COMMITTEE GUIDE

UNOOSA

United Nations Office for Outer Space Affairs

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Contents

1. Presidents' Letter

Dear Delegates,

We are thrilled to welcome you to another edition of CCBMUN in the United Nations Office for Outer Space Affairs (UNOOSA) committee. As your presidents, we give you a warm welcome. Our names are Lucia Loaiza and Antonella Ardila, students from 10th and 11th grade at Colegio Bolivar, and we are honored to be leading this committee. We have both been part of several models including international models, which have given us experience regarding the dynamics of MUN.

In UNOOSA you will have the opportunity to debate relevant issues regarding the present and the future of outer space regulation. The way that humans use outer space is quickly evolving, thus, it's important to create regulations to avoid conflicts and promote the responsible use of this space. On this occasion, we have picked highly pertinent topics for you to discuss, and we look forward to hearing all the innovative solutions you will bring to the committee. We want this committee to be a safe space for each one of you, where you are free to express your ideas and to grow as delegates.

The debate will not only be an academic experience, but it will also be a time for you to explore your leadership skills and to grow personally and as part of a group. We invite all of you to bring your ideas to the committee and feel free to speak your mind, without fear of judgment. We hope you get the most out of this model UN experience, and we want all of you to know that you can count on us. We look forward to passing down our knowledge, and please don't hesitate to reach out if you have any questions or concerns.

Best wishes to all,

Lucia Loaiza and Antonella Ardila
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Topic 1: *Regulating Nuclear Power Sources in Space*

I. History/Context

In a world where almost everything is automated and electricity plays a fundamental role in driving progress and growth, the development of a powerful and reliable source of energy is necessary. One of the most used and controversial energy sources is nuclear energy. Its beginnings can date back to December 1938, when Otto Hahn and Fritz Strassman, chemists at the Kaiser Wilhelm Institute for Chemistry first discovered nuclear fission, a process in which atoms are split and as a result, produce energy. This discovery would be a turning point in the history of science, as it would mark the beginning of the implementation of nuclear power sources, a favoured energy source due to its power and lasting capacity.

As its popularity grew, nuclear energy would be used more and more, particularly in outer space, where it would be used to provide energy and heat. Several space missions have been executed using nuclear power sources, such as "The Navy Navigation Satellite System", the first ever satellite navigation system, launched in June 29, 1961 by the United States' Navy and powered by a radioisotope thermoelectric generator (RTG). An RTG is a type of nuclear battery that converts the heat released from the natural decay of radioactive material into electricity, ensuring a power supply in environments where solar energy is not available.

Figure 1: Navy Launches First Nuclear-Powered Spacecraft (U.S. Air Force, 1961)

Some years later, on April 14 1969, NASA (the National Aeronautics and Space Administration) introduced Nimbus III, the first successful launch of a nuclear powered spacecraft, with the ability to collect meteorological data, measure the ozone layer, sea ice, etc. That same year, astronauts Neil Armstrong and Buzz Aldrin would become the first humans to walk on the moon, marking a milestone in the history of space research.

While in outer space, they conducted a series of experiments known as "Apollo 11 Lunar Surface Experiments" where they placed a set of experimental packages of data-collection

instruments in order to send information back to Earth. The first package placed on the lunar surface was the "Apollo 11 Passive Seismic Experiment Package", made to detect moonquakes (similar to earthquakes) and learn more about the structure of the moon. This package used heater units, which generated heat by slowly releasing energy from decaying plutonium.

Since then, several other space missions and experiments have relied on the use of nuclear power sources, such as: Viking 1 (1975), the first ever spacecraft to land on Mars using RTG; and Voyager 1 & 2 (1977), a series of space probes made to gather interstellar data, powered by three multi hundred watt radioisotope thermoelectric generators, among many others.

