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THE JOHNS HOPKINS MODEL UNITED NATIONS CONFERENCE

Committee on the Peaceful Uses of Outer Space

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Committee on the Peaceful Uses of Outer Space

Topic A: *Regulating the Militarization of Outer Space*

Topic B: *Regulating Commercial Activity in Outer Space*

Committee Overview

The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) was set up by the United Nations General Assembly in 1959. Founded because of the implications that the successful launch of Sputnik had for the world, COPUOS's mission is to review international cooperation in peaceful uses of outer space, to study space-related activities that could be undertaken by the United Nations, to encourage space research programmes, and to study legal problems arising from the exploration of outer space.[1]

The United Nations realized early on that space would be the next frontier for exploration, and so it has been involved in space activities since the beginning of the space age. The dawn of the space age began with the successful launch of mankind's first artificial satellite, Sputnik 1, in 1957, as part of the International Geophysical Year. From that time on, the United Nations has emphasized its commitment to the use of space for peaceful purposes and the importance of the use of satellite technology for the advancement of science. Soon after the launch of Sputnik 1, the United Nations established COPUOS as an ad hoc committee, with 18 inaugural members, including the two major parties involved in the space race: the United States of America and the Soviet Union. In 1959, the U.N. General Assembly officially established COPUOS as a permanent body, which had 24 members at that time.[1]

COPUOS now has 87 members, and maintains its goal as "a focal point for international cooperation in the peaceful exploration and use of outer space, maintaining close contacts with governmental and non-governmental organizations concerned with outer space activities, providing for exchange of information relating to outer space activities and assisting in the study of measures for the promotion of international cooperation in those activities."[2] In addition to being one of the largest committees in the U.N., COPUOS has two subcommittees, the Scientific and Technical Subcommittee and the Legal Subcommittee. Each deal with complex and intricate issues that have arisen following the development of space technology and international interests.

[1] Committee on the Peaceful Uses of Outer Space. United Nations Office for Outer Space Affairs. 2018. Retrieved from: http://www.unoosa.org/oosa/en/ourwork/copuos/index.html
[2] Ibid.

In 2019, delegates will be tackling two important issues that are or will very soon become topics of contention among nations. We have come to a point in time where both the militarization and commercial activity of outer space have a large impact on the worldwide relations and stability. Similar to international waters, space has been defined as a region free for all nation states to explore and not subject to claims of national sovereignty. But, the lack of any specific governing body over this area means that regulations have to be set to prevent the violation of the rights of or the endangerment of any persons or nations within outer space.

Though multiple treaties have been drafted regarding international space law, there still exists certain areas in which there are disagreements or insufficiencies. Hence, delegates will be able to use this conference as an opportunity to draft, refine, and debate on new treaties and guidelines that will promote the development of outer space and outer space technology while maintaining a peaceful and safe environment for all persons and nations to explore.

Topic A:

Regulating the Militarization of Outer Space

Introduction

The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), established by the United Nations General Assembly in 1959, was designed to govern the use and exploration of outer space for peace, security, and technological development for the benefit of mankind. With its creation spurred by the scientific advancements of the U.S. and the U.S.S.R and what that meant for the global community, COPUOS's main mission includes studying space-related activities that can be undertaken by the U.N., promoting the dissemination of information and education of outer space and space research programs, coordinating international cooperation in peaceful uses of outer space, and studying legal problems that have the potential to arise from the exploration of outer space.

One of the most important and impactful issues that COPUOS has to tackle is the militarization of outer space. Since its inception, COPUOS has always maintained a stance of limiting the number and type of weapons permitted in outer space, and have passed treaties and agreements banning nuclear weapons testing in outer space. This is due to the fact that the space race, which contributed to the formation of COPUOS, was partially motivated by military expansion.[3] Furthermore, not only have nations always looked towards space as a medium for delivering highly destructive weapons, but global tensions today are still rising, especially regarding issues such as North Korea's supposed nuclear weapons that have the capability of reaching an altitude of 3700 km, well into the realm of outer space.[4]

Because of these factors, while taking into consideration that many nations with the capability of satellite launch are not members of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and have a poor record of disclosing such weapons,[5] the issue of militarization is a pressing issue with consequences that will only become more severe as mankind furthers its exploration in space, and as more nations gain the capability for satellite and outer space activities. Furthermore, powerful nations such as the U.S. and the European Union member states have voted against or abstained on treaties and resolutions that prohibit the placement of weapons in outer space.[6] The ambiguity of these decisions, without further intervention, can only lead to a more chaotic and unpredictable future regarding the peaceful use of space for the greater good of humanity.

Delegates of this committee will have to approach this topic with great thought and concern. Resolutions must be

[3] Staff. (2010). The Space Race. History.com. A+E Networks. Retrieved from: https://www.history.com/topics/space-race

[4] Cohen, Z; Starr, B. Trump condemns North Korean long-range missile launch. CNN Politics. CNN News. 2017. Retrieved from: https://www.cnn.com/2017/07/28/politics/north-korea-missile-test/index.html

[5] Treaty on the Non-Proliferation of Nuclear Weapons (NPT). (N.D.). United Nations Office for Disarmament Affairs. Retrieved from: https://www.un.org/disarmament/wmd/nuclear/npt/

[6] Disarmament Committee Approves Drafts on No First Placement of Arms in Outer Space, Ban on New Types of Mass Destruction Weapons. (2014). United Nations, General Assembly, First Committee, Sixty-Ninth Session, 21st Meeting. Retrieved from: https://www.un.org/press/en/2014/gadis3514.doc.htm

drafted that not only effectively promote the safe usage of outer space via the regulation of military weapons above the atmosphere, but also have the potential to be approved and supported by at least most, if not all, of the member nations that have satellite launch capabilities or plan on obtaining such capabilities in the near future. Without any consensus on the state of nuclear weapons permitted in outer space, disputes will inevitably occur, with the possibility of sparking unwanted conflicts, or further raise global tensions. Delegates must remember that though the safety and peace of outer space is of paramount importance, they must keep their nation's interests at heart, and so a balance must be struck so that resolutions are both effective and realistic given many nations' interests.

Historical Background

Though the placement of the first man in outer space did not happen until more than 20 years later, the world's first step into the realm of space happened during World War II, when German military scientists were conducting research on the use of liquid fuel in rockets.[7] Though initially most of the rockets developed were unstable, extensive testing and pressures from the Allied Forces during World War II pushed the scientists to develop the so-called "Wonder Weapon", the V-2 rocket.[6] With an operational range of over 300 km, the V-2 rocket, capable of reaching altitudes of 206 kilometers, was the first man-made object to reach outer space as defined by the Karman line at an altitude of 100 km.[6]

Figure 1. Artist's Rendition of the V2 Rocket[6]

With the V-2 rocket setting the stage for space-reaching projectiles, continued innovation came from the development of intercontinental ballistic missiles (ICBMs). With the start of the Cold War, the U.S.S.R. focused on the development of V-2-esque rockets that would be able to hit European targets.[8] However, development of the hydrogen bomb in tandem with increased tensions with the U.S. led to increased funding for ICBMs. It was not until 1957 that the Soviets successfully launched the world's first ICBM - the R-7, capable of a range of over 6,000 km.[7] With many German scientists who worked on the V-2 moving to the U.S. after WWII, the U.S. also began their research into ICBMs shortly after the war. However, lack of success and the U.S.'s superiority in their air force led to little motivation for further research. It was not until the development of the hydrogen bomb by the Soviets in 1953 that the U.S. makes its ICBM program, the Atlas missile, its highest priority, with the first successful flight occuring more than a year later than the R-7 in 1958.[9] These rockets also served as the basis for space launch systems, which spurred the "space race" as we now know it between the U.S. and the U.S.S.R.

