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SPACE LAW: NEED OF EXPLORATION AND INCREASING COMMERCIAL ACTIVITIES; A CRITICAL EVALUATION

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Abstract

Space law is the body that controls all space-related activity. It is made up of several treaties and accords. There is no territorial jurisdiction and no state can control space because law regulates it and space is a region that does not belong to any country. International law governs space since it is outside the purview of states. The area is slowly developing and the rules there are also developing slowly because it is not a portion of where human habitat is created. The area is slowly developing because it is not where human habitat is formed, and the laws there are also being developed gradually.

However, the state had complete control over space and space activity, and all of these activities were governed by state law and the space laws were organized around that framework. However, private organizations are now taking action. Additionally, there are a lot of brand-new commercial activities emerging, but no laws exist to regulate them. Furthermore, the law on space is being attempted to give double interpretation due to the development of space activities, particularly commercial ones. Therefore, laws must be created to ensure peaceful space activities.

A few economic activities, including space mining, space travel, and the exercise of property rights in space, need to be completely prohibited. Such operations are prohibited by international space law, which states unequivocally that everyone has a right to use space for humankind as a whole. Not for any individual or specific nation.

Already, space operations are harming both the earth's and space environments with numerous environmental risks and space debris. Additionally, future commercial space activities may pose a serious threat.

Keywords: International space law, outer space, exploration, importance and benefits of exploration, traditional space activities, new commercial activities, critical evaluation.

I. INTRODUCTION

There was a time when people had to travel by walk a great distance, even to get to a neighboring hamlet or use animals to travel. This would take a longer amount of time even to get to a nearby city. If one wanted to go to some new place, they also had to ask for the precise address at every tiny distance. As time went on, we developed building new techniques and technology, moving from animal carts to the manufacturing of large luxury cars and other transportation vehicles. Thanks to GPS, we can now independently travel the entire world. Through ships and airplanes, we can travel long distances in a surprisingly shorter amount of time.

Not only can we travel great distances quickly with developed technologies, but we can also talk to everyone in any corner of the globe, do business via email and have video calls with anyone anywhere in the world. Watch any live broadcast of the world from the comfort of your own home on a television. And money the most vital aspect of life; the exchange of money can be done very easily in the banks. Due solely to the creation known as outer space, all of these things are easily possible in the modern world. Our beautiful world contains a wealth of mysteries for us to discover and use in the nature by unknown creator.

Everyone has always been fascinated by space, from early humans to modern humans. Since the beginning of time, man has been observing the sky. He relied on the sky to know the time each morning when he woke up and each night he went to sleep. The poets have long adored the constantly-shifting, bright morning white sky that turns into a blue sky and various hues before transforming into the night's darkness. Man has always been intrigued by the day and night, the sun and rain, the moon and stars. This has driven him to seek out their secrets and travel to those places of wonder to view them up close. However, when you arrive at the sky's adobe, it is not the same as the lovely sky that can be seen from the earth. Living there is completely impossible. Man needs water and air to survive, all of which are undoubtedly unavailable in space. This is a pretty simple and obvious fact. Space cannot be owned or exploited like on Earth; rather, it is a place to admire and be used for the benefit of humanity.

This is how the exploration of space started with words of wonder, praises of beauty, curious for mystery. But this space is far away from the earth surface. How did these miraculous services we use emerge from that region of space, where there is no evidence of human life? That was made possible by our unwavering commitment to reach for the stars, which inspired all of our technological advancement. Man ultimately entered the area by reaching out the sky. And got in a race to demonstrate how powerful they were and now they needed to be restrained. Space law intervened to save the day. In actuality, the reach of the law extends to every region where man reaches out. Therefore, it makes sense that the law should be established there once a man venture into outer space, and it was. History confirms that man is a greedy animal, and in order to protect all of humanity and the environment from the greed of man laws must be in place in every aspect of life to protect both nature and the entire human race.

II. HISTORY OF SPACE LAW

He began his journey into space before man began to document various locations on Earth. His adventure into space began when he began observing the sky day and night, wondering at all the natural activities happening in the sky. Man had adequate resources to conquer any portion of this planet earth, so he worked tirelessly for a very long time to seize dominance and control over everything; thinking to be the ultimate power on earth. He overlooked the fact that the law is more potent than anything else in existence. Law is the ultimate power everywhere. Man has been an obedient follower of the law since the beginning of this power of law's influence and controlling over him. Every region of the world that is geographically divided into separate states has its own laws and regulations that must be followed. And now that there is law, man is powerless to seize anything on earth. Without law it has also made it illegal for man to capture anything on earth. To successfully capture anything on Earth, man must abide by certain rules.

