

**Committee:** Legal Committee (GA6)

**Issue:** Formulating an international legal framework for the operation of privately owned corporations in outer space

**Student Officer:** Leandros Bremer

**Position:** Co-Chair

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## PERSONAL INTRODUCTION

Dear Delegates,

My name is Leandros Bremer, I am 16 years old, and I attend the 11<sup>th</sup> grade at the German School of Athens. I have the honor of serving as one of the Co-Chairs of the Legal Committee (GA6) at the 7<sup>th</sup> ACGMUN Conference. This will be my third time chairing at an MUN conference, and I am extremely grateful for this opportunity.

To begin with, I would like to congratulate you on your forthcoming participation in ACGMUN, and thus urge you to prepare well and enjoy the debate process of the conference. This conference is an outstanding opportunity to expand your knowledge and experience while having an unforgettable three days, so I advise you to make the most of it.

This study guide provides you with an insight into the subject of formulating an international legal framework for the operation of privately owned corporations in outer space. Nevertheless, further research will be necessary for you to be fully prepared. It is necessary that you familiarize yourself with your country's policies and the rules of procedure. If any questions on this topic, or anything else regarding the conference arise, please feel free to contact me via my email at [leandros.bremer@gmail.com](mailto:leandros.bremer@gmail.com).

I look forward to meeting you all!

Kind regards,

Leandros Bremer

## TOPIC INTRODUCTION

Operation in space was long dominated by government-run organizations and highly trained astronauts and cosmonauts. It seems that in the last few decades, privately owned corporations have taken over and made space travel accessible to the broader population. These companies seek to generate profit through resource mining, satellite communication, space exploration, or space tourism. This commercialization of outer space certainly brings financial and innovative opportunities, but its environmental and societal effects and concerns should not be overlooked.

Environmental concerns include rocket launch emissions or the risk of pollution of our earth's orbit by space debris; space travel could fuel social injustices, as it will more than likely be reserved for those with the financial means to access it. This is why establishing an extensive international legal framework that regulates these businesses' procedures in the vast dominion of space is essential. This pressing matter brings up complex issues related to property rights, legal responsibility, environmental issues, and the fine line that must be drawn between promoting innovation and upholding international security.

The competitive commercialization of outer space by private corporations draws many parallels to the race to outer space the world experienced during the Cold War. This potential threat to our international community is not mentioned or covered in any legally binding treaty, which again underlines the need for such a legal framework.

Creating an international legal framework is crucial to ensuring ethical and environment-friendly business operations in space while resolving the many issues that arise from the commercialization of space travel. This way it will be able to both guarantee sustainability in outer space practices and attempt to combat societal inequity, which connects to the conference's theme of reaching net-zero.

## DEFINITION OF KEY TERMS

### Climate Change

"Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. But since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas."<sup>1</sup>

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<sup>1</sup> ---. "What Is Climate Change?" *Climate Action*, United Nations, 2023, [www.un.org/en/climatechange/what-is-climate-change](http://www.un.org/en/climatechange/what-is-climate-change).

### Commercialization

“The condition of being focused on the profitable aspects of something, especially to excess.”<sup>2</sup>

### Ozone Layers

“The ozone layer is one layer of the stratosphere, the second layer of Earth’s atmosphere.”<sup>3</sup>

### Privately owned Corporation

“A corporation whose shares and related rights or obligations are not offered for public subscription or publicly negotiated in the respective listed markets but rather the company's stock is offered, owned, traded, exchanged privately.”<sup>4</sup>

### Space Tourism

“Segment of the aviation industry that seeks to give tourists the ability to become astronauts and experience space travel for recreational, leisure, or business purposes.”<sup>5</sup>

### Sustainability

“Meeting the needs of the present without compromising the ability of future generations to meet their own needs.”<sup>6</sup>

## BACKGROUND INFORMATION

### The Cold War and the Race for Outer Space

The Cold War was a period of political tension and military rivalry between the United States of America (USA) and its North Atlantic Treaty Organization (NATO) allies on one side and the Union of Soviet Socialist Republics (USSR) and its allies on the other. It lasted from 1947 to 1991.<sup>7</sup> Science and technology were two areas where

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<sup>2</sup> “Definition of Commercialize | Dictionary.com.” *Www.dictionary.com*, [www.dictionary.com/browse/commercialization](http://www.dictionary.com/browse/commercialization).