[7] Hollingham, R. V2: The Nazi rocket that launched the space age. BBC Future. BBC. 2014. Retrieved from: http://www.bbc.com/future/story/20140905-the-nazis-space-age-rocket

[8] Staff. Russia tests an intercontinental ballistic missile. History.com. 2009. Retrieved from: https://www.history.com/this-day-in-history/russia-tests-an-intercontinental-ballistic-missile

[9] Atlas Missile Construction History. TheMilitaryStandard. N.D. Retrieved from: http://themilitarystandard.com/missile/atlas/constructionhistory.php

Though the space race was not an overt demonstration of military might, the implications of the technologies generated political tension. It was the successful launch of Sputnik 1, that spurred the United Nations to form COPUOS, in order to ensure and reaffirm the U.N.'s stance on the peaceful uses of space.[1] Though the U.S.S.R was the first to send a man-made satellite into orbit, by the early 1960s, both the U.S. and U.S.S.R were able to regularly deploy satellites.[1] These satellites were mainly reconnaissance satellites used to take pictures of foreign military installations for intelligence gathering purposes. Furthermore, because of the rate of the development of satellites and other artificial outer-space machines, the Legal Subcommittee drafted the Outer Space Treaty in 1966, which was later agreed upon by the General Assembly.[10] This treaty, described later in this guide, effectively banned the placement of weapons of mass destruction, especially nuclear weapons, in orbit or in any part of outer space, as defined by the Karman line.[9] As of 2018, there are currently 107 nations that have ratified this treaty, and 23 other nations have signed but not ratified the treaty.[9]

With the advent of satellites and ICBMs, technologies were developed to combat these new potential threats. Throughout the 1950s and 1960s, both superpowers focused on Anti-Ballistic Missiles (ABMs) used to counteract ICBMs, with the U.S.S.R having its first success in 1961.[11] However, realizing the possibility of an endless arms race, the parties conducted a series of bilateral conferences, now known as the Strategic Arms Limitation Talks (SALT) in order to limit the number of ICBMs and corresponding ABMs.[10] SALT I occurred between 1969 and 1972, and resulted in both the ABM treaty, which placed a limit on the number of ABMS and ABM complexes, and the Strategic Arms Limitation Talks Agreement, which limited the number of strategic ballistic missile launchers, and only permitted the addition of the new submarine-launched ballistic missile (SLBM) launcher if matched by an equal dismantling of ICBMs or older SLBMs.[10] To circumvent this limitations, the U.S. developed multiple independently targetable reentry vehicles (MIRVs), which are ICBMs that are capable of striking multiple targets at once with decoys, making successful ABM systems technically difficult and financially costly.[10] Because of these developments, the second round of talks, SALT II, began in 1972. Originally meant to ban new missile programs, the treaty was not ratified by the U.S. due to Soviet actions in Afghanistan.[10]

With the collapse of the U.S.S.R. after the Cold War, the U.S. remained as the world's hegemonic superpower. However, many other nations also began developing outer space missile and satellite technologies, including India, Japan, China, and the European Union. Russia still had large reserves of ICBMs and other sub-orbital capable projectiles. The Strategic Arms Reduction Treaty (START) was a series of bilateral treaties that were signed between U.S., former U.S.S.R, and the Russian Federation in an attempt to limit and decrease the number of nuclear weapons that each nation had in its reserve. [12] Though START I was ratified by the U.S.

[10] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. United Nations Office for Outer Space Affairs. 2018. Retrieved from: http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html

[11] The Editors of Encyclopaedia Britannica. Strategic Arms Limitation Talks. Encyclopaedia Britannica. 2016. Retrieved from: https://www.britannica.com/event/Strategic-Arms-Limitation-Talks

[12] Treaty Between the United States of America and the Union of Soviet Socialist Republics on Strategic Offensive Reductions (START I). Nuclear Threat Initiative. 2011. Retrieved from: http://www.nti.org/learn/treaties-and-regimes/treaties-betwee

and the U.S.S.R., subsequent START treaties between the U.S. and the Russian Federation either never entered into force, or negotiations never concluded in an agreement.[11] However, the New START treaty, signed in 2010 and ratified soon after, called for the number of strategic nuclear missile launchers to be reduced by half by both nations.[11]

Satellites

Figure 2. Artist's impression on the number of satellites and orbital debris in Earth's orbit. [13]

Post-Cold War militarization focuses on satellite technology and application, which have proved to be much more versatile and powerful than sub-orbital missiles. According to the United Nations Office for Outer Space Affairs (UNOOSA), there are currently around 4800 satellites in orbit, of which around 1700 of them are functional.[14] With the number of satellites in orbit owned by a many nations, it is vital to consider the impacts and capabilities that these satellites have to fully understand the militarization of outer space. Modern day militarization of outer space through satellites focuses on three distinct applications: reconnaissance, global positioning systems, and military communication systems.

Reconnaissance served as the main motivation for nations to own satellites in orbit during the Cold War. Since then, technology has developed to a point where satellites are able to perform high resolution photography, Imagery Intelligence (IMINT), that has a resolution as high as 10 cm. Furthermore, satellites are able to hijack and eavesdrop signals that are meant for other satellites or are transmitted between two different sources, known as signals intelligence, or SIGINT. Because of the utility of these features, reconnaissance satellites are actively used in both war and peace times. Satellites can also be used to provide early warning of missile launches and locate nuclear detonations, as demonstrated by the U.S. providing advance warning to Israel regarding Iraqi SS-1 SCUD missile launches.

The Global Position System (GPS) is perhaps the application of satellites that we are most familiar with. Controlled by the U.S. Department of Defense and using more than 24 satellites in intermediate circuit orbit, the GPS allows us to pinpoint our precise location anywhere on Earth. With maintenance costs of over US $400 million a year, the U.S. also uses this system for military purposes, including locational awareness of armed forces, accurate targeting of specific missiles or facilities, and detection of nuclear detonations. However, as the U.S. solely controls the GPS, many other nations have tried to rely upon their own systems, including the planned Galileo positioning system of the

n-united-states-america-and-union-soviet-socialist-republics-strategic-offensive-reductions-start-i-start-ii/

[13] ESA's clean space targets orbital debris and greener environment. European Space Agency. 2012. Retrieved from: http://www.esa.int/Our_Activities/Space_Engineering_Technology/Clean_Space/ESA_s_Clean_Space_targets_orbital_debris_and_greener_environment

[14] United Nations Register of Objects Launched into Outer Space. United Nations Office for Outer Space Affairs. 2018. Retrieved from: http://www.unoosa.org/oosa/en/spaceobjectregister/index.html

European Union[15], the operational GLONASS of Russia[16], and the multi-regional Beidou system of China.[17]

The third application of satellites is military communication systems, specifically network-centric warfare, which relies on high speed communications to allow soldiers and the military to view the battlefield in real-time. This enables greater communication between soldiers planning strategies based on real-time satellite imagery, communications information, and other data on opposing forces.[18] Furthermore, this allows encrypted data to be more securely sent from any location in the world. This is such an important factor that the U.S. Department of Defense is working to connect all of its military units into a computerised network known as a Global Information Grid in order to create a more efficient military.[17]

Contemporary Conditions

Combating these Technologies

With the advent of ICBMs and satellites for military purposes, the natural response is the development of technologies to combat these technologies. These discussed technologies are perhaps those that have the most impact in the militarization of outer space, because of their nature and purpose.

ICBMs are weapons that do not, at least officially, have an effective counter; not even with today's rapid innovative developments. One possibility is to destroy the missile launch sites. However, these are often hidden well, and the destruction of an entire launch site would definitely mean immediate retaliation, leading to an undesirable outcome. Another method is to try and destroy the missile in its boost phase, as it is just launched, it is still relatively slow and within in the atmosphere. However, this also presents a few problems. As the boost phase happens right after launch, there remains little time for an anti-ICBM to come into contact, which would mean constant close-distance surveillance, which is impractical both politically and financially. Conversely, trying to destroy the ICBM in its terminal phase, after reentry heading towards its target, is highly unrealistic, given the extreme high speeds at which the missiles travel, the danger of fallout as the missile is most likely directly over its target, and the launch of projectile-like decoys that have the same shape and heat signatures of the warheads, rendering anti-ICBM technology highly ineffective.