Figure 2: Galileo orbiter (information@eso.org, 2018)

Controversy regarding the use of nuclear power technologies in space research became more prominent during this time period, particularly after the launch of spacecrafts and space probes which relied heavily on nuclear sources for their functioning. This was especially true after missions like Kosmos 954, when a Soviet nuclear satellite exploded over northern Canada and affected Dené land, an indigenous community, causing significant environmental and health concerns.

Similarly, one of the most controversial and criticized space technologies was "Galileo" (1989), a space probe used to study Jupiter and its moons. This space probe relied on over 40 pounds of plutonium, generating distrust and skepticism by people who did not have confidence in nuclear energy. It led to increased popularity of global movements such as the anti-nuclear coalition, made up of groups like the Campaign for Nuclear Disarmament, environmental groups like Greenpeace, etc. These groups opposed the use of nuclear power sources due to the potential accidents associated with nuclear energy (for example, the explosion and release of plutonium into the atmosphere), possible environmental damage, or health concerns (the lethal and poisonous qualities of plutonium associated with cancer).

Despite protests, the use of nuclear power sources in space probes only kept increasing, and when "Galileo" was announced to the public, the coalition grew more unhappy, and stated that, *"They oppose any use of nuclear materials in space, regardless of risk, but also charge that the government is understating the risks of releasing potentially lethal material"* (1989, The Washington Post).

In response, the government decided to perform a series of tests and experiments (corroborated by NASA, the Department of Energy, and outside experts) to determine the true nature of nuclear sources used in "Galileo" and other space missions. The results indicated that for the most part, the implementation of nuclear sources in this mission presented a "minimal" risk. *"The probability of a shuttle accident is roughly one in 78, NASA safety officials estimate. If there is an accident, the panel said, the probability of release is 4.4 in 10,000, which would result in between one and 80 cancer deaths. NASA's figures are 3.6 in 10,000 and less than one death"* (1989, The Washington Post). However, this did not fully reassure antinuclear coalitions and, up to this day, the use of nuclear power sources remains an issue of public controversy.

II. Current Situation

Regulating the use of Nuclear Power Sources (NPS) is of critical importance and also a very challenging task in our modern age. Technology, safety, sustainability and proper regulations are key points that must be addressed in the current debate on the use of nuclear power sources, particularly with the rise and development of more modern technologies. More spacecrafts and planetary rovers - which make significant use of nuclear power - are being developed, among them "Curiosity", a rover developed by NASA in 2012, which was sent to explore Mars in order to determine if life had ever existed there. This exploration vehicle relies heavily on a radioisotope thermoelectric generator, thus drawing attention to the prominent use of nuclear power sources in space, decades after they were discovered. That is why it's important to create guidelines that establish regulations and protocols as space technology keeps evolving.

Figure 3: Curiosity (Brown, 2012)

One of the most widely known international guidelines addressing the use of nuclear power sources is called the Principles Relevant to the Use of Nuclear Power Sources in Outer Space and was adopted by the United Nations in 1992. Please find out more about it using the following link: 47/68. Principles Relevant to the Use of Nuclear Power Sources In Outer Space.

These principles helped to highlight that activities related to nuclear power sources (NPS) must follow international laws, like the Outer Space Treaty (OST). Please find out more about the treaty using the following link: 2222 (XXI). Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies) The main purpose of the treaty is to set a foundation for the legal framework of international space laws. The main goal is to promote rigorous safety evaluation, using probability to analyze risks, in order to be able to minimize the risk of any accidental harmful radiation exposure. These principles also reveal the need of future alterations to regulate emerging nuclear power uses, and of evolving international regulations and recommendations regarding radiological protection.

Similarly, the guideline states that its purpose is "to protect people and the environment in Earth's biosphere from potential hazards associated with relevant launch, operation and end-of-service phases of space nuclear power source applications" (IAEA, 2009). To achieve this, it establishes a set of regulations, including the mandatory development of safety requirements and policies whenever the government or any intergovernmental organization within the country authorizes NPS missions, whether these are conducted by governmental or non-governmental entities.