<sup>3</sup> National Geographic. “Ozone Layer | National Geographic Society.” *Education.nationalgeographic.org*, 22 Nov. 2022, [education.nationalgeographic.org/resource/ozone-layer/](http://education.nationalgeographic.org/resource/ozone-layer/).

<sup>4</sup> Tuovila, Alicia. “Privately Owned.” *Investopedia*, 27 Oct. 2021, [www.investopedia.com/terms/p/privately-owned.asp](http://www.investopedia.com/terms/p/privately-owned.asp).

<sup>5</sup> “Space Tourism - an Overview | ScienceDirect Topics.” *Www.sciencedirect.com*, [www.sciencedirect.com/topics/social-sciences/space-tourism](http://www.sciencedirect.com/topics/social-sciences/space-tourism).

<sup>6</sup> McGill. “What Is Sustainability?” University of Alberta, 2013. [www.mcgill.ca/sustainability/files/sustainability/what-is-sustainability.pdf](http://www.mcgill.ca/sustainability/files/sustainability/what-is-sustainability.pdf)

<sup>7</sup> Britannica. “Cold War | Causes, Facts, & Summary.” *Encyclopædia Britannica*, 2018, [www.britannica.com/event/Cold-War](http://www.britannica.com/event/Cold-War).

competition was heightened by this ideological and geopolitical conflict, with space being a main staging ground for either side to prove the superiority of their way of thinking.

The first artificial satellite to orbit the Earth, Sputnik 1, was launched by the Soviet Union on October 4, 1957, signaling the start of the space race.<sup>8</sup> This accomplishment not only proved the Soviet Union's technological advancements but also paved the way for more intense competition. In response, the USA created the National Aeronautics and Space Administration (NASA) in July 1958. The first human in space and the first man on the moon followed.<sup>9</sup>

In response to this race to outer space, the Outer Space Treaty was ratified by the United Nations in 1967, with several other relevant treaties added in the following years. It laid out guidelines for the peaceful exploration of outer space and to impede any militarization or colonization attempts in outer space. Thus, the issue of domination of space was solved. The challenge arising in our time is that private entities are not involved or mentioned in this treaty, which in turn means that the new phenomenon of the steady commercialization of space is taking place without any legal framework.

A new era began with the fall of the Berlin Wall in 1989 and the disintegration of the Soviet Union in 1991, which signaled the end of the Cold War. Though the space race was still driven by competition, international cooperation in space exploration grew, opening the door for cooperative projects like the International Space Station (ISS). This international cooperation has largely been transformed into public-private partnerships and collaborations between corporations and governmental organizations.

Modern space exploration has its roots in the Cold War era, which laid the groundwork for a rapid advancement in satellite technology, rocketry, and human spaceflight capabilities. The successes and difficulties of this era continue to have an impact on today's space activity as many parallels can be drawn between the space race between the USA and the Soviet Union charged by an ideological conflict and a new race to outer space, which is largely fueled by the prospect of profits.

As already established, the current commercialization of outer space and the contest between corporations it results in has a lot in common with the Race to outer space in the Cold War. Subsequently, similar to the Outer Space Treaty during the Cold War, a new and updated legal framework specifically concerning privately owned

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<sup>8</sup> Department Of State. The Office of Electronic Information, Bureau of Public Affairs. "The Launch of Sputnik, 1957." 2001-2009.State.gov, 18 Apr. 2008, 2001-2009.state.gov/r/pa/ho/time/lw/103729.htm#:~:text=On%20October%20%2C%201957%2C%20the.