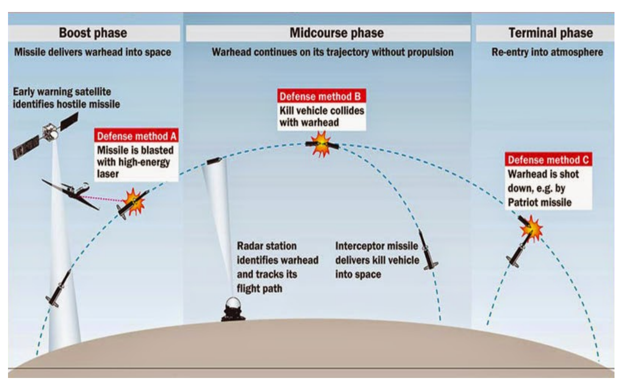


Figure 3. Methods to intercept ICBMs[19]

Because of this, many nations have shown interest in developing weapons that target ICBMs while they are in space. And

[15] Galileo is the European global satellite-based navigation system. European Global Navigation Satellite Systems Agency. 2018. Retrieved from: https://www.gsa.europa.eu/

[16] GLONASS News, Information and Analysis Center for Positioning, Navigation and Timing. 2018. Retrieved from: https://www.glonass-iac.ru/en/

[17] Lei, Z. China's Beidou satellite system upgraded for global reach. The Telegraph. 2017. Retrieved from: https://www.telegraph.co.uk/news/world/china-watch/technology/new-china-satellite-system/

[18] DoD CIO. Vision for a Net-Centric, Service-Oriented DoD Enterprise. Department of Defense Global Information Grid Architectural Vision. 2007. Retrieved from: http://www.acqnotes.com/Attachments/DoD%20GIG%20Architectural%20Vision,%20June%2007.pdf

[19] Rambo. Missile Defense Counters. The Tactical Database. (2014). Retrieved from: http://tactdb.blogspot.com/2014/08/missile-defense-counters.html

because of the distance to outer space, most of these weapons will have to be stationed in orbit and outside of earth's atmosphere to be able to be effective. Furthermore, as demonstrated by our dependence on satellite technologies, many nations will also want to have methods to defend against anti-satellite, or ASAT weapons. Because of these defensive reasons, many nations have expressed the urge to move towards weaponization of outer space, for the purpose of self-preservation or as a method for potential retaliation. Though these may be desired in good faith, the placement of these "defensive mechanisms" may trigger an arms race, which would be detrimental towards world trust.

Space Weapons under Development

Besides anti-ICBM and ASAT technologies, there are also a few weapons that are known to be underdevelopment. Because of their lack of classification as Weapons of Mass Destruction, they are either ambiguous with regards to or not prohibited by the Outer Space Treaty, which could prove to be problematic if these weapons are actually employed in space and used for hostile reasons.

One of these technologies includes kinetic bombardment, which involves launching a solid metal projectile, of tungsten or uranium, accelerated by gravity, reaching speeds of more than 8 kilometers a second, and having destructive capability estimated to be equal of that of a small nuclear bomb.[20]

Figure 4. Artist's impression of a kinetic bombardment device. The rods being launched are solid rods composed of tungsten.[21]

Due to its directly vertical angle and high speeds, these weapons would be extremely difficult to stop and be detrimental if abused, and so a new treaty that takes into account these types of inert weapons will have to be drafted to ensure the safety of humankind from weapons of outer space. Additionally, space lasers have also become a possibility, where lasers of high energy can be used to either destroy electrical circuits or sensors from satellites, or be used to target sub-orbital missiles or foreign spacecraft.

These technologies bring up the important question as to what exactly constitutes a weapon. Is it the motivation and intention, or the possibility of damage that could classifies one thing as a weapon? If the simple definition of motivation and/or intention is brought up, nations can simply argue that their weapons are for defensive purposes, or other weapons such as space based lasers are for peaceful purposes, as clearing space debris as described later. These difficult questions will have to be answered by delegates for a

[20] Pentagon Preps for War in Space. Wired Science. 2004. Retrieved from: https://www.wired.com/2004/02/pentagon-preps-for-war-in-space/?currentPage=2

[21] Artraccoon. Kinetic Bombardment System. Deviantart. (2017). Retrieved from: https://www.deviantart.com/artraccoon/art/Kinetic-Bombardment-System-515058066

comprehensive resolution to be drafted and adopted to ensure the peace and safety of outer space.

Space Debris

Another issue that accompanies the development of military weapons for outer space usage are the space debris that are created when testing and using these weapons for non-hostile purposes. For example, in 2007, China conducted an anti-satellite missile test to destroy a Chinese weather satellite orbiting at an altitude of 865 kilometers via a kinetic kill vehicle, and the U.S. Navy destroyed the dysfunctional U.S. spy satellite USA-193 using a ship-fired RIM-161 Standard Missile 3 in 2008.[22] Besides the political backlash that was received by China on account of its actions, the space debris created by the 2007 missile test was the largest recorded creation of space debris, with more than 150,000 particles estimated, of which more than 3,000 pieces are of trackable size.[23]

The frictionless nature of space means that these particles are able to travel at speeds of more than 10 kilometers per second, meaning particles less than one-tenth of a millimeter can damage satellites and spacecraft, and those that are of larger sizes can cause catastrophic damage.[24] Furthermore, depending on the orbital altitude, these particles and debris will remain in orbit for a very long time.

[22] McIntyre, J. Navy missile hits dying spy satellite, says Pentagon. CNN News. 2008. Retrieved from: http://www.cnn.com/2008/TECH/space/02/20/satellite.shootdown/

[23] ISS crew take to escape capsules in space junk alert. BBC News. 2012. Retrieved from: https://www.bbc.com/news/science-environment-17497766

[24] Tripathi, PN. Weaponisation and Militarisation of Space. CLAWS Journal. 2013. Retrieved from: http://www.claws.in/images/journals_doc/464050849_PNTripathi.pdf

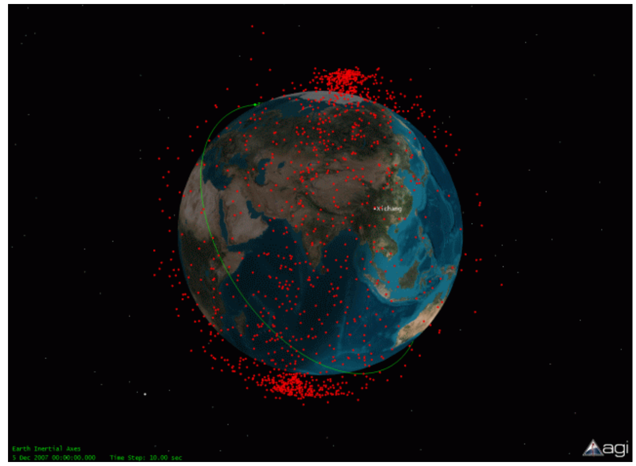


Figure 5. Map of debris (red) caused by the 2007 Chinese Anti-Satellite missile test.[25]

In 2016, more than 2,000 debris particles were still in orbit from China's 2007 missile tests. Because of the altitude, the debris will likely remain in orbit for many decades.[23] The debris will remain as a threat to future satellites and spacecraft far in the future, compromising the peace and relative safety that outer space can offer. Hence, limitations or regulations will have to be enacted in order to minimize the amount of space debris created, allowing for a safer environment for all participants.

A corollary to the space debris problem are methods that have been attempted by governments as anti-debris mechanisms. A prime example is the Chinese Space Junk Laser developed by China's Air Force Engineering University.[26] Claimed to be for cleaning up space debris, the laser works by pushing the target debris into earth's atmosphere, which enables re-entry to combust the debris. However, there have also been reports that this technology can also be used for anti-satellite measures, by taking out or temporarily blinding satellites of foreign

[25] Kelso, T. Chinese ASAT Test. Celestrak. (2012). Retrieved from: https://www.celestrak.com/events/asat.php

[26] Pappalardo, J. Could a Chinese Space Junk Laser Double as a Weapon? Popular Mechanics. 2018. Retrieved from: https://www.popularmechanics.com/military/weapons/a15338238/china-space-junk-laser-weapon-potential/

nations.[25] Because of these worries, it is imperative that COPUOS is able to come up with regulations and laws that ensure these technologies meant for peaceful purposes will not be abused in any way.