Moreover, the safety framework also establishes that, in case of a potential emergency related to the use of nuclear power sources in spacecraft, the body in charge of conducting the mission should be prepared, and should have developed protocols and procedures to tackle any possible emergency. Not only that, but the guide establishes that whenever a governmental or intergovernmental organization decides to launch a nuclear powered mission, it must justify the implementation of nuclear sources,

Figure 4: World Map Countries that Have Signed the Treaty (Shutterstock)

considering the risks and advantages of utilizing nuclear energy, and keeping in mind alternatives to NPS application.

Ultimately, this guideline provides a clear and complete overview of the regulations and protocols governments must follow to launch NPS missions. Nevertheless, there is a great variety of guidelines, including one which was created by the UN together with the International Atomic Energy Agency (IAEA) called the "Safety Framework for Nuclear Power Source Applications in Outer Space" that establish guidelines to encourage the safe use of NPS. Please follow the link to read these guidelines: Safety Framework for Nuclear Power Source Applications in Outer Space.

It is important to note that the Outer Space Treaty (OST) is the foundation of Space Regulation. It is the cornerstone of international space law and shines light on the provisions relevant to using NPS in space exploration. Moreover, article 6 of the treaty establishes international responsibility for the use of space, including the use of NPS. Therefore, states involved in space activities using NPS must comply with international regulations.

In conclusion, delegates are expected to address the benefits and disadvantages of implementing nuclear powered sources in space, considering their environmental, technological and social implications, while keeping in mind their country's outer space programmes and position on the topic. Some countries may argue in favour of regulations on the use of NPS in outer space, while others may emphasize the importance of technological innovations, and argue for fewer restrictions, while emphasizing the need for international cooperation to ensure responsible use of outer space territory.

III. Key points of the debate

- Effectiveness of NPS for long-term space exploration
- The balance between strict regulations regarding safety and technological innovations in space NPS
- Accountability of agencies for nuclear power sources use through the Outer Space Treaty

- Impact of international regulations on nuclear powers advancements and development
- Environmental risks related to NPS used during space exploration
- Implementation of non-nuclear alternatives for NPS on space missions

IV. Guiding questions

1. Has your country used nuclear power sources in any of its space missions? If so, how has it been used?
2. Has your country ratified any international treaties that regulate the use of nuclear power sources in outer space?
3. Has your country ever experienced or contributed to any accidents involving nuclear power sources in space?
4. What safety measures does your country follow to prevent risks associated with nuclear power sources in space missions?
5. What proposals does your nation have for modifying or improving current regulations on nuclear power sources in outer space?
6. What legal frameworks does your country have to manage the development or exportation of nuclear space technologies?
7. Are there any safer alternatives to using nuclear energy in space missions?

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IMAGES

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Figure 4: World Map countries that have signed: ภาพประกอบสต็อก 1867162915 | Shutterstock. (n.d.). Shutterstock.
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Topic 2: *The Use of Private Satellite Networks in Warfare*

I. History/Context

The military decided to start using satellites because these were able to give information that could not be provided by using only land equipment. To understand this topic, it is essential to understand the types of satellites that are used in military situations. A very commonly used satellite is the **communication** satellite which, as the name implies, is used to communicate easily between units. The satellite uses encrypted voice, video, and data transmission to communicate between bases and is useful for military purposes, as it reduces the risk of messages being intercepted by enemy forces.

Another kind of satellite used by the military is the **navigation** satellite, which uses troop movements and, more recently, drone navigation to help determine the precise location of troops on either side of the conflict. **Early Warning** Satellites are also commonly used to provide alerts to the main base, warning them about missile launches or nuclear explosions.With the introduction of satellites, military operations became more elaborate and satellites took on an even bigger role in these organizations over time. A clear example of this is the U.S. Defense Support Program (DSP), a satellite that helps detect nuclear detonations in a matter of seconds. Another of the most widely used types of satellites is the "Signals Intelligence Satellite", which intercepts electronic signals and communications taking place on earth in order to monitor satellite communications, listen to radio waves or telephone conversions, decode encrypted messages, etc.