<sup>9</sup> Uri, John. "65 Years Ago: The National Aeronautics and Space Act of 1958 Creates NASA - NASA." NASA.gov, 26 July 2023, www.nasa.gov/history/65-years-ago-the-national-aeronautics-and-space-act-of-1958-creates-nasa/#:~:text=President%20Eisenhower%20signed%20the%20National.

companies is of vital importance to safeguard international security and ensure peaceful, ethical, and sustainable practices in outer space.

### Commercialization of Outer Space

The commercialization of outer space has undergone a transformative shift in recent years, marked by a confluence of factors that have reshaped the dynamics of the space industry. Historically dominated by government space agencies, the landscape began to change with the emergence of private entities eager to explore the vast potential beyond Earth.

Key to this evolution has been the privatization of space activities, exemplified by companies like SpaceX, Virgin Galactic, and others. It is estimated that there are around 10,000 space-focused companies valued at about 4 trillion United States Dollars (USD).<sup>10</sup> These enterprises have not only demonstrated technological prowess but have also introduced a new type of efficiency with reusable technologies, significantly lowering the traditional barriers to entry.

The commercial satellite industry has played a pivotal role, providing essential services such as communication, Earth observation, and navigation. Satellites, once exclusively operated by governments, now serve diverse markets, including businesses and individuals, contributing to the flourishing commercial space sector.

The broader availability of satellites and the space industry as a whole sparks concerns about safety, privacy, and sustainability and thus, necessitates a comprehensive legal framework to regulate it. Space tourism has added another dimension to the transformation of the space sector; companies like Blue Origin and Virgin Galactic are pioneering suborbital flights for civilians, opening up a new market in space travel that was once the exclusive domain of professional astronauts. Furthermore, international collaboration has become a hallmark, with governments partnering with private companies in joint ventures. NASA's contracts with private entities for cargo resupply missions to the International Space Station exemplify this collaborative approach, fostering a synergy between public and private interests. Moreover, new markets have emerged, promising additional avenues for commercial space exploration; concepts like asteroid mining and lunar exploration are being explored, offering the potential for extracting valuable resources from celestial bodies. As these new practices are not covered or dealt with in any international legal guidelines, dangers concerning sustainability arise.

In conclusion, the international community needs to work together to ensure that through legally binding regulations, issues concerning sustainability, ethics, and equality are addressed and prioritized in this swiftly evolving and developing market of outer space.

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<sup>10</sup> Koetsier, John. "Space Inc: 10,000 Companies, \$4T Value ... And 52% American." Forbes, [www.forbes.com/sites/johnkoetsier/2021/05/22/space-inc-10000-companies-4t-value--and-52-american/?sh=3bf1141a55ac](https://www.forbes.com/sites/johnkoetsier/2021/05/22/space-inc-10000-companies-4t-value--and-52-american/?sh=3bf1141a55ac). Accessed 25 Dec. 2023.

## **Environmental Effects**

The growing involvement of private corporations in outer space activities has raised environmental concerns about various aspects of their operations. The proliferation of space debris is a major issue, as satellites and rockets contribute to the growing accumulation of objects in orbit increasing the risk of collisions. Another aspect of environmental impact stems from ventures aimed at extracting resources from celestial bodies, mining asteroids, and extracting resources, which raises ethical, legal, and environmental concerns. The effects of such activities on extraterrestrial environments are not fully understood, necessitating careful thought.

Launch activities, which are an essential component of space exploration, also pose environmental challenges. As space tourism grows in popularity, emissions from rocket launches and spacecraft operations contribute to companies' carbon footprint. Consequently, the frequency and scale of space tourism activities will determine how much pollution they cause in the atmosphere. The deployment of satellite constellations for communication purposes can result in light pollution, which can have an impact on both astronomical observations and nocturnal ecosystems.

The aforementioned concerns exist without clear international regulations concerning space activities and relevant environmental protection. In the absence of these, corporations can act without accountability in outer space, which in turn could lead to the disregard of sustainability, instead prioritizing of profits.