Due to his greed, man is prone to wanting to enjoy all of his privileges and rights before performing his duties. In order to regulate human activity and safeguard others from it, human civilization has created laws. We established international space rules as part of the same procedure to regulate human activity that may be damaging to others. Space law can be traced back to its earliest reference in 1910 when it was first mentioned in the journal[1]. Law in space was only a fiction when humans first began to write about it. Even before World War II, Germany, the Soviet Socialist Republic and the United States of America had made tremendous technological advancements. However, immediately following World War II, these space activities gained more momentum, and rival nations like the United States of America and the Union of Soviet Socialistic Republic competed to be the first to enter space, which was a sign of dominance. As the space activities had only recently begun to build their foundations to reach the sky. However, it was difficult to put the framework of space law together. But just after World War II these space after a two decades time from 1910; in 1932 started building the importance and concepts of space law[2].

The international community was very concerned about the rivalry that exists on Earth and does not extend to space otherwise; space would become another arena for conflicts and rivalry. And following the launch of the first man-made satellite, Sputnik, in 1957 by the Union of Soviet Socialistic Republic, everyone was once again on edge, waiting to see how the rival nations would respond. It was necessary to establish specific regulations at the time to increase international cooperation, prevent space-related conflicts, and guarantee the space activities are peaceful. Numerous questions relating to the use of space remained unanswered after Neil Armstrong who made the first moon landing. Developing a fundamental principle to be followed was necessary. A fundamental guideline that would be followed in space had to be adopted. A space treaty was finally adopted in 1967[3].

III. EXPLORATION OF SPACE

When man first began looking up at the sky and watching natural phenomena in the sky, space was already well, under the way of exploration. Man became increasingly curious to visit that location in order to clearly observe the space after this investigation based on direct unaided observation. He built up many technologies made a lot of invention and eventually reached the sky with the first satellite Sputnik. Later he developed a variety of technologies and made numerous inventions and finally reached the sky through launching the first satellite, Sputnik, into space. Later, man created the technology to travel into space on his own, and he has made numerous journeys there to study astronomy and advance science and research. Sputnik was a moment when we were only trying to reach space. In contrast to that situation, now we as humans are anxiously waiting to own the space.

[1].https://www.legalservicesindia.com/article/2338/Nature-and-Evolution-of-Space Law.html

[2].https://www.legalservicesindia.com/article/2338/Nature-and-Evolution-of-Space Law.html

[3].https://www.legalservicesindia.com/article/2338/Nature-and-Evolution-of-Space-Law.html

IV. SPACE EXPLORATION MEANING

Space exploration entails hunting for unknown discovery in outer space. It is physically and technologically moving outside the earth's atmosphere to study astronomy, scientific research and discovery, for economic benefits, and national defense. In the modern world, we rely almost entirely on space for majority of our everyday activities. Space exploration is not just the study of astronomy as the general public may believe, neither it's just for scientific research and development, nor only for national security. We use the benefits of outer space in our daily activities, it creates many job opportunities, and it allows us to take better precautions to protect our mother Earth from natural disasters that occur inside and outside of the earth's atmosphere.

V. IMPORTANCE AND BENEFITS OF SPACE EXPLORATION

Space exploration is an important part of human development. Man must grow in all facets of life and man's curiosity in all fields of life keeps him always in development process. However, development should always be in the best interests of mankind. Development should also adhere to ethical guidelines. Development in any field should adhere to basic concepts and rules in order to maintain balance in nature. There is always a trade-off between development and ethics.

Following the end of space race, countries began to concentrate on developing space technology. We have benefited from the place in numerous ways in our lives. We enjoy the communication, navigation, weather forecasting and other services on our mobile phones which were possible due to scientific breakthroughs made by space research; space research has always advanced knowledge and science. It safeguards our planet and environment by keeping an eye out for any indications of climatic change and measuring soil, air, and water pollution. It also assists in safeguarding wild animals and their habitat by keeping an eye out for land and natural resources to safeguard our ecosystem. It is also beneficial to healthcare. It offers a variety of employment options, from low-paying vocations to high-tech jobs. Our ability to foresee natural disasters and save lives on earth is made possible by the placement of satellites in orbit specifically for Earth observation[4]. We therefore require space exploration, which is the greatest feat of humankind to have reached outer space. The human race will benefit greatly from this progress, which is one of man's special avenues of advancement.

