

# J-COPUOS COMMITTEE



*the*  
**PEACEFUL**  
**USES** *of*  
**OUTER**  
**SPACE**

# **Study Guide Committee on the Peaceful Uses of Outer Space (COPUOS) The Peaceful Uses of Outer Space**

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## Key Terms

- **Outer Space Treaty (OST) (1967):** The main international agreement that sets rules for how countries can use space.
- **Militarisation of Space**  
Using space for military support (like surveillance satellites).
- **Weaponisation of Space**  
Placing or using weapons in space or targeting space objects.
- **Satellite**  
An object placed in orbit around Earth used for communication, navigation, or observation.
- **Low Earth Orbit (LEO)**  
The region of space close to Earth where many satellites are located.
- **Geostationary Orbit (GEO)**  
An orbit where satellites stay fixed above one point on Earth.
- **GNSS (Global Navigation Satellite Systems)**  
Satellite systems (like GPS) that provide location and navigation data.
- **Small satellite constellations**  
  
networks of numerous, low-cost satellites
- **Space Debris**  
Broken or unused objects in space that can cause collisions.
- **Kessler Syndrome**  
A chain reaction in which collisions between space debris create even more debris.
- **Space Traffic Management**  
Coordinating satellites to prevent collisions in space.
- **Mega-Constellations**  
Large groups of satellites (like Starlink) are working together.
- **Commercialisation of Space**  
Private companies participating in space activities for profit.
- **New Space**  
The modern era of space activity involves private companies and innovation.
- **Space Governance**  
The system of rules and organisations that manage space activities.
- **International Cooperation**  
Countries that are working together on space missions and research.
- **Transparency and Confidence-Building Measures (TCBMs):** Actions (such as sharing information) to build trust between countries.

- **Dual-Use Technology**  
Technology that can be used for both civilian and military purposes.
- **Space Sustainability**  
Ensuring space remains usable and safe for future generations.
- **Space Exploration**  
Sending missions to study space, planets, and the universe.
- **In-Situ Resource Utilisation (ISRU)**  
Using resources found in space (like water on the Moon).
- **Space Resources**  
Materials in space (minerals, water, etc.) that can be used.
- **Space Law**  
Rules and agreements that regulate space activities.
- **Liability (in space law)**  
A country's responsibility for damage caused by its space objects.
- **Registration Convention**  
Requires countries to register objects they launch into space.
- **Rescue Agreement**  
Countries must help astronauts in danger.
- **Astronauts as "Envoys of Mankind"**  
Astronauts represent all humanity and must be protected.
- **Global Common**  
A shared area (like space) that belongs to all humanity.
- **Space-Faring Nations**  
Countries with advanced space capabilities.
- **Non-Space-Faring Nations**  
Countries without their own space programs.
- **Digital Divide (Space Context)**  
The gap between countries with and without access to space technology.
- **Satellite Internet**  
The Internet is provided through satellites (useful in remote areas).
- **Earth Observation Satellites**  
Satellites that monitor Earth (weather, environment, disasters).
- **Deep Space Network (DSN)**  
A system of antennas used to communicate with spacecraft far from Earth.
- **Optical (Laser) Communication**  
High-speed communication using lasers instead of radio waves.

- **Robotic Planetary Exploration**

The use of unmanned spacecraft (robots, rovers, probes) to explore planets, moons, and other celestial bodies.

- **Deep Space Science**

The study of distant parts of the universe (like galaxies, stars, and black holes) using advanced space telescopes and missions.

- **In-Situ Resource Utilisation (ISRU)**

Using materials found in space (like water or soil on the Moon or Mars) to produce fuel, oxygen, or other resources.

## **1. Introduction to the Committee: COPUOS**

### **1.1 Historical Background of the Committee**

The Committee on the Peaceful Uses of Outer Space (COPUOS) was established by the United Nations General Assembly in 1959, during the early years of space exploration. Its creation was largely influenced by the growing interest in outer space following the Soviet Union's launch of the first artificial satellite, Sputnik 1, in 1957. This milestone marked the beginning of the space age and raised international concerns about the potential militarisation of space. As a result, COPUOS was formed to promote international cooperation in space activities and to ensure that outer space would be used for peaceful purposes. Over time, the committee became a central platform for developing international space law and fostering dialogue among member states.