During the Cold War, from 1947 to 1991, when the US and the USSR along with their respective allies were in a state of constant tension, satellite communication began to be implemented on a global scale, being deployed directly by nation states. Satellites were used by the military during this time for strategic communications, early warning systems, arms control verification and military observation. Satellites provided a new method of military communication, allowing secure and reliable channels and media for command and control.

By using systems such as the Defense Satellite Communications System (DSCS), military leaders and troops found a way to maintain contact and not be interrupted no matter the hostility or remoteness of the environment. This evolution was important because it allowed large scale operations to be more coordinated, and gave military bases a more

feasible way to keep contact in conflict zones where it was necessary to communicate in a safe and quick way. To see a short timeline of DSCS, please use the following link: DSCS.

Likewise, these satellites played an important role in the development of early warning mechanisms that can help identify threats such as missiles. During the Cold War, this alert system supported military strategies like mutual assured destruction (MAD) and made it easier to know when to activate defence mechanisms. Satellites were also important to verify compliance with arms control agreements such as the Strategic Arms Reduction Treaty (START) and the Strategic Arms Limitation Talks (SALT). This verification gave a trustworthy and unbiased proof of weapons being dismantled, since the US and the USSR could verify obedience without needing to depend on diplomatic systems, thus helping develop agreements and confidence between both sides.

Moreover, one of the most relevant *national technical means of verification* was satellite imagery, which has become an important part of enforcing treaties. Satellites like GAMBIT and HEXAGON, owned by the United States, were crucial during the Cold War for gathering information on Soviet military plans. Because of these satellites, the US was capable of taking high resolution pictures of missile silos, airfields, naval bases and nuclear test sites, which helped analysts track troop movements and weapons development with greater accuracy. They also provided live surveillance, which reduced uncertainty and allowed for more informed strategic decisions. The USSR has similar systems to monitor the US, such as Zenit and Yantar. This work set the scene for the use of satellites in outer space as a tool for monitoring threats, and for helping guide military decisions.

II. Current Situation

In recent years, space technology has managed to evolve significantly, particularly with the emergence of private satellite networks, implemented for the most part in telecommunications, broadcasting and navigation. Despite the original purpose of these networks, some governments have implemented private networks in order to track down enemies, and to provide intelligence and navigation into enemy territory in

Figure 1: Satellite Imagery (Medium, 2018)

situations of conflict. The ongoing Russo-Ukrainian War highlights the relevance of using private satellites in military contexts to provide analysis for strategic and security purposes. During this conflict, the implementation of reconnaissance or imaging satellites, provided for the most part by private companies such as Starlink and Maxar, have become more prominent, providing surveillance and taking photographs of enemy installations on Earth. These are used as a tool to measure the success of military operations and the extent of structural damage.

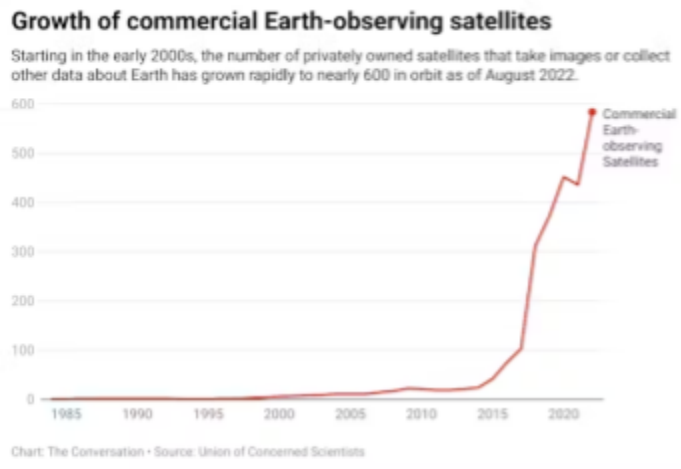

Figure 2: Rise of privately-owned satellite companies (Borowitz, 2022)