Radiofrequency and Orbital Slots

Another problem that occurs with the militarization of outer space is related to radio frequencies and orbital slots. With the continuing increasing development of satellites and communications for scientific and peaceful purposes, more and more satellites and communications are sent to outer space, and both outer space and air space is becoming increasingly crowded. Military satellites and their communications will have radio frequencies that are classified in case of attacks, and some military satellites will also have classified orbital altitudes, in order to prevent secret communications from being intercepted, and satellites from being shot down.[24] In the future, governments will have to reserve and take up more radio frequencies and orbital paths than needed to mask the true values that are in use. That means there will be many frequencies and orbital slots that will be unused and wasted purely for military security reasons.[24] This limitation will decrease the amount of satellites and communication systems that can be used for peaceful and scientific purposes. This conflict and trade-off is something that will need to be tackled in order to ensure that the resources related to outer space will not become monopolized by militaries and will instead be used for the benefit of all mankind.

Weaponization vs. Militarization

Though weaponization of outer space is a large part of the topic, recognize that the topic asks for the regulation of militarization of outer space. Notice that there is a subtle difference between these two concepts. Weaponization focuses on the explicit placement and usage of weapons in outer space, while militarization refers to any development that is meant for military gain. This means that the use of satellites or other outer space methods for activities such as missile guiding, reconnaissance imagery, or communications eavesdropping would count as militarization. This is often a more subtle and hard to regulate topic than weaponization. It is obvious that the complete ban of militarization would be highly unhelpful, as for example, the lack of satellite assisted missile guidance would mean less accurate missiles, which could lead to great civilian collateral damage. But on the other hand, one cannot fully allow the militarization without restrictions, as the line that delineates what exactly constitutes a weapon becomes fuzzy, as mentioned in examples previously. Thus, delegates will have to walk this fine line to both allow enough freedom for militarization such that the possible negative effects such as collateral damage will be minimized, while ensuring that the weaponization of outer space does not get out of hand.

Past United Nations and International Action

Outer Space Treaty

Entering into force in 1967, the Outer Space Treaty was the first of its kind, and subsequently formed the basis of international space law. The treaty, in short, prohibits the placement of any weapons of mass destruction in outer space, whether it be in orbit or on the moon or any celestial body.[27] The treaty explicitly forbids any sort of claim of sovereignty over any portion of outer space, and that the exploration of space shall be done for the benefit of all nations. It also prohibits the militarization of the moon and other celestial bodies, but note that the militarization of outer space itself is not illegal.[26] Furthermore, the treaty also fails to prohibit the placement of conventional weapons in outer space. This could be a potential issue, as weapons with high destructive power but not classified as weapons of mass destruction, such as kinetic bombardment, can still be legally placed in space.[26] The treaty also fails to prohibit missile-bourne ground or sea based WMDs. With 107 parties to the treaty and a further 23 nations that have signed but not ratified the treaty, this treaty is essential in limiting a large portion of the militarization of outer space.[26] However, its shortcomings, as described above, point towards many issues that can be and should be improved upon to ensure that the militarization of outer space is regulated.

Other Treaties

Besides the Outer Space Treaty, there have not been many pertinent treaties or agreements that deal specifically with weapons in outer space. The Partial Nuclear Test Ban Treaty prohibits the testing and explosions of nuclear weapons in outer space, but does not touch upon the legality of conventional weapons.[28] Though there have seen efforts by nations such as the U.S.S.R. and China to pass resolutions and propose treaties that would prohibit the placement of any type of weapon in outer space, those efforts have been met with strong opposition by certain countries as the U.S.[26] This points to aspects of those proposals that can certainly be improved upon in order to ensure ratification to help facilitate the development of outer space as a peaceful area safe from foreign threat and harm.

[27] International Legal Agreements Relevant to Space Weapons. Union of Concerned Scientists. 2004. Retrieved from: https://www.ucsusa.org/nuclear-weapons/space-weapons/international-legal-agreements#.W0UqldJKg2w

[28] Treaty Banning Nuclear Tests in the Atmosphere, in Outer Space, and Under Water (Partial Test Ban Treaty) (PTBT). Nuclear Threat Initiative. 2011. Retrieved from: http://www.nti.org/learn/treaties-and-regimes/treaty-banning-nuclear-test-atmosphere-outer-space-and-under-water-partial-test-ban-treaty-ptbt/

Questions a Resolution Must Address

1. *Is the complete prohibition of any weapon in outer space the optimal solution to maintaining a peaceful outer space?*
   Core to this discussion is the legality of weapons in outer space. Is the safest option a complete prohibition of weapons, or does that entice a third party to take advantage of a defenseless satellite system and create widespread damage?

2. *If weapons are not completely prohibited, where do we draw the line, and how do we incentivise countries as to not partake in a arms race?*
   Initial efforts to limit weapons in outer space were attempts to stop an arms race. However, with advancing technologies from countries from all over the world, more countries are capable of sending weapons to space. Thus, certain countries may feel threatened, sending more weapons into space, thus launching a space race.

3. *Should restrictions for sub-orbital weapons or earth/sea-based space capable weapons exist?*
   Though there are no weapons of mass destruction stationed in space, the Outer Space Treaty does not prohibit any WMDs that are launchable from earth and/or the sea and are capable of reaching outer space. This means that these technologies threaten the peace and WMD-free zone of outer space. Should there be restriction placed on these to preserve the safety of outer space? If so, what kind?

4. *Will satellite assisted military technologies still be completed unregulated?*
   Though not acting directly as weapons, satellites are capable of assisting them on earth. This gives nations an unfair advantage in the case of war, violating the principle of proportionality in certain cases. Furthermore, the distinction between and aid to a weapon and a weapon itself may become fuzzy, hence needing clarification.

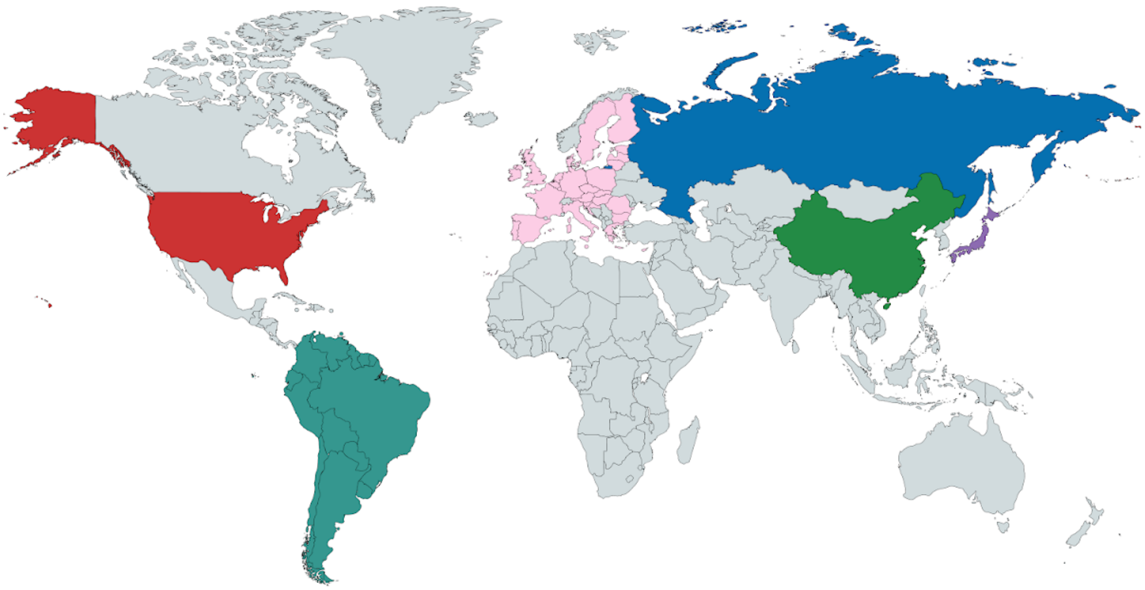
5. *Can there be a line drawn between what can be considered as a weapon in this context?*
   The Outer Space Treaty bans Weapons of Mass Destruction, but previously described weapons have the capability of widespread damage, yet do not fall under this categorization. Is it time to reform this definition in this context? Furthermore, what differentiates a tool from a weapon? Is it the destructive capability? Is it intention?.

6. *How can a balance be struck between the regulation of weapons and their intention?*
   Is there some way where we can guarantee that certain potential weapons, such as space debris clearing lasers, will only be used for peaceful purposes as they are officially meant to be? Is there an incentive, or is the only way a complete ban of everything that can potentially become a weapon?