### **1.2 General Information About the Committee**

COPUOS is a permanent committee of the United Nations that operates under the authority of the General Assembly. It comprises member states from around the world and is supported by two subcommittees: the Scientific and Technical Subcommittee and the Legal Subcommittee. These subcommittees meet annually to discuss scientific advancements, technical challenges, and legal frameworks related to space activities. COPUOS serves as a forum for countries to collaborate, share information, and coordinate policies on the peaceful exploration and use of outer space. Its meetings are typically held in Vienna, Austria, where the United Nations Office for Outer Space Affairs (UNOOSA) also supports its work.

### **1.3 COPUOS' Mandate and Objectives**

The primary mandate of COPUOS is to govern the peaceful uses of outer space and to ensure that space activities benefit all of humanity. Its objectives include promoting international cooperation in space exploration, preventing the militarisation of outer space, and encouraging the development of legal frameworks governing space activities. COPUOS is also responsible for addressing issues such as space debris, the sustainability of outer space, and equitable access to space technology and resources. Through its work, the committee contributes to the development of international treaties and guidelines that help maintain outer space as a safe, secure, and peaceful environment for present and future generations.

## **2. Background Information**

### **2.1 What Are the Peaceful Uses of Outer Space?**

Under the OST, outer space shall be used for “peaceful purposes”. This is stated in the non-binding preambulatory text, which states that there is a “common interest of all humankind in the progress of the exploration and use of outer space for peaceful purposes”, and also in article IV, which establishes that “the Moon and other celestial bodies shall be used by all State Parties to the Treaty exclusively for peaceful purposes”. Although the drafters of the OST chose not to establish the use of space for peaceful purposes as a more general obligation in the text of the Treaty, it has nevertheless been posited that such a concept has now achieved the status of customary international law, because it has been included in General Assembly resolutions that have garnered unanimous or near-unanimous support from the international community.

Moreover, the term's consistent appearance in domestic laws and policies governing outer space indicates its widespread recognition as a legal obligation. While this is a generally accepted obligation, the meaning of "peaceful purposes" is not understood by all in the same manner. Many States understand "peaceful purposes" to mean non-aggressive or non-hostile uses or activities, rather than non-military uses or activities. However, some have argued that this concept should be understood to mean 'non-military', in line with its use in other arms control domains, where 'military purposes' are always considered non-peaceful. Widespread State practice about the use and concern about supports the former interpretation (that military space activities can be peaceful) and, as such, outer space is now filled with satellites used for military purposes such as intelligence gathering, reconnaissance, navigation, targeting over battlefields, early warning of missile and air hostile operations, or military communications, usually without protest from the international community. This interpretation has also enabled development. Even in testing counter-space technologies, several stakeholders have warned that this hints at the weaponisation of outer space. There is no universally accepted definition of space weapon; however, weaponisation of outer space generally refers to the proliferation, testing, deployment, and use of weapons or counterspace capabilities located in or directed towards space or space systems. The term itself is also not universally accepted, as it does not readily translate into all languages. Moreover, in some instances, the word 'militarisation' is used to refer to both military activities in space and to the weaponisation of space, which could eventually lead to conflict.

## 2.2 Key Space Activities (Satellites, Exploration, Communication)

Key space activities are currently experiencing a "New Space" revolution, characterised by the rapid rise of private-sector involvement, commercialisation, and the deployment of massive satellite constellations. These activities are primarily divided into three interconnected pillars: satellites (observation and navigation), space exploration (robotic and human), and communication

### 1. Satellite Activities

Satellites are the most active area of space utilisation, with a significant shift toward low Earth orbit (LEO) small satellites (CubeSats) for cost-effective deployment.