## **Socioeconomic Effects**

The commercialization of space will bring about socioeconomic effects, both positive and negative. Of course, the emerging space industry will facilitate a huge influx of employment opportunities in sectors such as engineering, manufacturing, or research. However, this will parallelly strengthen many nations' economies. The profit-oriented companies in outer space will have the potential to make space exploration and travel more accessible to the broader population, thus expanding the general understanding of space activities.

On the other hand, most private space companies will operate in More Economically Developed Countries (MEDCs), and access will be limited to people with the financial means. This could heavily exacerbate global economic inequality, and space endeavors could become very exclusive. Furthermore, profiteering from space operations, like resource mining or satellite installation, raises ethical concerns over sustainability, safety, and transparency; this is the reason why governments and international organizations must create and enforce regulations to ensure safety, prevent conflict, and address ethical concerns. The economic promise of this emerging industry needs to be balanced with the associated environmental impact of such activities.

## **Outlook to the Future**

The huge influx of private companies in the space sector is followed by two main potential dangers, which will have to be preempted by legal regulations. The

commercialization of space and its consequences and the issue of the domination of space is similar to the space race in the Cold War, but the actors are not countries. Instead, they are private companies. Now is just the beginning of this newly privatized space industry, but many aspects of a new “race for profits” are conspicuous. Currently, corporations act in the absence of a comprehensive and, most importantly, international legally binding regulatory framework, which can result in the disregard of the environment or ethics in their operations. In the pursuit of more profits, safety and privacy may be ignored, especially in the industry of space tourism or satellites, but in order to foster a healthy environment for both the companies and outer space, in which this industry can grow, the international community needs to cooperate and lay out strict guidelines for the private space sector. A level playing field needs to be established, and the prioritization of the preservation of space needs to be ensured.

## MAJOR COUNTRIES AND ORGANIZATIONS

### Blue Origin

Blue Origin is a private space corporation and defense contractor which was founded by Jeff Bezos. The company manufactures Rockets, Satellites and Spacecraft, while also supplying Nasa's Artemis Program with lunar lander services. Other notable projects include the reusable suborbital launch vehicle, New Shepard, for space tourism, or, the New Glenn, orbital launch vehicle for satellite deployment. Their mission statement states that they are “committed to building a road to space so our children can build the future underlines their commitment to enable human access to space and their belief that our future lies in outer space.”<sup>11</sup>

### China

To regulate its space activities, including those conducted by private entities, China has developed and implemented national space laws and policies. These laws address licensing, registration, and liability issues, demonstrating China's commitment to responsible space activities. China's commercial space sector has grown significantly with the emergence of private companies involved in satellite launches, space tourism, and other space-related activities. The government will almost certainly be involved in developing regulations that govern the behavior of private entities, like Galactic Energy; the country operates many forms of satellites, including Earth observation satellites, communication satellites, and navigation satellites. While these satellites are mostly used for weather monitoring, resource management, and communication, it is important to note that they can also be used for surveillance purposes.

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<sup>11</sup> “About Blue Origin - Benefits, Mission Statement, & Photos | JobSage.” [www.jobsage.com](http://www.jobsage.com), [www.jobsage.com/companies/about/blue-origin#](http://www.jobsage.com/companies/about/blue-origin#).



## **United States of America (USA)**

The USA has long advocated for international cooperation in space activities. Discussions on the development of norms, guidelines, and principles governing the behavior of both government and private entities in outer space are included. Through national legislation and regulatory frameworks, the United States government has taken steps to regulate and oversee the activities of private space companies. This entails working with government agencies such as the Federal Aviation Administration (FAA) and NASA to ensure national and international compliance. National legislation is exemplified by the Commercial Space Launch Competitiveness Act (CSLCA). Additionally, the USA encourages public-private partnerships in space exploration. Collaborations between government space agencies such as NASA and private companies contribute to regulatory framework discussions, as discussed below.