On the other hand, space exploration is a tremendously costly endeavor. Particularly in light of the numerous troublesome areas to deal with on Earth, it is not economically viable. Many dangers have been introduced by us into both the earth's atmosphere and the outer atmosphere. Not just on the earth's surface, but also deep within the soil and water source, have we wrought our creations. The amount of pollution in the air, water, light, noise, and land that has resulted from human development is what is causing ozone depletion and global warming. We have developed at the cost of damaging the natural environment. Therefore, there are many issues that need to be resolved and fix what we have done, and if we don't do that, we'll continue to create problems and new issues will inevitably arise in the brand-new domain known as space. In addition to these, there are numerous more issues such as global poverty, shelter for developing nations, assistance during natural disasters, health, and education. Instead of striving to learn more about the cosmos, money spent on space exploration would be better used to address problems on Earth where humans are still suffering[5].

Additionally, there have been some negative effects of space exploration on the environment. Every year, the space industry consumes millions of tons of coal, resulting in waste gases such as carbon dioxide being released into the atmosphere and directly contributing to environmental issues such as ozone depletion and acid rain[6]. The immense grassland known as the Kazakh Steppe runs from northern Kazakhstan into Russia. The Baikonur Cosmodrome, the world's oldest spaceport in existence, is located there. Sputnik 1 and Vostok 1 were both launched from this launch pad, marking the first man-made satellite and space voyage, respectively. Unsymmetrical dimethylhydrazine, sometimes known as "devil's venom" by the scientists was the fuel utilized by several of the rockets. As a result of this, a sizable portion of steppe was transformed into an ecological disaster area and was highly carcinogenic to humans. On the other hand rockets release their pollutants from the surface of the earth to the mesosphere and the pollution that is released in the upper layer lasts for the longer period of time compared to earth. In comparison to all other sources of soot put together, the particles emitted by rockets are nearly 500 times more effective at trapping heat in the atmosphere, which leads to the enhanced warming climate effect[7].

VI. TRADITIONAL USE AND ACTIVITIES OF OUTER SPACE

In order to carry out the functions for which they were designed, satellites are launched into space using rockets. We would be unable to use any satellite-based services without rockets because they are what launch vehicles of satellites into orbit and land them where they are destined. And it is meant to orbit the earth, where the pull of the planet's gravity balances the speed. The satellites would fall back to Earth in a straight path if this balanced placement was not done. These satellites orbit earth at different heights, velocities, and trajectories. Geostationary and polar orbits are the two most prevalent forms of orbit.

What do satellites do? A moon, planet, or object in orbit around a star or planet is a satellite. The fact that Earth orbits the sun, for instance, makes it a satellite. In the same way, the moon orbits the earth, making it a satellite. However, the term "satellite" is most frequently used to refer to a device that is propelled into space by rockets and orbits the earth or another celestial body. The natural

[4].https://www.asc-csa.gc.ca/eng/about/everyday-benefits-of-space-exploration/(19/4/2023)

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[7].https://www.bbc.com/future/article/20220713-how-to-make-rocket-launches-less-polluting

satellites are the earth and moon, but millions of artificial satellites exist in orbit around the globe. Astrology has been utilized with man-made satellites since their inception, and it continues to be employed today along with new breakthroughs in satellite technology, such as taking photographs of other planets to aid meteorologists in forecasting weather and tracking hurricanes. Photographs taken by some satellites of other planets, the sun, the black holes, the dark matter and the distant galaxies aid in scientists understanding of the solar system and the cosmos.

Other than these functions, satellites have also created technologies that have facilitated life on earth by offering a variety of services like beaming TV signals and phone calls across the globe. Additionally, a group of the GPS's more than 20 satellites makes up the system. These satellites can assist in determining your precise location if you have a GPS receiver[8]. The commercial operations have evolved and been growing in number with all these advancements in satellite and technology. We currently engage in a number of commercial activities, which have grown in number.

VII. NEW COMMERCIAL ACTIVITIES OF OUTER SPACE

When commodities or services are exchanged with the intention of making a profit, this is known as a commercial activity. But how is this even conceivable in space? As ordinary people, we perceive space as a sky that contains the sun in the morning and the moon and stars at night or the solar system, with the sun at its centre and the planets revolving around it. What potential business could there be here, one may ask? Every day, man unknowingly and commercially uses space. Satellite navigation, satellite television, communication satellites, and commercial satellite imaging are just a few of the many business operations that man provides and uses in space. In addition to these, there are also recently developed commercial space operations, such as those involving property rights, space mining, space tourism, and space insurance, as well as intellectual property rights in space.