- **Earth Observation (EO):** Satellites like Sentinel-2 and Landsat monitor climate change, track pollution, monitor deforestation, and manage disasters by collecting data on land, sea, and atmosphere.
- **Satellite Navigation (GNSS):** Constellations such as GPS (USA), Galileo (EU), GLONASS (Russia), and BeiDou (China) provide precise geospatial positioning (often within centimetres) for agriculture, logistics, and mapping.
- **Small Satellite Constellations:** The rise of mega-constellations (e.g., SpaceX's Starlink, OneWeb, Amazon's Project Kuiper) provides high-speed, low-latency Internet access worldwide.
- **Space Traffic Management & Debris Mitigation:** With thousands of new satellites, protecting the space environment from collisions and mitigating space debris are critical, growing activities.
- **Space Exploration**
  - Space exploration is expanding beyond government-only endeavours to include commercial partners, focusing on robotic research and sustained human presence
  - **Lunar Exploration (Artemis Program):** NASA and international partners are focusing on returning humans to the Moon, utilising the Gateway station and Artemis missions to test technologies for long-term presence and future Mars missions.
  - **Robotic Planetary Exploration:** Missions like Mars Perseverance rover, China's Zhurong, and India's Chandrayaan-3 continue to study planetary geology, search for life, and map surfaces.
  - **Deep Space Science:** Projects like the James Webb Space Telescope and Europa Clipper aim to understand the origins of the universe and search for potential habitable environments.
  - **In-situ Resource Utilisation (ISRU):** Research is ongoing to use local space resources, such as water ice on the Moon or lunar soil, to produce oxygen and fuel, reducing the need to carry supplies from Earth.

- **Space Communication**

Communications are vital for transmitting scientific data, controlling spacecraft, and connecting remote areas, and there is a shift from radio waves to laser technology. · **Deep Space Network (DSN):** A global network of large antennas (e.g., NASA DSN, ESA's Deep Space Antennas) enables communication with distant probes across the solar system.

- **Tracking and Data Relay Satellites (TDRS):** Specialised satellites in geosynchronous orbit ensure near-continuous, high-speed communication coverage for missions in LEO, including the International Space Station (ISS).
- **Optical (Laser) Communications:** NASA is implementing optical communication (using infrared lasers), which offers 10 to 100 times higher data rates than traditional radio, enabling complex data transfer for future missions like Artemis.
- **Satellite Internet:** Megaconstellations are increasingly utilised to bridge the "digital divide" by providing connectivity to underserved areas

- **Key Technology Trends (2025–2030)**

- **Artificial Intelligence/Machine Learning (AI/ML):** AI is used on-board satellites for data processing, autonomy, and navigating space traffic.
- **Nuclear Propulsion & Power:** Advancements in high-power electric propulsion to support deeper space exploration.
- **Quantum Communication:** Research into highly secure, quantum-encrypted communications.
- **Space Sustainability:** Development of technologies for on-orbit servicing, assembly, and debris removal

## 2.3 Importance of Space for Daily Life

Outer space has a direct, practical impact on our everyday lives through the technologies we use constantly. For example, satellite-based GPS systems in apps like Google Maps or Uber rely on satellites to provide accurate location and directions, helping people travel efficiently. Communication satellites enable sending messages on platforms like WhatsApp and streaming videos on YouTube without interruption. Weather satellites, such as those operated by NASA and EUMETSAT, track storms and provide real-time data that help governments warn people about extreme weather events, such as hurricanes and floods. In agriculture, satellite imagery is used to monitor crop health, detect drought conditions, and guide irrigation systems, helping farmers increase yields and reduce waste. Satellites also support banking systems by enabling secure international transactions and precise timekeeping, both of which are essential to financial networks. Additionally, satellite data helps emergency services respond quickly to natural disasters by mapping affected areas and coordinating rescue efforts. These examples show that space technology is deeply integrated into daily life, enabling faster communication, easier travel, and safer communities. For example

- Satellite-based navigation systems (e.g., Google Maps) enable accurate location tracking and route planning
- Ride-hailing services such as Uber rely on satellite data for real-time positioning
- Communication platforms (e.g., WhatsApp) depend on satellite infrastructure for global connectivity
- Broadcasting and streaming services, including YouTube, utilise satellites for data transmission
- Meteorological satellites operated by organisations such as NASA provide data for weather forecasting
- Early warning systems for natural disasters (e.g., hurricanes, floods) are supported by satellite monitoring
- Aviation systems rely on satellite navigation for safe and efficient flight operations

- Satellite imagery supports agricultural management by monitoring crop conditions and optimising resource use
- Global financial systems depend on satellite-based timing for secure and accurate transactions
- Emergency response teams use satellite data to assess damage and coordinate disaster relief efforts
- Maritime navigation and communication systems rely on satellites for safe sea travel
- Environmental monitoring satellites track climate change and ecological impacts

### 3. Legal and Institutional Framework

#### 3.1 The Outer Space Treaty and Key Principles

The Outer Space Treaty is the foundational legal framework governing activities in outer space. Adopted by the United Nations in 1967, it was created during the Cold War to ensure that space would be used for peaceful purposes rather than for military conflict. The treaty has been widely accepted by countries worldwide and remains one of the most important agreements in international space law. It establishes basic rules that guide how states explore and use outer space, emphasising cooperation, responsibility, and the benefit of all humanity.