### **National Aeronautics and Space Administration (NASA)**

While NASA is an American government agency that operates primarily under American law, its collaborations with private companies frequently intersect with broader international legal concerns. NASA's Artemis program, which aims to return humans to the Moon, involves the development of lunar landers in collaboration with private companies. As lunar exploration progresses, issues concerning property rights and the use of lunar resources may become significant international legal issues. NASA has become increasingly connected with private companies, notably through public-private partnerships and collaborations. It has worked with private companies on projects such as the Commercial Crew Program (CCP) and Commercial Resupply Services (CRS). Such programs aim to develop crew and cargo transportation systems that are safe, dependable, and cost-effective to and from the ISS. Companies like SpaceX and Northrop Grumman have been involved in these programs, providing transportation to the ISS.

### **Space X**

SpaceX is a significant player in the commercial space launch industry. The company developed and now operates the Falcon 9 and Falcon Heavy launch vehicles, which are used to launch commercial satellites, resupply the ISS, and provide other space transportation services. The development of reusable rocket technology, as demonstrated by the Falcon 9's ability to land and be reused for multiple missions, is one of SpaceX's ground-breaking contributions to the space industry. NASA has relied heavily on SpaceX to transport astronauts and cargo to the ISS. SpaceX and NASA's collaborative efforts highlight the evolving relationship between government space agencies and private corporations. SpaceX's Mars mission is a program aiming to establish a self-sustaining human presence on Mars. Elon Musk, Space X's founder, sees Starship, a reusable two-stage launch vehicle as the means to achieve this with the long-term goal of bringing life to Mars by establishing a permanent human presence there.



## United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)

While COPUOS does not create binding international legislation, it is a forum for discussions, negotiations, and the development of guidelines that help establish international norms and principles in the realm of outer space activities. The Legal Subcommittee (LSC) of COPUOS is specifically dedicated to addressing legal issues relating to outer space activities. The LSC debates and deliberates on issues such as liability, space object registration, space debris mitigation, and the legal aspects of space resource utilization. COPUOS provides a forum for member states to collaborate and coordinate on international issues and also contributes to the development of consensus on key issues, including those relating to private corporations' operations in outer space, by fostering dialogue and cooperation.

### Virgin Galactic

Virgin Galactic's primary business is to provide paying customers with suborbital space flights, a process named space tourism. The company transports passengers to the edge of space in its SpaceShipTwo vehicle, which is launched from a carrier aircraft. Virgin Galactic, like other private space companies, operates within the confines of national regulations. Its mission statement affirms that “As the spaceline for Earth, we aim to transform access to space for the benefit of humankind; to reveal the wonder of space to more people than ever before,” which clearly underlines its goal of making ‘Space Tourism’ more available for the wider population, through technological advancement. It is one of the largest enterprises involved in space.<sup>12</sup>

### TIMELINE OF EVENTS

Date	Description of event
1947-1991	Cold War
October 4, 1957	The first artificial Satellite, Sputnik 1, orbits the earth.
July 29, 1958	NASA is founded.
April 12, 1961	Yuri Gagarin becomes the first human in outer Space.
December 19, 1966	The Outer Space Treaty is signed.

<sup>12</sup> “Virgin Galactic | the Spaceline for Earth | Virgin.” Virgin.com, [www.virgin.com/virgin-companies/virgin-galactic#](http://www.virgin.com/virgin-companies/virgin-galactic#).

July 20, 1969	The Apollo 11 mission lands on the moon.
November 29, 1971	The Convention on International Liability for Damage Caused by Space Objects is signed.
November 12, 1974	The Convention on Registration of Objects Launched into Outer Space is signed.
September 16, 1987	The Montreal Protocol on Substances that Deplete the Ozone Layer is signed.
September 8, 2000	Blue Origin is founded.
March 14, 2002	Space X is founded by Elon Musk.
October 2004	Virgin Galactic is founded.
May 2020	Artemis Accords are announced by NASA.
October 2020	Lunar Gateway Memorandum of Understanding between the ESA and NASA is signed.