7. *How can the committee ensure that nations will feel safe enough that they will agree with and ratify the actions of the resolutions?*
   Certain nations, are against the complete ban of weapons in outer space because of the potential threat that other nations or organizations may have towards U.S. satellites, which would be defenseless otherwise. Hence the resolution has to in some way reassure the safety of space even without weapons in order to placate these nations.

8. *How can weapons testing be regulated to minimize space debris and the danger it poses to satellites and other spacecraft in orbit?*
   Weapons testing, such as the 2007 Chinese testing of ASAT technologies, create large amount of space debris which may pose as great dangers to spacecraft, endangering lives. Hence these will need to be regulated to ensure that space remains as safe.

Bloc Positions



● *United States of America*

The U.S. has held the leading position in space militarization ever since the concept became a reality. With Air Force Space Command created by Ronald Reagan in 1982, and the "Star Wars" program and its successor pushed by George W. Bush focusing on anti-ICBM technology, the U.S. has always made the agenda of moving towards the militarization of outer space clear.[29] Even today, under the Trump administration, novel technologies are being developed to ensure that the nation can take advantage of the resource. To quote the president, "It is not enough to have American presence in space we must have American dominance".[28] The U.S. has also further delineated its stance by refusing to enter into discussion over a proposed new treaty to prevent an arms race in space.

● *Russian Federation*

Though Russia drafted a working paper to prohibit all weapons from being placed in space, it has realized that military advantage lies in the militarisation of outer space.[30] Russia still maintains an anti-militarisation stance, with the head of the Russian Parliament's Upper House Committee on Defense and Security saying that the militarization of outer space is a "path to disaster".[31] However, Russia has also made it clear that it will push through with the militarization and weaponization of space if it perceives a threat from other nations, particularly the U.S. Furthermore, Russia certainly has the capability, with Russian defense officials acknowledging deployment of radar-imagery jammers, laser weapons designed to blind U.S. intelligence and ballistic missile defense satellites, and anti satellite technology.[32]

[29] Oduntan, G. Donald Trump's space force: the dangerous militarisation of outer space. The Conversation. 2018. Retrieved from: https://theconversation.com/donald-trumps-space-force-the-dangerous-militarisation-of-outer-space-98588

[30] Proposed Prevention of an Armas Race in Space Treaty. Nuclear Threat Initiative. 2007. Retrieved: http://www.nti.org/learn/treaties-and-regimes/proposed-prevention-arms-race-space-paros-treaty/

[31] Daniels, J. Space arms race as Russia, China emerge as "rapidly growing threats" to US. CNBC. Retrieved from: https://www.cnbc.com/2017/03/29/space-arms-race-as-russia-china-emerge-as-rapidly-growing-threats-to-us.html

[32] Haltiwanger, J. Russia is now talking tough with its Space Force response. Business Insider. 2018. Retrieved From: https://www.wearethemighty.com/russia-tough-space-force-response

● *The People's Republic of China*

Though not one of the major players in the space race, China's rising technological prowess has made it a formidable force in the militarization of space. Although China was initially against the development of weapons in space, its president, Xi Jinping, spoke to astronauts at the launch of the Shenzhou X manned mission in 2013 that China would take bigger steps in space exploration in pursuit of its "space dream," and its continued development in those areas have helped facilitate this notion.[33] China recognizes that the biggest threat in space as of now is the U.S., and focuses its technologies on the U.S.'s overreliance on satellite technology by developing anti-satellite (ASAT) missiles, as demonstrated by the ASAT missile testing in 2007.

● *Union of South American Nations*

The Union of South American Nations (UNASUR) emphasizes the need to cooperate to make space a peaceful and safe environment. The nations agree with the Russian-Chinese revised proposal to prevent the placement of weapons of any kind in outer space. [31]

● *State of Japan*

Though Japan's national security and militarization is limited by restricted defensive options after WWII, its reliance on the Yoshida Doctrine, trust that Japan-US relations serve as sufficient security deterrent, negates any need.[34] However, recently Japan has begun efforts to move away from this doctrine, and instead focus on improving its own military, in addition to members of the Liberal Democratic Party (LDP) and New Komeito Party studying current space law and drafting the "Basic Space Bill in order to remove legal obstacles to advanced military space development, military management of space programs, and the exportation of some currently restricted space technologies".[35]

● *European Union*

The EU calls for greater international cooperation and set agreed standards of responsible behaviour for outer space conduct, which has been proposed to the UN. A representative of the EU claims that the nations are strongly committed to preventing an arms race in space, and iterates that "a new legally binding instrument on preventing the placement of weapons in outer space and on the threat of use of force against outer space objects would need to be comprehensive, effective and verifiable."[36]

[33] Vasani, H. How China Is Weaponizing Outer Space. The Diplomat. 2017. Retrieved from: https://thediplomat.com/2017/01/how-china-is-weaponizing-outer-space/

[34] Kallender, P; Hughes, C. Hiding in Plain Sight? Japan's Militarization of Space and Challenges to the Yoshida Doctrine. Journal of Asian Security. (2018) Retrieved from: https://www.tandfonline.com/doi/abs/10.1080/14799855.2018.1439017?journalCode=fasi20

[35] Japan's Space Law Revision: the Next Step Toward Re-Militarization?. Nuclear Threat Initiative. (2008) Retrieved from: http://www.nti.org/analysis/articles/japans-space-law-revision/

[36] Debating Proposals on Common Principles to Ensure Outer Space Security, First Committee Delegates Call for Adoption of Legally Binding Treaty. United Nations. GA/DIS/3557. (2016) Retrieved from: https://www.un.org/press/en/2016/gadis3557.doc.htm

Conclusion

Technology today has progressed to a point where leading engineers during the initial stages of the space race could only dream of. With ICBMs, anti-IBMs, spacecraft, and satellites, our lives have become very much entangled with dependent on technologies residing in outer space. However, with the great powers that are bestowed upon us by satellite technologies, there comes great responsibility, and potential threats that may try to wrestle those technologies away. The lack of regulation on conventional weapons placement, the need for self-protection of satellites due to over reliance, and extensive sub-orbital missile testing all pose significant threats to peace in outer space and may trigger an arms race.

Delegates will have to perform the difficult task of determining what actions are best to be taken, and what restrictions or regulations must be imposed on the militarization of outer space such that the peace and integrity of outer space as it has in the past been, will continue to be preserved. Delegates will have to minimize the potential for damage, harm, and distrust regarding outer space activities, while ensuring that they keep their nation's best interests at heart. Though the delegates are representing their own nation's interests, it is important to recognize that without compromise, no agreement will be achieved, and all of these efforts will be for naught. The delegates will need to consider all of their options and come to an agreement that will ensure the safety of outer space for generations to come.

■

Topic B:

Regulating Commercial Activity in Outer Space

Introduction

The commercial space industry is rapidly growing. In 2015 alone, $323 billion of economic activity centered around the private use of space.[37] The number of private launches doubled from 2016 to 2017.[38] Most commercial activity in space focuses on telecommunications satellites, but now private companies have become eager to launch new missions with other monetary incentives. New sections of the space industry include space tourism, asteroid mining, long-distance earth transportation in orbit, and transportation to other celestial bodies (once habitats arise).[39] The future of space as an industry has huge potential and will continue to rapidly grow as more companies enter the field and commercial opportunities appear. However, as opportunity grows, many questions remain about what regulation should be imposed regarding the commercialization of space. There are many players (countries, NGOs, and private entities) all looking for a piece of the new financial space race.

37 The Future of Space Commercialization. Joshua Hampson. 2017. Retrieved from: https://science.house.gov/sites/republicans.science.house.gov/files/documents/TheFutureofSpaceCommercializationFinal.pdf
38 The decline of commercial space launch costs. Bill Beyer. Retrieved from: https://www2.deloitte.com/us/en/pages/public-sector/articles/commercial-space-launch-cost.html
39 Commercialisation of space: Opportunities and Challenges. Department of War Studies, King's College London. 2013. Retrieved from: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=16&ved=2ahUKEwiVyqyGgvvdAhXwY98KHUnXBDkQFjAPegQIABAC&url=https%3A%2F%2Fwww.mcgill.ca%2Fiasl%2Ffiles%2Fiasl%2F2013-01-2425_space_commercialisation_background_paper.doc&usg=AOvVaw057wmaAtyqwGaL6gAoeTNy

Historical Background

The history of the commercialization of space begins in the 1960's in the United States, which was the first country to actively encourage such private exploration. Since the beginning in the 1990's, companies from many other countries have appeared, greatly increasing the possibilities and outreach of the private space industry.