##### *Key Principles of the Outer Space Treaty:*

- · Outer space shall be used for peaceful purposes only and not for warfare · No country can claim sovereignty over outer space, the Moon, or other celestial bodies
- · The exploration and use of space must benefit all countries, regardless of their level of development
- · States are responsible for national space activities, including those conducted by private companies
- · The placement of nuclear weapons or other weapons of mass destruction in space is prohibited
- · Astronauts are regarded as “envoys of mankind” and should be assisted in case of emergency
- · States are liable for damage caused by their space objects
- · Space activities must be conducted with due regard to the interests of other countries

These principles continue to guide international cooperation and help prevent conflict in outer space, making the treaty a cornerstone of global space governance.

#### 3.2 Role of the United Nations in Space Governance

The United Nations plays a central role in ensuring that outer space is used for peaceful purposes and for the benefit of all humanity. Through its specialised bodies and committees, the UN provides a platform for international cooperation, dialogue, and the development of legal frameworks governing space activities. As space exploration and technology continue to advance, the UN’s role has become increasingly important in addressing emerging challenges, including space debris, satellite congestion, and the involvement of private companies. One of the key bodies responsible for space governance is the United Nations Office for Outer Space Affairs, which supports international cooperation and helps countries develop their space capabilities. Additionally, the Committee on the Peaceful Uses of Outer Space serves as the main forum for discussing legal and scientific issues related to space. Through COPUOS, the UN has facilitated the creation of major international treaties, including the Outer Space Treaty, which establishes the basic principles governing outer space activities.

The United Nations also works to promote transparency, prevent conflict, and ensure that space remains accessible to all nations. It encourages responsible behaviour through guidelines and resolutions, including those addressing the long-term sustainability of outer space activities. Furthermore, the UN supports developing countries by providing training, resources, and access to space technology, helping to reduce inequalities in space exploration. Overall, the United Nations plays a vital role in maintaining space as a peaceful, cooperative, and sustainable domain.

### 3.3 International Cooperation in Space Activities

International cooperation in space activities drives cost-sharing, technological advancement, and scientific discovery, primarily through alliances such as the ISS partnership (USA, Russia, Europe, Japan, Canada) and the Artemis Accords, which now include over 29 nations. Cooperation is shifting toward regional blocs (US/allies vs China/Russia), focusing on peaceful exploration, shared technical expertise, and addressing planetary challenges such as climate change.

- · Outer Space Treaty – Establishes that space must be used for peaceful purposes and prohibits national ownership of celestial bodies
- · Rescue Agreement – Requires countries to assist astronauts in distress and return them safely
- · Liability Convention – Holds states responsible for damage caused by their space objects
- · Registration Convention – Requires countries to register objects launched into space
- · Moon Agreement – Promotes the peaceful use of the Moon and its resources (though less widely adopted)
- · Artemis Accords – Encourages peaceful exploration, transparency, and cooperation in lunar missions
- · International Space Station – A joint project involving multiple countries (e.g., the U.S., Russia, ESA members, Japan, Canada)
- · European Space Agency – Promotes collaboration among European countries in space research and technology
- · UNOOSA – Supports international cooperation and assists developing countries in accessing space technology
- · UN Guidelines for the Long-Term Sustainability of Outer Space Activities – Encourage responsible and sustainable behaviour in space

## 4. Current Global Situation

### 4.1 Increasing Number of Space Actors

The global space industry is undergoing a significant transformation. Whereas it was once “the preserve of the governments of a few spacefaring nations,” it now involves more actors engaged in a wider range of activities. The actors include new countries, the private sector, academia, and even citizens who, for example, are advancing military and security intelligence, monitoring climate change, improving navigational capacity, or setting up space tourism businesses.

Asia is a major factor in this revolution: China, India, Japan, and South Korea have all expanded their national space programs and actively nurtured their commercial space sectors with investment incentives. For example, over the past decade, the Chinese government has invested an impressive C\$2.5 billion to develop its commercial space sector.

This increase in actors and activity is leading to greater co-operation and greater competition—international agreements for global space governance.

## **4.2 Commercialisation of Outer Space**

One of the most significant recent developments in the space race is that it is no longer the exclusive domain of national governments. This is largely because barriers to entry have been lowered by improved technologies that enable the reusability of rockets, the miniaturisation of satellites, and the mass production of space objects.