Another private satellite system that has become more prominent during this armed conflict, is ICEYE, a Finnish private satellite company, specializing in SAR (Synthetic Aperture Radar), meaning it takes pictures of the Earth day and night and thus, provides real time imaging for countries and other private actors. This satellite network is currently used by Ukraine in the Russo-Ukraine armed conflict, allowing the country to locate over 60 units of Russian military equipment, including camouflaged units. Another highly relevant satellite system used during this conflict includes Planet Labs, a private group of imaging satellites used to verify attacks on civilian populations, such as the bombing of Mariupol's theater in 2022. On the other side, Russia makes use of private companies such as the Russian company Sputnix, and it has also been alleged that they have obtained information from American and European companies, such as Airbus, through third party intermediaries. (Winterbach et al., 2024)

At the same time, private satellite networks have played a very important role in other significant modern disputes, such as the Yemen conflict. Here, the Saudi led coalition (a military alliance supporting Yemen's internationally recognized government) launched satellites to spy on and monitor Houthi groups and military bases. These satellites were provided by Starlink, a satellite internet service developed by SpaceX, which gave the Yemen government complete oversight of the Houthis, becoming the first ever country in West Asia to gain full access to Starlink. The Houthis condemned the use of Starlink, claiming that Starlink was a violation to the nation's security and sovereignty, as it could

potentially control Yemeni data and knowledge, raising controversy about the use of private satellite networks in warfare.

In recent years, many more private companies have begun developing space satellites, some specifically for situations of potential conflict. One of the most famous and influential private satellite operators in Europe is SES (Société Européenne des Satellites), a Luxembourg satellite company that provides television broadcasting and communications services. However, recently SES has launched a new and specialized defence division known as "SES Space & Defense", which is allied with NATO, the US military and other countries to deliver communications on the battlefield, and to provide intelligence data about enemies. Most recently, SES drafted a contract with the US Army to provide the use of its satellites. This includes, providing good quality internet to US troops located in Africa and the Middle East, providing troops with real time intelligence, and delivering connectivity to remote bases.

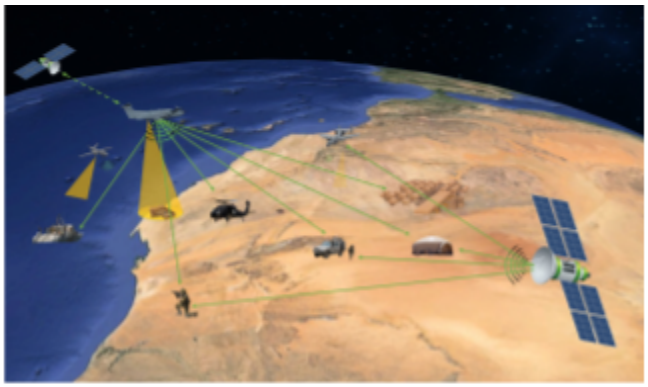

Figure 3: What Is SIGINT and How It's Maximizing Military Capabilities (MAG Aerospace, 2023)

Another highly relevant private company specializing in satellite systems is Maxar Technologies, an American company, used for the most part to provide imagery. Most recently, this company has started forming alliances with other private actors like Saab, a Swedish aerospace and defence company, best known for producing military vehicles and technology. Thus, Maxar's imagery and terrain data are now available for the creation of defence and security weaponry, raising concerns about the increased militarization of commercial satellite systems.

Despite these challenges, countries keep evolving their private satellite networks, particularly companies in the United States, which has the most advanced and largest military satellite programme. The US government currently owns 247 satellites, whilst Russia is recorded as having 110 and China 157 (World Population Review, 2025).