The first commercial satellite, Telstar 1, was launched for AT&T on July 10, 1962, and was developed by Bell Telephone Laboratories for telecommunications purposes. It amazed the world by transferring television broadcasts between centers in the United States and France, which had huge microwave antenna to track the satellite. While only in orbit for several months due to electronic failure from radiation, Telstar 1 demonstrated the feasibility of private space vehicles.[40]

Sparked by the successful example of a commercial satellite, US President Kennedy signed into law the Communications Satellite Act only a few months later. The act, which was the first governmental recognition of commercial space operations, established regulations for private satellite operations for companies in the United States.[41] Subsequent US presidents continued such a legacy, stressing the importance of and

40 The Day Information Went Global. NASA. 2018. Retrieved from: https://www.nasa.gov/topics/technology/features/telstar.html
41 Communications Satellite Act Signed. NASA. 2017. Retrieved from: https://www.nasa.gov/directorates/heo/scan/images/history/August1962_2.html

providing incentives for the commercialization of space for United States companies.[42] Such freedom for private space exploration allowed for American company Space Services Inc. to successfully launch the first private rocket into space in 1989.[43]

In 1992, Russian company TsSKB-Progress launched the first private orbital mission, which landed six days later. It was a goodwill mission after the collapse of the Soviet Union, with the capsule carrying gifts such as peace letters and Russian products.[44] The first private space station visit was conducted by Russian company MirCorp in 2000. Soon after, Russian company Space Adventures flew American businessman Dennis Tito to the International Space Station. Some say that "if the era of commercial spaceflight has a birthday, it's April 28, 2001," the day the first space tourist launched from the Star City complex outside of Moscow. Although the mission occurred without any problems, it was conducted against the recommendations of space agencies from the United States, Canada, Europe, and Japan.[45]

The first successful private lunar probe flyby was conducted by Luxembourg company LuxSpace in 2014, carried by the Chinese rocket Chang'e 5-T1. The spacecraft weighed 10 kilograms and took only 6 months and $500,000 to develop, providing an example of a private "mission in quicker time and lower cost."[46] In Mid-2017, Luxembourg was the first European country to enact a law granting companies the right to resources which they extract from space. Such an act fuels the prospect of space mining and its lucrative returns, and is part of Luxembourg's ambitious initiative to "boost exploration and the commercial utilization of resources."[47]

Figure 6: The first space tourist, Dennis Tito[48]

Most space activity in Europe has typically been facilitated through the European Space Agency (ESA), but larger companies have begun to form over the past few decades. Starting in the 1980's, Arianespace became the first private launch service provider in the world, and still continues today, with a total of 550 satellites launched to date.[49]

China and India's commercial space markets are both limited due to stricter government policies and control over the nation's space programs. India's national space administration, the Indian Space Research Organization (ISRO), created the

[42] Commercial Market Outreach Plan for the International Space Station. Equals Three Communications and Booz Allen Hamilton. 2002. Retrieved from: https://www.hq.nasa.gov/office/hqlibrary/documents/o49797051.pdf

[43] The launch of Conestoga 1. Space Services Inc of America. 2014. Retrieved from: http://www.spaceservicesinc.com/conestoga-1

[44] From Russia, With Love: 'Peace Rocket' Heads to U.S. : Space Craft is slated to splash down off Washington state with cargo of goodwill items. Associated Press. 1992. Retrieved from: http://articles.latimes.com/1992-11-16/news/mn-496_1_washington-state

[45] First Space Tourist: How a U.S. Millionaire Bought a Ticket to Orbit. Mike Wall. 2011. Retrieved from: https://www.space.com/11492-space-tourism-pioneer-dennis-tito.html

[46] First commercial mission to the moon launched from China. Stephen Clark. 2014. Retrieved from: https://spaceflightnow.com/2014/10/25/first-commercial-mission-to-the-moon-launched- from-china/

[47] Luxembourg becomes first European country to pass space mining law. Cecilia Jamasmie. 2017. Retrieved from: http://www.mining.com/luxembourg-becomes-first-european-country-pass-space-mining-law/

[48] Dennis Tito. Mark Jefferson. 2018. Retrieved from: http://www.spaceadventures.com/dennis-tito-2/

[49] Arianespace Company Profile. 2017. Retrieved from: http://www.arianespace.com/wp-content/uploads/2017/04/Company-profile-May-2017.pdf

government company Antrix Corporation Limited in the 1990's to pursue commercialization of space programs. India generally only allows the launch of private communications satellites, rather than other space vehicles. Lack of legal regulations and launch freedoms in the country have slowed commercialization progress.[50] Similarly, the space industry in China is dominated by the China Aerospace Science and Technology Corporation (CASC), a state run and profitable institution. The largest private space operation is China Spacesat Co., a micro-satellite company listed on the Shanghai Stock Exchange. However, CASC still holds 51% ownership in the company.[51]

Other large corporations involved in the commercial space market include Boeing, Lockheed Martin, Raytheon, Safran, Thales, Airbus, and Northrop Grumman, which typically take on government contracts. With aerospace budgets increasing worldwide, it is difficult to find a space project that does not involve one of these main contractors. United Launch Alliance (ULA), a joint venture between Lockheed Martin and Boeing, provides private launch services. Since its formation in 2006, ULA had a monopoly on many US military launches and private contracts worldwide, but its expanse has since decreased.[52]

Beginning in the 2000s, the term NewSpace arose, referring to the increased private capital and global interest in the commercialization of space. While it often headlines the news, some say that NewSpace is "more of a philosophy than a physical reality."[53]

Figure 7: ULA Atlas V Rocket Launch[54]

Much of the current activity around private space ventures stems from the "Billionaire Space Race," reminiscent of the US-Soviet space race. Some of the most notable parties include: Canadian/South African/American Elon Musk of SpaceX, American Jeff Bezos of Blue Origin, British Richard Branson of Virgin Galactic, Russian Yuri Milner of the Breakthrough Starshot Project, and American Paul Allen of Vulcan Aerospace.[55]

Several of such companies have set precedents of their own. In September of 2008, American company SpaceX went from being a startup to a "company chartered to revolutionize space travel," when they launched Falcon 1 into orbit. After multiple failed attempts, SpaceX became the first private company to successfully launch a liquid-fueled rocket. Only two years later, they became the first private company to recover a spacecraft from orbit.[56] American company Blue

[50] Dynamics of the Indian Space Program. Eligar Sadeh. 2016. Retrieved from: https://www.tandfonline.com /doi/full/10.1080/14777622.2016.1246340

[51] Made in China 2.0: State-led Commercialization of China's Space Industry. Muyang Chen. 2016. Retrieved from: https://jsis.washington.edu/eacenter/2016/04/07/made-china-2-0- state-led-commercialization-chinas-space-industry/

[52] SpaceX breaks Boeing-Lockheed monopoly on military space launches. Irene Klotz. 2016. Retrieved from: https://www.reuters.com/article/us-space-spacex-launch-idUSKCN0XO2TC

[53] Blue Origin just validated the new space movement. Eric Berger. 2016. Retrieved from: https://arstechnica.com/science/2016/10/blue-origin-just-validated-the-new-space-movement/

[54] ULA Atlas V - AEHF 4 - Rocket Launch. 2018. Retrieved from: http://www.visitspacecoast.com/ event/ula-atlas-v-aehf-4-rocket-launch/21290/

[55] The great billionaire space race. Charles Luzier. 2016. Retrieved from: http://theweek.com/ articles/648995/great-billionaire-space-race

[56] SpaceX becomes first private firm to launch craft to space station. AFP. 2012. Retrieved from:

Origin launched and landed a rocket off of their New Shepard launch system, becoming the first ever successful Vertical Takeoff, Vertical Landing (VTVL) from space. Only four months later, in January of 2016, they reused the same rocket.[57] SpaceX followed closely behind, completing the exact same achievement a year later.[58]

Figure 8: Blue Origin's VTVL
New Shepard Launch System[59]