Commercial actors such as SpaceX (U.S.), Blue Origin (U.S.), Galactic Energy (China), MDA (Canada), and Skyroot (India) are even developing their own independent launch capabilities — one of the most notable barometers of the booming space industry. Some of these companies have launched megaconstellations comprising hundreds or even thousands of satellites, while others are seeking to extract resources from asteroids, Mars, and the moon.

The commercialisation of space has transformed the way national space agencies operate, with many trending towards public-private partnerships. NASA, for instance, has outsourced the orbital and lunar transport to SpaceX and Boeing, and the Indian Space Research Organisation (ISRO) has partnered with a domestic private defence contractor, Alpha Design Technologies, to construct satellites for its navigation system. These various players are contributing to the global space economy. The Organisation for Economic Co-operation and Development defines the global space economy as “the full range of activities and the use of resources that create value and benefits to human beings in the course of exploring, researching, understanding, managing, and utilising space.”

These resources potentially include lunar soil, water, and minerals, some of which will facilitate space exploration beyond the moon. The value of this economy was estimated to be C\$632 billion as of 2021, and some estimate that total revenues could surpass C\$1 trillion by 2030.

The global market for space launches alone is projected to more than double to about C\$27 billion by the end of this decade, with more countries — including Canada — greenlighting commercial launches to incentivise private investment and innovation.

## **4.3 Growth of Satellite Technology**

Since the first satellite was launched into orbit in 1957, space technology has evolved drastically. Satellites were once as big as a small school bus and weighed up to 6 tons. The situation has changed over the last decade, with the development of small standardised satellites and reusable launch capabilities driving the growth of new space-based infrastructure. Today, thousands of satellites of all types orbit around the Earth, enabling a wide variety of communications, positioning, and earth observation applications.

Communications satellites have enabled us to have in-flight telecommunications, high-speed networks in rural areas, cable TV and network programming; Positioning satellites have powered us with the convenience of location-based services, allowed us to understand where we are and track movements anywhere on the planet; Earth observation satellites provided an ability to count, measure, and detect change across industries including agriculture, energy, mining, and urban planning, to name a few. These unique satellite technology capabilities have helped create a globalised, connected planet that drives our modern economies and enables each of us to manage our daily lives.

The Soviet launch of Sputnik 1 on 4 October 1957 – the world’s first space satellite – sent periodic pulses of radio waves back to Earth. More than just a matter of prestige, Sputnik demonstrated that we could, indeed, use space. Thus began the space race. A few days later, on 30 October 1957, the US launched Explorer 1. Then came the National Aeronautics and Space Agency (NASA).

Advances in communication technologies and military systems were both significant drivers of early spaceflight. In 1960, TIROS-1, the first successful weather satellite, provided meteorologists with vastly improved data. Then, that same year, the first successful communication satellite, Telstar 1, broadcast television across the Atlantic Ocean, a step toward radically altering the paths of global satellite communication. The following years witnessed innovation in space satellite technology. In the 1970s, geostationary satellites were launched, travelling at the same speed as Earth's rotation and therefore appearing stationary relative to Earth. The following years witnessed innovation in space satellite technology. In the 1970s, geostationary satellites were launched, travelling at the same speed as Earth's rotation and therefore appearing stationary relative to Earth.

The first Earth-observation satellite — Landsat 1 — was launched in 1972, and the ability to image the Earth from space at high resolution is now increasingly relied upon for environmental monitoring, agriculture, and urban planning.

During the 1980s and '90s, global positioning systems (GPS) came online. The US Department of Defence's NAVSTAR GPS became fully operational in 1995, and the satellite-based navigation system transformed navigation, military operations, and every industry that relies on precise location data. By the dawn of the 21st century, satellites began to drive global communications as never before—the need for high-speed internet access led to the launch of large satellite constellations. Perhaps the most important development is SpaceX's Starlink project, announced in 2018.

Over time, Starlink aims to deploy thousands of low Earth orbit (LEO) satellites to provide high-speed, low-latency internet connectivity virtually everywhere in the world. LEO satellites orbit much closer to Earth than traditional geostationary satellites used for telecoms, providing lower latency and higher internet speeds.

