says He Expects Better Results." *Ars Technica*, 8 Oct. 2021, <https://arstechnica.com/science/2021/10/putin-slashes-russias-space-budget-and-says-he-expects-better-results/>.
- Bhatt, Ishan. "Militarizing the Final Frontier: Arms Control in Space." *Harvard International Review*, Harvard International Review, 6 May 2020, <https://hir.harvard.edu/militarizing-the-final-frontier-nor/>.
- Bowcatt, Owen. "Outer Space Demilitarisation Agreement Threatened by New Technologies." *The Guardian*, Guardian News and Media, 11 Sept. 2013, <https://www.theguardian.com/science/2013/sep/11/outer-space-demilitarisation-weapons-technologies>.
- General, Assembly. "United Nations Office for Outer Space Affairs." *NPS Principles*, 1992, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/principles/nps-principles.html>.
- Gould, Joe. "China Aims to Weaponize Space, Says Intel Community Report." *Defense News*, Defense News, 14 Apr. 2021, <https://www.defensenews.com/congress/2021/04/14/china-aims-to-weaponize-space-says-intel-community-report/>.
- Harris, K. "Remarks by Vice President Harris on the Ongoing Work to Establish Norms in Space." *The White House*, The United States Government, 19 Apr. 2022, <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/04/18/remarks-by-vice-president-harris-on-the-ongoing-work-to-establish-norms-in-space/>.
- Khalid, Munazza. "Space Legal Regimes, Militarization, and Weaponization of Outer Space." *Taylor & Francis*, 7 Dec. 2021, <https://www.tandfonline.com/doi/abs/10.1080/14777622.2021.2008768?journalCode=fast20>.
- Kumar Lal, Dr Anil. "China's Space Militarisation: Comparative Analysis and India's Options." *Times of India Blog*, Anil Kumar Lal, 13 Feb. 2021, <https://timesofindia.indiatimes.com/blogs/rakshakindia/chinas-space-militarisation-comparative-analyses-and-indias-options/>.



- Mills, Claire. "The Militarisation of Space - Researchbriefings.files.parliament.uk." *UK Parliament*, UK, 14 June 2021, <https://researchbriefings.files.parliament.uk/documents/CBP-9261/CBP-9261.pdf>.
- Mission Geneva, U.S. "United States Remarks for Conference on Disarmament Subsidiary Body 3 – Prevention of an Arms Race in Outer Space CD Session on Space." *U.S. Mission to International Organizations in Geneva*, 22 Mar. 2022, <https://geneva.usmission.gov/2022/03/22/cd-prevention-of-an-arms-race-in-space/>.
- NTI. "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/>.
- Peperkamp, Lonneke. *PDF Hosted at the Radboud Repository of the Radboud University Nijmegen*, 10 Mar. 2021, <https://repository.ubn.ru.nl/bitstream/handle/2066/177230/177230.pdf>.
- Petroni, Giorgio, et al. "The New Space Race: Risks and Opportunities." *ISPI*, ISPI, 20 Oct. 2021, <https://www.ispionline.it/en/pubblicazione/new-space-race-risks-and-opportunities-32060>.
- Pike, John. "Space." *Kinetic Energy Hit-To-Kill Warhead*, John Pike, 2022, <https://www.globalsecurity.org/space/systems/kew-htk.htm#:~:text=A%20kinetic%20kill%20vehicle%20is,to%2020%20kilometers%20per%20second>.
- soft, DEWE. "Every Satellite Orbiting Earth and Who Owns Them." *Dewesoft*, 18 Jan. 2022, <https://dewesoft.com/daq/every-satellite-orbiting-earth-and-who-owns-them#:~:text=How%20Many%20Satellites%20Are%20in%20Orbit%20Around%20Earth%3F,1%2C%202021>.
- World Domain, Lewik. "Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space." *Lewik*, <https://www.lewik.org/term/13632/declaration-of-legal-principles-governing-the-activities-of-states-in-the-exploration-and-use-of-outer-space/>.
- World, Economic Forum. "Global Risks Report 2022." *World Economic Forum*, WEFO, 11 Jan. 2022, <https://www.weforum.org/reports/global-risks-report-2022/in-full/chapter-5-crowding-and-competition-in-space>.
- Zak, Anatoly. *Kosmos-2499: Is It a Spy or an Assassin... or Both?*, Anatoly Zak, 30 Apr. 2017, <http://www.russianspaceweb.com/Cosmos-2499.html>.



Appendix or Appendices

When researching in order to fully comprehend the issue make sure to read the following articles:

- i. World Economic Forum, October 25 2018, <https://www.weforum.org/agenda/2018/10/are-we-heading-for-a-new-nuclear-arms-race-06bf1940-5034-47c0-833f-99227a964656/>
- ii. UN Office for Disarmament Affairs, -, <https://www.un.org/disarmament/topics/outerspace/>
- iii. UN Office for Disarmament Affairs, 1967, [https://treaties.unoda.org/t/outer space](https://treaties.unoda.org/t/outer_space)