The achievement of landing and launching a rocket is especially important when considering the cost per pound to enter orbit. A crucial way to decreasing launch price is to use reusable rockets, saving millions of dollars each launch.[60] This is an important focus of NewSpace companies, in addition to governmental space organizations. The overall price of each launch is rapidly decreasing, resulting in a higher availability of space vehicle flights for more purposes. Lower prices have resulted from scientific advances as well as high competition in the market, pushing for cheaper options. For example, SpaceX launches are between forty to sixty percent lower in price than their competitors, giving them a huge edge for marketing relatively inexpensive flights.[61] However, prices can still go down. In early 2018, a company called Rocket Lab launched their second Electron Rocket, which is about the weight of a small car and costs $5 million per launch, compared to $62 million for SpaceX's Falcon 9 rocket.[62] In 2018, the price to send one pound into orbit was between $9,000 to $40,000, depending on the space vehicle's size and reusability. Private companies and governmental space agencies are all trying to decrease this threshold, possibly to the hundreds of dollars per pound range within 25 years.[63]

Contemporary Conditions

Current Issues

One of the main issues concerning the future of the commercialization of outer space is nation's differing opinions on how much responsibility private companies should be granted beyond Earth. Profit driven companies have greatly progressed human expansion into outer space, especially in the past few years, but allowing them to continue to do so in the future means less government control over their actions. Limited regulations can lead

https://www.telegraph.co.uk/news/science/space/9281509/SpaceX-becomes-first-private-firm-to-launch-craft-to-space-station.html

[57] Blue Origin re-flies New Shepard used on Nov. 2015 flight. Jason Rhian. 2016. Retrieved from: http://www.spaceflightinsider.com/missions/commercial/blue-origin-re-flies-new-shepard/

[58] SpaceX conducts historic Falcon 9 re-flight with SES-10 – Lands booster again. William Graham. 2017. Retrieved from: https://www.nasaspaceflight.com/2017/03/spacex-historic-falcon-9-re-flight-ses-10/

[59] Blue Origin says its New Shepard passengers will get first dibs on New Glenn tickets. Loren Grush. 2016. Retrieved from: https://www.theverge.com/2016/10/5/13175240/blue-origin-new-shepard-astronauts-new-glenn-ticket-priority

[60] Commercialization of Space: 4 Predictions for the 21st-Century Gold Rush. Andrew Anagnost. 2017. Retrieved from: https://www.autodesk.com/redshift/commercialization-of-space/

[61] The decline of commercial space launch costs. Bill Beyer. Retrieved from: https://www2.deloitte.com/us/en/pages/public-sector/articles/commercial-space-launch-cost.html

[62] Here's How Much It Costs for Elon Musk to Launch a SpaceX Rocket. Brad Tuttle. 2018. Retrieved from: http://time.com/money/5135565/elon-musk-falcon-heavy-rocket-launch-cost/

[63] Here's how much money it actually costs to launch stuff into space. Sarah Kramer and Dave Mosher. 2016. Retrieved from: https://www.businessinsider.com/spacex-rocket-cargo-price-by-weight-2016-6

to more accidents and the possibility of the loss of life, as well as disagreements on territorial and resource claims. However, the venture capital approach of the "Billionaire Space Race" has fueled innovation for the new space race as well as decreased barriers to entry for smaller companies.[64] Moving forward, nations must agree on the role that private companies will play in the exploration of outer space, as well as their interactions with governments and the United Nations.

SpaceX

Elon Musk founded SpaceX in 2002, aspiring to colonize Mars and reduce space transportation costs. In 2008, SpaceX became the first privately funded company to send a payload into space. NASA awarded SpaceX with a contract in 2008 to launch unmanned cargo rockets to the International Space Station (ISS). In 2010, SpaceX became the first private company to launch a payload into space and return it to Earth. In 2011, NASA gave SpaceX another contract that would enable SpaceX to develop a rocket that could transport astronauts to the ISS and return them to Earth. On December 21, 2015, Space launched the Falcon 9 rocket, and, notably, recovered the first stage of the Falcon 9 rocket as it landed upright, on its own accord, indicating the reusability of the rocket's stages. Although SpaceX endeavors to make its systems crew compatible, there have been a few recent mishaps, as in June 2017, when a cargo rocket exploded before it arrived to the ISS. However, SpaceX rebounded in December 2018, after successfully launching a payload of satellites using the Falcon 9.

Virgin Galactic

Virgin Galactic, founded by Sir Richard Branson, aims to develop commercial spacecraft with fast turnaround that provide a logistical solution to space tourism. Due to a major setback on October 31, 2014, when its Enterprise spacecraft underwent a fatal crash, Virgin Galactic vigilantly employed a gradual approach in testing its new Unity spacecraft. On May 29, 2018, the Unity spacecraft made just the second Virgin Galactic powered flight since the Enterprise accident. After the successful launch and return of the Unity spacecraft, Branson claimed that his company is only a few flights away before it can construct a spacecraft that can provide suborbital space flights. In making space tourism a lucrative business, Virgin Galactic aspires to enable rapid reuse of its spacecraft. The second launch of the Unity spacecraft occurred only fifty-four days after its first launch. Virgin Galactic is in direct competition with Jeff Bezos-owned Blue Origin. Bezos hopes to employ the same venture as fellow billionaire Branson, in creating a model in which spacecraft reusability could potentially vastly reduce the costs of space tourism.

Space Mining

Space mining will be crucial to the progress of commercial space programs and manned space exploration of planetary bodies, such as Mars. As commercial and other space missions face a surge in popularity, terrestrial resources central to the space industry's operation may be depleted, thus increasing the need for space mining. In 2015, the United States government passed the Commercial Space Launch Competitiveness Act (SPACE Act), allowing American companies to commercially explore and harvest space resources. Due to government initiatives, like the SPACE Act, a rising number of

[64] Opportunities and challenges in commercializing space privately. Qasim Mohammed. 2016. Retrieved from: techcrunch.com/2016/09/09/opportunities-and-challenges-in-commercializing-space-privately/

space mining missions, and growing investments in space mining companies, the space mining industry's value is expected to skyrocket from its current 0.65 billion dollar valuation to a 2.84 billion dollar valuation by 2025. Private companies, like Planetary Resources and Deep Space Industries, have focused on the problem of refueling spacecraft that explore parts of space far from Earth. Specifically, these private companies hope to build refueling stations in space that would allow for spacecraft to make longer missions without carrying as much fuel from Earth, thus dramatically reducing costs of launches. Some have criticized the boons that the Space Act has dealt to American companies. While the Space Act allows private companies to explore space without having to navigate through government regulations, some believe that the act violates the US's international obligations to commercial space, outlined in the Outer Space Treaty of 1967 and the Moon Agreement of 1979.

Past United Nations and International Action

After COPOUS was permanently established in the late 1950's, it worked to create the "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," which is also called the 1967 Outer Space Treaty[65]. The treaty entered into force on October 10, 1967 and now currently has 107 country signatures.[66] Although most of the agreement applies to governmental space agencies, Article VI focuses on the commercialization of space through private entities. It states:

> *"...The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization."*[67]

There are no other UN mentions or regulations on the private exploration of space, beyond detailing the responsibility of State Parties for actions of non-governmental organizations. Although there are other principles and minor treaties in place created by COPOUS, none yet relate to the commercialization of space.[68]

The most recent developments occurred during the UNISPACE+50 conference in Vienna, Austria in June of 2018. During the High-Level Segment, more than 100 member states drafted a working resolution to increase cooperation in the peaceful use of outer space. The resolution will be voted on later this year in the United Nations General Assembly.[69] Among the broad range of topics discussed to promote peace in space, the committee noted the importance of

[65] Who Owns the Moon? | Space Law & Outer Space Treaties. Elizabeth Howell. 2017. Retrieved from: https://www.space.com/33440-space-law.html

[66] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. UNODA. 2018. Retrieved from: http://disarmament.un.org/treaties/t/outer_space

[67] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies. US Department of State. Retrieved from: https://www.state.gov/t/isn/5181.htm

[68] Who Owns the Moon? | Space Law & Outer Space Treaties. Elizabeth Howell. 2017. Retrieved from: https://www.space.com/33440-space-law.html

[69] UNISPACE+50 concludes with global commitment to cooperate in space and use space for sustainable development. United Nations Office for Outer Space Affairs. 2018. Retrieved from: http://www.unoosa.org/oosa/en/informationfor/media/2018-unis-os-499.html

"non-governmental organizations and their contribution to its endeavours to promote the development, strengthening and furtherance of understanding of international space law," as well as the importance of information sharing between private space entities.[70] Delegates must address the need for a comprehensive resolution on the exploitation and use of space resources. Many questions remain as to how a UN resolution may regulate the commercialization of space.