By 2024, the company had launched more than 3,000 satellites and plans to increase that to 12,000 or more. When the constellation is complete, it also has the potential to narrow the digital divide, providing reliable, high-speed access to communications and the internet for people in remote areas and developing countries with poor or no traditional infrastructure.

Looking forward, satellite technologies will continue to advance as small-satellite technologies, improved propulsion systems, and artificial intelligence make satellites more capable. Meanwhile, new technologies such as satellite quantum communication could ultimately transform secure communications. Just recently, Starlink announced the first successful video call over its satellite network, another meaningful step towards a more connected future.

## 5. Challenges

### 5.1 Militarisation vs Peaceful Use

Outer space is a global common for the benefit of all countries and is not owned by a single country. Space is an important asset for navigation and communication, for national security and defence, and for disaster management and climate monitoring, benefiting humanity. Moreover, the Outer Space Treaty (OST) of 1967 guarantees all States the right to use and freely access space and other celestial bodies. It also provides that all the States shall use the moon and other celestial bodies for peaceful purposes.

In recent times, outer space has become a war ground where nations are trying to establish their supremacy by developing space-based weapons. For example, Russia's 2021 Direct-Ascent Anti-Satellite (DA-ASAT) test created a large amount of space debris that threatened the International Space Station. The militarisation of outer space could lead to a new arms race and undermine international and national security, violating international laws. Furthermore, the increasing militarisation of outer space has become a major concern for the international community, as more states develop advanced space-based defence capabilities. Countries are investing in technologies such as anti-satellite (ASAT) weapons, space-based missile detection systems, and electronic warfare tools that can disrupt or turn off satellites. For instance, China's 2007 anti-satellite test and India's 2019 Mission Shakti demonstrated the growing capability of states to target objects in orbit.

Similarly, the establishment of the United States Space Force reflects the view of space as a strategic military domain. These developments risk triggering an arms race in outer space, increasing tensions between major powers, and undermining global stability. Moreover, the deployment of dual-use technologies—systems that can serve both civilian and military purposes—makes it difficult to distinguish between peaceful and military activities, complicating regulation and trust among nations. This situation highlights the urgent need to reinforce international legal frameworks, such as the Outer Space Treaty, and to promote new agreements that limit the weaponisation of space. Strengthening transparency, confidence-building measures, and diplomatic dialogue will be essential to prevent conflict and ensure that outer space remains a peaceful domain for all humanity.

### 5.2 Space Debris and Orbital Congestion

The rapid expansion of both governmental and private space activities has intensified concerns related to space debris and orbital congestion, making space sustainability a critical issue in modern space governance. The growing deployment of large satellite constellations by companies such as SpaceX and Blue Origin has significantly increased the number of objects in low Earth orbit, raising the likelihood of collisions and creating additional debris. This phenomenon, often described as the "Kessler Syndrome," suggests that collisions between orbiting objects could generate cascading debris, potentially rendering certain orbital regions unusable. Incidents such as China's 2007 anti-satellite test, which produced thousands of long-lasting debris fragments, further illustrate how human activities can contribute to long-term hazards in space. Similarly, increasing satellite launches for communication, navigation, and Earth observation have made orbital paths more crowded, complicating space traffic management and coordination among operators. Even military developments, including the establishment of the United States Space Force, add to the complexity of monitoring and regulating objects in orbit due to the use of dual-use technologies. These challenges highlight the importance of international cooperation and responsible behaviour within frameworks such as the Outer Space Treaty and ongoing discussions within COPUOS to develop guidelines for space debris mitigation, debris removal, and the long-term sustainability of outer space activities.

### 5.3 Inequality in Access to Space Technology

Inequality in access to space technology remains a significant challenge in the global space landscape, as not all countries possess the financial, technical, or infrastructural capacity to develop and operate space systems. Advanced space-faring nations such as the United States, China, and members of the European Space Agencies have established extensive space programs, while many developing countries rely on external support to benefit from space applications such as satellite data and communication services. This disparity limits the ability of less developed states to independently use space for purposes such as disaster management, climate monitoring, and economic development. For example, countries without their own satellite systems often rely on shared data from international initiatives or organisations such as UNOOSA. Additionally, the high costs associated with satellite launches, research, and infrastructure create barriers to entry, further widening the technological gap, and countries affected by this include