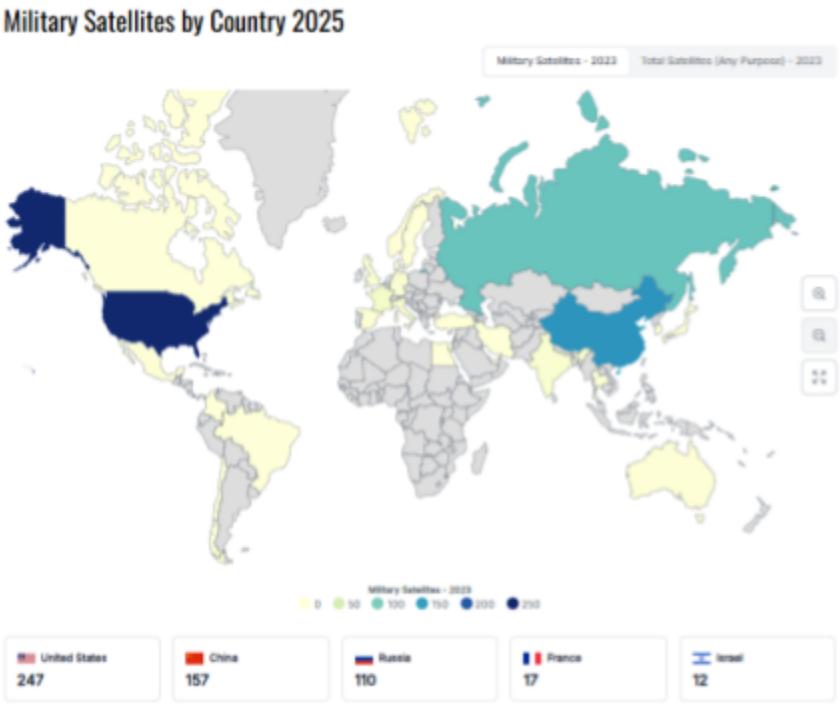

Figure: Military satellites by country (World Population Review, 2025)

To find out how many military satellites each country has, please use the following link: [Military satellites by country](#).

Satellite systems are expensive to develop and maintain, which means that much of the information governments receive comes from commercial operators. On the chart, we can compare how the number of government satellites compares to the total number of satellites available in a country.

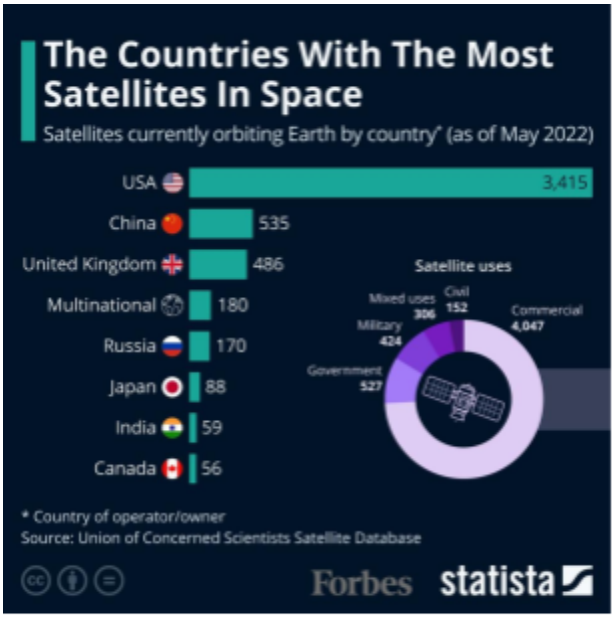

Figure: Total number of satellites for a range of countries (Buchholz, 2023)

The United Kingdom is among the most advanced countries in the development of private satellite networks (as shown in figure 4), particularly with the rise of companies like OneWeb. In September 2023 OneWeb officially merged with Eutelsat (a French company) to form Eutelsat OneWeb. Unlike Starlink, which dominates much of the commercial satellite market, Eutelsat OneWeb has established strong partnerships with European governments seeking to reduce their reliance on non-European providers. For instance, France has signed a 10-year agreement with OneWeb, securing access to satellite services with a focus on military operations and secure communications. The chart below shows how ownership of satellites is distributed globally. For a clearer picture, use this link: [Satellite Ownership].