### RELEVANT UN RESOLUTIONS, TREATIES AND EVENTS

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 19 December 1966 (**A/RES/2222**)<sup>13</sup>
- Convention on International Liability for Damage Caused by Space Objects, 29 November 1971 (**A/RES/2777**)<sup>14</sup>
- Convention on Registration of Objects Launched into Outer Space, 12 November 1974 (**A/RES/3235**)<sup>15</sup>

<sup>13</sup> UNOOSA. "Outer Space Treaty." *Unoosa.org*, 2019, [www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html](http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html).

<sup>14</sup> "Liability Convention." *Www.unoosa.org*, [www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/liability-convention.html](http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/liability-convention.html).

<sup>15</sup> "Registration Convention." *Www.unoosa.org*, [www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/registration-convention.html](http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/registration-convention.html).

- Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 5 December 1979 (**RES 34/68**)<sup>16</sup>
- Montreal Protocol on Substances that Deplete the Ozone Layer, 16 September 1987<sup>17</sup>
- Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space, 7 June 2021 <sup>18</sup>

## PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

### Artemis Accords

The Artemis Accords are a set of principles and guidelines, which aim to reaffirm and develop several aspects of the Outer Space Treaty of 1967, while reapplying these to civil space activities. They were announced as part of NASA's Artemis Programme in May 2020.<sup>19</sup> The main principles of these Accords are peaceful exploration, transparency, interoperability, emergency assistance, registration of space objects, release of scientific data, preserving heritage, space resources, and deconfliction of activities and orbital debris.<sup>20</sup> It is important to note that the Artemis Accords are voluntary and not legally binding. The numerous signatories of these Accords showcase their effectiveness, although they are often criticized by countries like Russia, arguing that they favor the United States in the matter of space exploration, and through its principles of space resource exploitation go against the Outer Space Treaty.

### Lunar Gateway Memorandum of Understanding

In October 2020, representatives of the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA) signed a legally binding Memorandum of Understanding, which creates a regulatory framework for the cooperation in establishing the Lunar Gateway, per NASA's Artemis lunar exploration program. The Lunar Gateway is a human outpost around the Moon for space exploration and science that will enable a regular human presence on the Moon. As the establishment of the 'Lunar Gateway' has not yet begun, not much can be said about the effectiveness of this memorandum. What can be said, is that it is an

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<sup>16</sup> "Moon Agreement." *Www.unoosa.org*,  
[www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/moon-agreement.html](http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/moon-agreement.html).

<sup>17</sup> United Nations. *MULTILATERAL Montreal Protocol on Substances That Deplete the Ozone Layer (with Annex). Concluded at Montreal on 16 September 1987*. 16 Sept. 1987.

<sup>18</sup> *UNITED NATIONS OFFICE for OUTER SPACE AFFAIRS GUIDELINES for the LONG-TERM SUSTAINABILITY of OUTER SPACE ACTIVITIES of the COMMITTEE on the PEACEFUL USES of OUTER SPACE UNITED NATIONS*.

<sup>19</sup> NASA. "NASA: Artemis." NASA, NASA, 2019, [www.nasa.gov/specials/artemis/](http://www.nasa.gov/specials/artemis/).

<sup>20</sup> NASA. "NASA: Artemis." NASA, NASA, 2019, [www.nasa.gov/specials/artemis/](http://www.nasa.gov/specials/artemis/).

important course of action in formulating legally binding regulations for operations in outer space.