- **Many Sub-Saharan African countries (e.g., Niger, Chad, and the Central African Republic)**  
These countries often lack the financial resources, infrastructure, and technical expertise to develop their own space programs. As a result, they rely heavily on international data (e.g., weather, agriculture, and disaster monitoring) from external organisations and partners.
- **Small Island Developing States (SIDS) (e.g., Maldives, Fiji, Tuvalu).** These countries are highly vulnerable to climate change and natural disasters, but lack independent satellite systems. They depend on foreign satellite data for early warning systems, sea-level monitoring, and disaster preparedness.
- **Landlocked developing countries (e.g., Nepal, Bhutan, Laos).** Due to limited budgets and geographic constraints, these countries have minimal access to space infrastructure. They often rely on regional or international cooperation for communication satellites and Earth observation data.
- **Least Developed Countries (LDCs) (e.g., Afghanistan, Haiti, Yemen):** Political instability, economic constraints, and limited institutional capacity prevent the development of national space programs. These countries depend on international aid and shared satellite services for essential applications like mapping, agriculture, and emergency response.
- **Some Developing Economies with Emerging Space Ambitions (e.g., Pakistan, Bangladesh)**  
While these countries may have small or developing space programs, they still face limitations in funding, technology transfer, and access to advanced launch capabilities compared to major space-faring nations.

Addressing the inequality in access to space technology requires strengthening international cooperation and expanding capacity-building efforts. Developed space-faring nations and organisations, such as UNOOSA and the European Space Agency, can support developing countries through technology transfer, training programs, and shared access to satellite data. Initiatives such as joint satellite missions, regional space programs, and public-private partnerships can help reduce costs and increase accessibility. Additionally, promoting open data policies for Earth observation and climate monitoring allows countries without their own space infrastructure to benefit from critical information. By encouraging inclusive policies, financial assistance, and international collaboration within frameworks such as the Outer Space Treaty, the global community can help ensure that all nations have fair opportunities to use and benefit from space technology.

## 6. Questions to Ponder

- How can countries ensure that outer space is used only for peaceful purposes?
- What role should the United Nations play in regulating space activities?
- How can space be kept free from weapons and military conflicts?
- What are the risks of increasing militarisation of outer space?
- How can international cooperation in space exploration be encouraged?
- What responsibilities do space-faring nations have toward non-space-faring nations?
- How can access to space technology be more evenly distributed among countries?
- What rules should govern private companies operating in outer space?
- How can space debris be managed to prevent damage to satellites and spacecraft?
- Should there be stronger international agreements on space resource use (like mining)?
- How can transparency between countries reduce tensions in space activities?
- What challenges exist in enforcing laws in outer space?
- How can scientific space research be protected from political conflicts?
- What steps can be taken to ensure outer space remains a global common for humanity?

## 7. Possible Solutions

### **Reinforce International Commitments to Peaceful Use:**

Member states should reaffirm and strengthen their commitments to ensuring that outer space is used exclusively for peaceful purposes. This can be achieved by expanding adherence to existing treaties and promoting confidence-building measures that discourage the placement of weapons in space.

**Establish Transparency and Confidence-Building Measures (TCBMs):** To reduce mistrust and prevent conflict, countries should adopt transparency measures such as sharing information on space missions, satellite launches, and military-related space activities. Regular reporting and open communication channels can help minimise misunderstandings and reduce tensions.

### **Develop Comprehensive Legal Frameworks for Emerging Challenges:**

As space activities evolve, updated legal frameworks are needed to address issues such as private-sector involvement, the utilisation of space resources, and liability for damages. These frameworks should be clear, enforceable, and universally recognised.

### **Improve Enforcement and Accountability Mechanisms:**

One of the key challenges in space law is enforcement. Establishing monitoring systems, reporting obligations, and potential sanctions for violations can enhance accountability and ensure compliance with international regulations.

**Promote the Principle of Outer Space as the “Province of All Mankind”:**

Outer space should be recognised and preserved as a shared domain for all humanity. Policies and agreements must reflect this principle by preventing monopolisation and ensuring fair access and benefit-sharing.

**Ensure Responsibilities Toward Non-Space-Faring Nations:** Space-faring nations have a responsibility to ensure that their activities benefit all

of humanity. This includes sharing scientific knowledge, avoiding harmful practices, and contributing to global development through space-based technologies.

**Develop Effective Space Debris Mitigation Strategies:**

Space debris poses a significant risk to satellites and spacecraft. International guidelines should promote debris-reduction practices, including responsible satellite design, de-orbiting plans, and active debris-removal technologies.

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