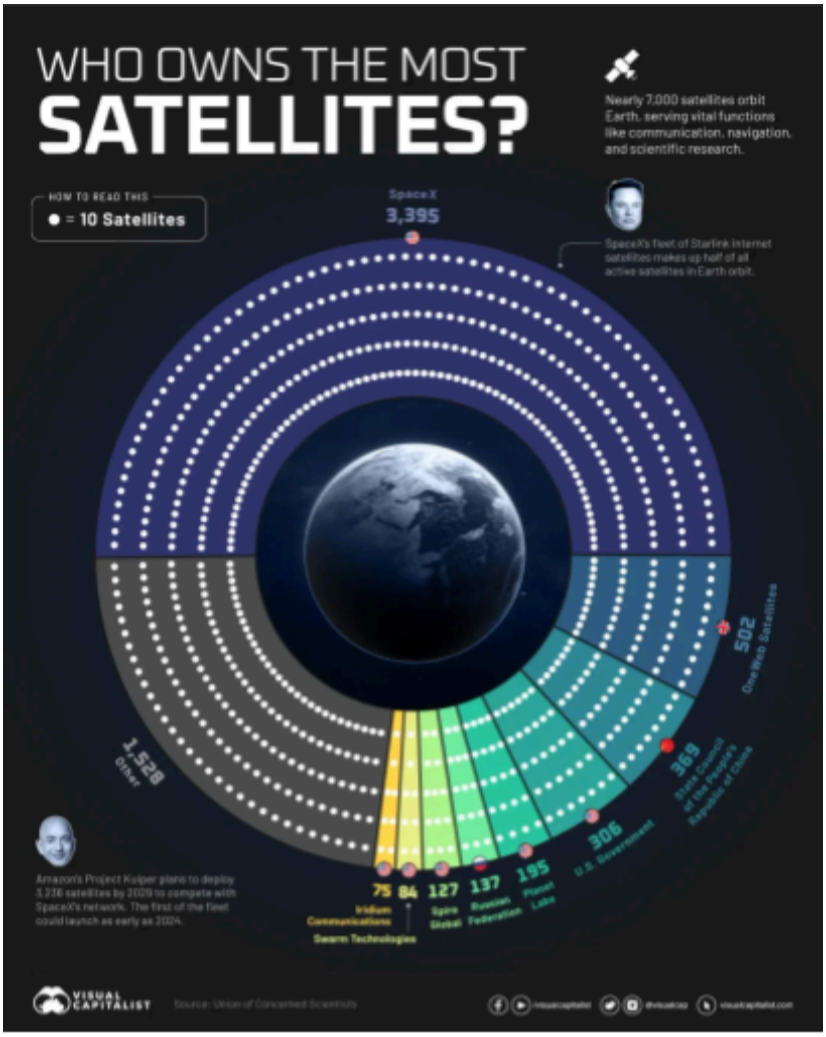

Figure 4: Which Companies Own the Most Satellites?(Venditti & Smith, 2023)

Ethical concerns

The rapid military expansion in space has led to legal and ethical concerns, particularly with existing international treaties and agreements, since many governments feel that they fail to address modern concerns, and that more regulations are required to monitor and regulate private satellite systems being used for military purposes. These agreements include the Outer Space Treaty (an international agreement adopted in 1976 providing the framework for outer space exploration and use) which states that space must be used for peaceful purposes, and denies the placement and use of weapons of mass destruction in outer space. Similarly, the Space Liability Convention, adopted in 1972, states that if a private satellite causes any damage, the launching country is responsible for the harm done.

However, this treaty was drafted long before the rise of powerful private satellite networks, such as Starlink (developed by SpaceX), which has recently gained prominence for its role in military operations such as the Russo-Ukrainian War, where Ukrainian forces used it to coordinate strikes and gather intelligence. They even managed to control drones that streamed live video through Starlink, allowing Ukrainian artillery units to target Russian army command centres, vehicles, etc. For example, the Aerorozvidka unit, ran 300 drone missions a day and used Starlink to connect drone video feeds with artillery teams, managing to land precise strikes on Russian forces.