### **Commercial Space Launch Competitiveness Act (CSLCA)**

The Commercial Space Launch Competitiveness Act of 2015 is a law passed in the USA, aiming to update regulations concerning commercial space use. It explicitly states that American industries can “engage in the commercial exploration and exploitation of space resources,”<sup>21</sup> also stating that this is every US citizen's right.<sup>22</sup> This legislation reduces regulatory barriers and promotes commercial space launches. Although the act underlines that it does not assert any sovereignty or exclusive rights on any celestial body, many scholars criticize this law, arguing that it recognizes ownership of space resources and is thus in clear violation of the Outer Space Treaty. Others support that the CSLCA is a vital step in the formation of international space law and will act as an addition to the Outer Space Treaty, finding a solution to the question of property rights in outer space. This act has strongly contributed to the success of American private corporations in space, including SpaceX and Blue Origin.

## **POSSIBLE SOLUTIONS**

### **Regulating the number of space launches by privately owned corporations per year**

Regulating the number of international space launches by privately owned companies per year would ensure the sustainability and longevity of outer space operations. This limitation further guarantees that environmental concerns and effects would be held to a degree in which they are not dangerous to the earth and our well-being. Controlling the number of launches helps in the coordination of trajectory and the avoidance of potential collisions between satellites and other space objects. This is critical for ensuring the safety of both crewed and uncrewed space missions. Furthermore, limiting the number of space launches aids in reducing space debris, which is a growing concern for the long-term viability of outer space activities. By prioritizing scientific explorations rather than space travel for recreational purposes, the issue of socioeconomic inequality could be combatted.

### **Regulating Launch Emissions**

Regulatory framework concerning rocket emissions, fuel, and power sources in outer space operations would ensure that privately owned companies operate in an environmentally sustainable manner. It is critical to minimize the environmental impact of space activities. Regulation of launch emissions protects the health and safety of local populations living near launch sites. Emissions from rocket launches can

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<sup>21</sup> US Congress. “Text - H.R.2262 - 114th Congress (2015-2016): U.S. Commercial Space Launch Competitiveness Act.” Congress.gov, 2015, [www.congress.gov/bill/114th-congress/house-bill/2262/text](http://www.congress.gov/bill/114th-congress/house-bill/2262/text).

<sup>22</sup> US Congress. “Text - H.R.2262 - 114th Congress (2015-2016): U.S. Commercial Space Launch Competitiveness Act.” Congress.gov, 2015, [www.congress.gov/bill/114th-congress/house-bill/2262/text](http://www.congress.gov/bill/114th-congress/house-bill/2262/text).

be harmful to an individual's health; thus, enforcing emission standards helps to prevent negative effects on nearby communities. To protect public health, legal frameworks should include provisions for monitoring and reporting on emissions. A concrete regulation could be the ban on power sources containing black carbon, an emission especially damaging to the earth's ozone layers.

### **Imposing strong safety regulations on private space travel**

A legal framework mandating strong safety regulations in outer space activities by privately owned corporations would both protect human lives and the preservation of the outer space environment. Safety regulations are critical in protecting the lives of astronauts and space travelers. The inherent dangers of space exploration necessitate safeguards to reduce risks and ensure the safety of those venturing beyond Earth's atmosphere. To avoid potential accidents or failures during launch, orbit, and re-entry, protocols for spacecraft design, testing procedures, and emergency response plans must be established. Aside from individual safety, regulations are required to prevent environmental damage to outer space. It is critical to ensure that private space activities follow sustainability principles. Guidelines for waste management, satellite disposal, and space debris prevention are critical for preserving the space environment.

### **Promoting transparency and data-sharing by private space corporations**

Promoting transparency and data-sharing among private space corporations is critical to the development of an effective international legal framework for the operation of privately owned entities in outer space. Transparency increases public trust and accountability, meaning that when private space corporations share information about their activities, the public gains a better understanding of the risks and benefits of space exploration. This transparency acts as a public oversight mechanism, ensuring that private corporations follow international regulations and ethical standards. Furthermore, open communication among private space corporations, governments, and international space agencies is critical for emergency response coordination; in the event of an accident or an emergency, timely and accurate information sharing allows for a coordinated and effective response, minimizing damage and ensuring the safety of people and assets. This can be achieved through an open database where corporations share research and test results.

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