The legal rights granted to anyone who invents or generates new intangible property are known as intellectual property rights. The terms "patent," "copyright," "trademark," and "trade secret" refer to intellectual properties that are well-known. The purpose of intellectual property rights is to safeguard the creator's interests. As a result, the creator has been granted a number of rights to benefit from his innovative ideas, including the ability to keep the property rights to those ideas for a set amount of time and to benefit from them unhindered by third parties. This right is valid anywhere on earth when each state has its own laws governing the use of intellectual property rights within its borders. Is it really conceivable to have intellectual property rights in space, given that neither a nation nor a state owns the space? Do we really require intellectual property protections in space?

Space is outside of any nation's purview, and patents only have geographic validity in the issuing country. Therefore, a patent is a territorial right. The initial space activities were carried out by the public or the government, but they have gradually shifted to private sectors and commercial enterprises. Due to the fact that private companies are now involved in space activities, which are expensive, we need to set up a space patent office to handle patents relating to space. And any inventions produced by such private organizations should receive proper credit. We don't have any laws governing space patent law, but only one nation the United States has passed legislation expanding the scope of US patent law to include space[9].

The outer space treaty stipulates the parameters of international space law and has made it apparent that the exploration and use of space must be carried out in the best interests of all nations and for the common good. The concept that outer space is a shared inheritance of humanity is born from the fact that it shall be the domain of all of mankind and is open to exploration and utilization. No state can claim ownership because it is res communis. Article II of the Treaty on the Law of the Stars expressly forbids any nation from asserting sovereignty over another by way of occupation or by any other means[10]. Therefore, no government on Earth is permitted to purchase any land in space for its own purposes. A law authorizing American industry to engage in the commercial exploration and exploitation of space resources was passed by the United States in 2015, despite the fact that we are clear that we do not own any property in outer space[11].

Space travel for pleasure, amusement, or experience is known as space tourism. Space tourism comes in a variety of forms, including orbital, suborbital, and lunar space tourism. The first space traveller in 2001 is the American businessman Dennis Tito. After Tito's trip, orbital space travel became even more popular, with flights to the International Space Station performed by several others, including South African computer tycoon Mark Shuttleworth in 2002[12]. One of the primary environmental problems with space travel is the soot cloud that the rockets emit. Because the weather cannot wash it away, soot can accumulate between 5 and 31 miles above the surface. The ozone layer may be harmed by space flight in a variety of ways. While CO2 emissions and soot trap heat in the atmosphere, rockets emit up to ten times more nitrogen oxides than the largest thermal power plant in the United Kingdom. On average, travellers emit 50 to 100 times more CO2 than a passenger on a short trip. In essence, a diminished ozone layer facilitates the warming of the Earth by greenhouse gases, which causes global warming[13].

[8].https://www.nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-a-satellite-58.html

[9].https://www.legalservicesindia.com/article/790/IPR-protection-in-outer-space-activities.html#:~:text=Relevant%20provisions%20for%20the%20applicability,space%20object%E2%80%9D%20as%20a%20vehicle.

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[11].https://en.wikipedia.org/wiki/Commercial_Space_Launch_Competitiveness_Act_of_2015

[12].https://www.britannica.com/topic/space-tourism

[13].https://www.futurelearn.com/info/blog/is-space-tourism-good-for-the-planet#:~:text=One%20of%20the%20biggest%20environmental,washed%20away%20by%20the%20weather.

The process of obtaining valuable raw materials from asteroids and other tiny planets is known as asteroid mining, also referred to as space mining. Similar to Earth, other planets including the Moon, Mars, asteroids, and comets also have a wealth of valuable resources and rich deposits of useful materials. This has been noted by academics and industry, with the aim of one day using them[14]. States are free to explore all celestial bodies, study space, and use it in compliance with international law, as stated in Article I. According to Article II of the Outer Space Treaty, the Moon and other celestial bodies are not subject to national appropriation by claim of sovereignty through utilization, occupancy, or any other means. Despite the fact that the OST does not expressly mention "mining" operations, Article II of the Outer Space Treaty states that the Moon and other celestial bodies are not subject to national appropriation by claim of sovereignty through usage, occupation, or any other means.

The risk involved with space activities, such as satellite launches, in-orbit operations, and satellite decommissioning, is covered by a specific type of insurance called space insurance. It is a specialized insurance product created to shield organizations and governments engaged in space activities against monetary damages brought on by mishaps, failures, or other unanticipated occurrences. This type of insurance covers both property and liability and is mostly used for satellites and rockets. To clarify these ideas, think of rockets as the engine-equipped parts that launch other objects into space. Satellites are some of the "other things" that rockets propel into orbit after blasting off into space. Other types of spacecraft are covered by space insurance policies, but satellites, including those used for communications, GPS navigation, and weather (among other things), as well as the rockets that launch them into orbit, are by far the most frequently insured objects[15].