Another concern regarding the use of private companies is that satellites have inherent limitations. Recent cases show they are especially vulnerable to cyberattacks, with adversary nations infiltrating and hacking these systems on several occasions in order to weaken the security and defence measures of companies partnering with opposing states. For example, just before Russia invaded Ukraine in 2022, there was a huge cyberattack on a private satellite company called Viasat, which provides internet through satellites. Since Ukrainian forces relied on Viasat's satellites for communication, hackers (officially attributed by the U.S. and EU to Russia) targeted the system and deployed malicious code. As a result, over 40,000 internet modems stopped working, Ukrainian military communications were disrupted, and even civilians who were not involved in the conflict were affected

Figure 5: An illustration of a Starlink satellite in orbit. (Shutterstock, 2023)

because they depended on Viasat´s network for internet and other services.

Sovereignty is also affected when nations rely on private companies to provide them with military data, as these nations may become reliant on global companies over which they have no control. This, in turn, is likely to increase the divide between developed and developing nations, as wealthier nations will also have a much greater military advantage. Many nations expressed concern about Starlink being used for military purposes,and Iran made a formal complaint to the UN about this, when it said that Starlink was used illegally to monitor parts of the country.

What the private companies say

SpaceX has made it clear that Starlink was not meant to be weaponized, and this has led to the company creating Starshield, a satellite system exclusively used by the US government and allies for military missions and for intelligence data collection. It says that Starlink's terms of service state that the service is *"not designed or intended for use with or in offensive or defensive weaponry or other comparable end-uses."* (Duffy, 2023)

However, Starlink is still being used in Ukraine, and in a recent disagreement with the Polish foreign minister, Elon Musk was quoted as saying in a post that, *"Starlink was the "backbone of the Ukrainian army"* and that *"their entire front line would collapse if I turned it off"* (Looker, 2025). This comment was ill-received by many, who are concerned about the amount of power that private individuals or companies may have in international conflicts.

There is concern that private satellites may become targets if they are used for data collection in warfare, and that private companies cannot prohibit governments from using their data. Private satellite operators must continually strengthen their cybersecurity measures, particularly in military contexts where the threat often comes from well-funded, state-sponsored hackers.

Conclusion

In conclusion, private satellite networks have become essential in military operations, and their role in warfare will only continue to evolve. This is why countries need to address this controversial issue by respecting existing international treaties and, when necessary, creating new rules to protect the global community, and the companies themselves, from the risks that may arise as these space technologies continue to develop.

It should be kept in mind that some people argue that regulations should not be too restrictive, as more liberty is required to ensure that space programmes can successfully develop and advance. There is a need to balance innovation with security, and to make sure that space remains a territory for cooperation and not conflict.

III. Key points of the debate

- The ethics of using private satellite systems for warfare
- Military inequalities between nations due to access to private satellite systems
- The extent to which private satellite companies should collaborate with governments during armed conflicts
- Private satellite systems as targets in warfare
- The potential risk to civilians from the militarization of private satellite systems
- The misuse of sensitive data collected by commercial satellites during warfare
- Reassessing limitations and restraints imposed by existing treaties regarding the use of private satellite networks in warfare

IV. Guiding questions

1. How has your country acted upon the use of private satellite networks in military operations?
2. What legal responsibilities does your country have related to international space law when private companies in your country have satellites used in conflicts?

3. Has your country's government directly cooperated with private satellites providing service during a conflict?
4. What position does your country take on considering private satellites as legitimate military targets during war?
5. Has your country proposed or supported international agreements or regulations regarding the military use of private space infrastructures?
6. What measures has your country taken to prevent the misuse of commercial satellite data or networks during warfare?
7. How does your country assure that private space activities go accordingly with national security and international law?

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