[70] A/73/20. United Nations Office for Outer Space Affairs. 2018. Retrieved from: http://www.unoosa.org/oosa/oosadoc/data/documents/2018/a/a7320_0.html

Questions a Resolution Must Address

1. *Would prohibiting commercial space activities be the optimal solution guaranteeing public safety?*
   Paramount to this discussion is the discretion given to determining the value of human curiosity and space exploration. Will government policies be able to restrict the zeal of private companies in meeting certain safety guidelines prior to implementation of technologies for public consumption?

2. *What restrictions can the international community place on commercial space endeavours in order to espouse the facilitation of space exploration while mitigating potential risks to public safety?*
   Assuming that the international community believes that commercial space activities should not be prohibited altogether, certain guidelines must be constructed and previous laws updated in light of the risks of new technologies and ventures.

3. *Should the international community respond legislatively to the Commercial Space Launch Competitiveness Act of 2015?*
   The Commercial Space Launch Competitiveness Act of 2015 seems to afford the United States an act of sovereignty in recognizing ownership of space resources. Does this legislation defiantly oppose and violate the guidelines set forth by the Outer Space Treaty?

4. *How can a balance be struck between private sector interests and government regulations?*
   Internationally, the easing of government regulations has spurred private companies in several nations to ardently pursue commercial space ventures and exploration. Are government regulations that minimize public safety risks of non-interventional policy while maximizing private interests a feasible undertaking.

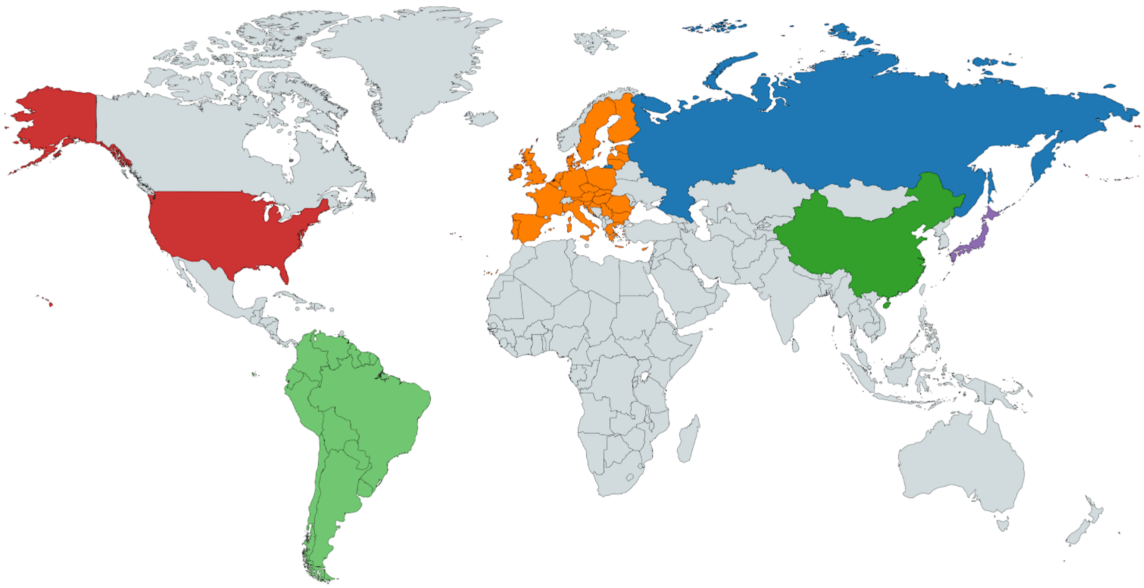
5. *How can the committee ensure that nations will agree with international commercial space legislation?*
   There is an inherent risk in privatizing commercial space exploration as profit-motivated companies may attempt to influence legislation and afford their respective nations an advantage in a global commercial "space race."

6. *How can commercial space exploration and testing of commercial vessels be regulated to ensure the minimization of space debris?*
   Commercial vessel testing may create space debris which can pose a threat to other exploratory or commercial spacecraft. Minimizing this danger will ensure that public safety and commercial interests are secured.

7. *How can we ensure that commercial spacecraft tests are adequate and ensure the passenger safety?*
   It may be necessary to update commercial flight legislation in ensuring that both the spacecraft and its passengers can withstand the demands of space travel.

8. *Should additional restrictions be placed on companies that are given government regulated flight contracts?*
   SpaceX was given NASA contracts to take over some capacities that NASA was in charge of. Should these kinds of ventures be specially regulated to ensure the mitigation of grey areas where private or commercial ventures are substituted for governmental ventures?

Bloc Positions



● *United States of America*

The US has been devoted to remaining at the forefront of space exploration. Since the Outer Space Treaty, the US has been committed to espousing the international standards of space exploration and adopting approaches to responsibly seek activities in space, such as space travel and space mining. With the recent passage of the Commercial Space Launch Competitiveness Act, private American companies are encouraged to pursue the commercial exploration and exploitation of space resources. Impressed by the successful launch of privately-owned spacecraft, such as SpaceX’s Falcon rocket, the Trump administration supports current progress in the U.S. commercial space industry.

● *Russian Federation*

Since the inception of its space program, Russia, known for launching the first satellite, Sputnik 1, into space, has remained primarily focused on space militarization. The US-Soviet space race, though grounded in militaristic and political purposes, galvanized US space activities and space exploration. The same, however, cannot be said for Russia, whose share of the commercial launch market is being slowly eroded by private ventures in the US that have introduced more cost-effective spacecraft launches. Russia’s chief spaceflight official, Deputy Prime Minister Dmitry Rogozin, made clear Russia’s intentions to avoid commercial space activities, as the low stakes are not “worth the effort to try to elbow [Elon] Musk and China aside.”

● *People's Republic of China*

China aspires to become a major player in the commercial space market, one day competing directly with US companies, like SpaceX. Due in part to the relaxing of Chinese government policies in 2014 to encourage movement of private companies into the space industry, China's commercial space market is expected to rocket to $120 billion by 2020. In fact, Wu Yanhua, the deputy chief of the National Space Administration expects China to be a global space power by 2030.

● *Union of South American Countries*

While the space programs of several Latin American countries have been established for a while, they are far behind the programs found in the US, Europe, and Russia. During a defense meeting of the Union of South American Nations (UNASUR) in 2011, members decided to prioritize the creating of a South American space agency, in the hopes that collaboration through UNASUR would reduce the costs of space projects. However, this collaboration would likely be more for space militarization efforts as opposed to commercial activities.

● *State of Japan*

Although Japan lacks the public demand to remain globally competitive, in 2017, the Japanese government published the Space Industry Vision 2030, which sets forth the goal of doubling the size of the Japanese space industry by 2030. Similar to the US and China, Japan relaxed government regulations, allowing private companies to move into a space industry once primarily occupied by government-owned systems.

● *European Union*

While the European Union firmly backs "a coherent and stable regulatory framework for the service and manufacturing of space applications in Europe and exploiting the internal market and job-creating potential of space," the EU will likely leave all commercial space activities to the European Space Agency.

Conclusion

Due to a recent loosening of government regulations by a few of the global space powers, private companies are increasingly permitted to move into a space industry that was once primarily occupied by government-owned systems. Most notably, companies like SpaceX are accelerating to a future where private space travel and exploration is the norm. Indeed, with such a strong force in the private sector threatening to impose directly on public interests, there is a great need for some regulation of the burgeoning commercial space industry.

Delegates will have to perform the challenging task of determining what commercial activities should be permitted, and what regulations should be imposed on the commercialization of outer space. Delegates will have to ensure that they minimize public risk regarding outer space activities, while ensuring that they maximize their nation's interests with respect to the commercialization of space activities. The delegates will need to consider all of their options and come to an agreement that will ensure safe, viable, and progressive exploration of outer space for generations to come.

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