The most crucial application of space technology is in daily life, where it is used for internet, weather forecasting, communication, and navigation. Today, we depend entirely on these services to meet all of our very basic needs. To receive these services we put up satellites in the space through which we enjoy these benefits. Satellite launches also rise in response to rising demand. And after their useful lives, these satellites form into space debris that is part of the waste in space.

All of these recent space activities do not fall under the categories of peaceful use or improving humankind as a whole. And both the earth and outer space are experiencing problems as a result of these activities. These activities have arisen solely for personal gain and amusement, and they should not be taken as they are solely for commercial and profitable purpose. According to the wealthy owners of space firms, the current plans for space tourism look overly ambitious. Yes, space exploration and research have the potential to advance humankind's future by bringing a wealth of cutting-edge ideas and resources to our planet, but we don't need it at the expense of endangering our own planet earth, which is where we need to focus our attention. As a fundamental principle of international space law, nations have no jurisdiction or authority to control or utilize space resources for their own national interests. As a result, property rights and space mining should not be considered.

Space waste refers to any trash that people have left behind in orbit on a space mission that was made on Earth. The size of space debris can range from that of a car to that of a dormant satellite, or it might be as little as a flake of paint. The true hazard comes from space debris or satellites that are still in orbit even after their operational lives have ended. These items can accelerate to speeds of more than 28,000 km/h, turning them into actual missiles. Space debris provided by the European Space Agency: Most of these payloads are satellites. This includes pieces that have been accidentally shattered or broken off. Missions that were launched into orbit have used rockets as discarded stages. Included are any components that have been damaged or shattered as a result of collisions. Tools, screws, cables, cameras, and other items related to the mission that has fallen to the ground. The following space waste categories are based on size: These particles, the most of which are invisible, are said to number over 128 million and are less than one centimeter. They number between 1 and 10 cm greater than 10 and range in size from a tennis ball to a marble, with an estimated 900,000 in orbit. They range in size from a tennis ball to a marble and are all between 1 and 10 cm greater than 10 cm. These objects include damaged tools lost during missions and defunct satellites, and there are said to be 900,000 of them in orbit.

VIII. CONCLUSION

It is our duty to make the best use of and long-term management of all space resources for the benefit of both the present and future generations. In order to ensure the safe and sustainable use of space resources for peaceful purposes, it is necessary to minimize the negative effects of human activities on the space environment and ecosystem, reduce space debris and pollution. The sustainability of space is a matter of growing importance as more nations and private enterprises build satellites and carry out space missions. Concern over the environmental and security effects of space debris and the need for international cooperation to ensure the appropriate use and management of space resources have been flowing out of this[16].

Satellite launches are expanding as a result of the space services that are being offered to us on a regular basis. As long as the launches are used for earth security, scientific advancement, and space research, they are permissible. However, these activities should not be entertained and should be controlled when they are causing harm to space and the earth while tracking into the commercial sector and making a profit. Furthermore, since these activities are relatively new and space does not belong to any one country, there are no laws that can be used to control them. Moreover we don't need a law to govern or regulate them because these commercially viable space activities need to stop, like space mining, space tourism and space property rights and cannot be a part of space activities.

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We require space, exploration and satellites because the services it offers have ingrained themselves into our daily lives. Space exploration must continue as it has historically been done for scientific purposes and research because it is crucial to the advancement of humanity. But in addition to development, we also need to focus on sustainability. With increased satellite launches and increased space activities, we must take stronger safety measures to protect both the earth and outer space. In order to reduce the pollution from rocket launches, new launch techniques and fuel must be developed. After satellites are launched into orbit and after their lives, they become part of the space debris that has become a significant problem in the development of space pollution. These are the issues that need to be investigated and given the necessary attention.

However, when it comes to commercial space activities, the term "commercial" seems absurd given that space cannot be used for the exclusive benefit of any one nation and is available to all for use and exploration, as stated in treaties and agreements. Space can be used for the benefit of entire mankind not for any personal profit. The international space law needs to be updated to remove any room for interpretational uncertainty. It's important to keep out all self-serving, amusement, and ownership activities in the sphere. In addition, there needs to be review and regulation on the other issues. Space belongs to all of humanity and must be safeguarded and conserved forever.

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